The Economic Impact of Brexit-induced Reductions in Migration

Jonathan Portes[†] and Giuseppe Forte[‡]

National Institute of Economic and Social Research

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[†]Senior Fellow, UK in a Changing Europe; Fellow, National Institute of Economic and Social Research.
Email: j.portes@niesr.ac.uk

[‡]Research Assistant, National Institute of Economic and Social Research.
Email: g.forte@niesr.ac.uk

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1 Introduction

Two issues dominated the UK's Brexit referendum debate: immigration and the economy. But the nature of discussion of these two topics was very different, and to a large extent compartmentalised. During the campaign, there was extensive discussion of the economic impact of Brexit on the UK economy. Detailed projections, under different scenarios for the post-Brexit UK-EU relationship, were produced by HM Treasury, the IMF and OECD, among others (HM Treasury, 2016; International Monetary Fund, 2016; OECD, 2016).

However, none of these projections incorporated the economic impact of changes in migration to the UK; they focused on trade (and to some extent investment) impacts. As one of us pointed out at the time, there was little or no analytical justification for this omission (Portes, 2016a). The purpose of this paper is to make progress towards filling that gap, using a broadly similar methodology and approach to that used in the trade-based analyses. Our results are therefore, at a high level, comparable. We analyse the impact of Brexit on migration flows to the UK in both the short and long term, and provide plausible, empirically-based estimates of the likely impacts on growth, employment and wages. The paper is structured as follows:

- We provide forecasts of the likely path of migration to the UK in the short term (that is, before any Brexit-induced policy change);
- We construct illustrative scenarios (not forecasts) for the impact of Brexit on migration to the UK over the medium to longer term, taking into account macroeconomic drivers and the impact of both the prospect of Brexit and future modifications to free movement;
- We briefly summarise the literature on the impact of migration to the UK on

employment, wages and (using cross-country evidence) growth;

- Using the existing literature, we provide estimates of the short and longer-term impact of Brexit.

2 The impact of Brexit

As explained in Portes (2016b), even before Brexit results in any changes to UK immigration policy or law (that is, while the UK remains a member of the EU and free movement continues as now) some fall in net migration from the EU appears likely, for several reasons:

- Even before the referendum, employment growth in the UK had slowed (whether as a result of Brexit-related uncertainty or, perhaps more likely, of other factors). Meanwhile unemployment is falling both in the EU as a whole and in the Eurozone;

- Moreover, for some countries at least (in particular Romania and Bulgaria), the very high levels of recent inflows is likely to reflect the impact of the lifting of transitional controls: this seems likely to run its course. So even if there had been no referendum, it is plausible that immigration would have fallen back somewhat from its peak earlier this year;

- The referendum could make this fall much sharper, both through the overall economic impact of Brexit on growth, output and employment, and because migration from some EU countries appears to respond to exchange rate changes;

- There are legal and psychological factors, relating both to uncertainty about future rights for EU citizens currently resident, and the more general political and social climate.

Over the longer term, the impact of the June, 23rd vote on migration will depend on the migration system adopted by the UK after Brexit. As set out in Portes (2016), it is helpful to divide the open questions along two dimensions:

- Will the new system give a considerable degree of preference to EEA citizens, even if not full free movement, compared to those outside the EEA, or will it treat all non-UK citizens equally (with the possible exception of Irish citizens, not discussed here)?

- Will the new system be relatively liberal accepting perhaps an increase in skilled migration from outside the EEA and at the same time reducing EU migration – or will it be restrictive, with the overarching objective still being to hit the governments target to reduce net migration to the tens of thousands?

The government has been careful to avoid committing itself to specifics. However, recent comments by the Prime Minister, Chancellor and Home Secretary suggest that the current direction of travel is for a system that does maintain some degree of European preference for highly-skilled workers and (possibly) incorporates sector-specific schemes for some other sectors where employers would struggle to fill the gaps left by the end of unrestricted free movement. In any case, this system would be accompanied by a continued commitment to substantially reducing overall migration and maintaining (or even tightening) the current restrictions on migration from outside the EU. Ex ante, it is impossible to say how a mixed system, with some preferences for EU nationals, would impact migration flows.

3 Forecasting migration to the UK

In Forte and Portes (2016, forthcoming) we estimate the economic determinants of migration to the UK from a number of the largest source countries for economic migration, as proxied by quarterly National Insurance number (NINo) registrations. As would be expected, high level macroeconomic developments (the evolution of GDP in both the UK and source countries, changes in unemployment rates, and the bilateral exchange rate) and the existence of free movement of workers can explain migration flows. In particular, we estimate that free movement with the UK results in an increase of approximately 500% – that is, by a factor of six – using our preferred estimator. A brief description of the methodologies employed both for estimating the impacts of these determinants and for forecasting future flows is set out in the Annex.

Coupled with NIESR's November 2016 economic forecasts (Hacche et al., 2016), our results allow us to forecast NI registrations between now and 2020. Our baseline estimate suggests that NI registrations of EU nationals for the countries in our sample (which constitute approximately 99% of the EU total* and 67% of the world total) will fall back from their recent very high levels to something closer to the 2010-15 average.

We wish, however, to incorporate estimates both of the wider psychological impact of the Brexit vote and, in due course, that of changes to free movement after Brexit. The first is inevitably somewhat speculative, while the second is, as set out above, unknown, since neither the timing of changes to free movement post-Brexit nor the parameters of a new system are defined as yet.

What we do have are empirically based estimates of the direct impact of free movement, and we use these to construct illustrative scenarios. In the first, we assume that,

*Our sample only excludes Croatia, Cyprus and micro-states among EU countries

over the period between now and 2020, the combination of these factors is equivalent to reversing half of the impact of introducing free movement in the first place; in the second, we assume that it is equivalent to reversing the entire effect of free movement. In both cases, we assume (given the lack of information on timing of any policy changes) that these impacts occur gradually over the period. We regard the first scenario as our central scenario; the second is best viewed as an extreme case of what might happen in the case of a hard Brexit with no European preference post-Brexit; this seems quite unlikely at present, albeit not impossible.

The resulting falls are quite large; in the central scenario, NINO registrations average about 443,000 over the 2016-20 period, falling to 327,000 by 2020 while in the extreme scenario they average about 350,000 falling to 140,000 by the end of the period. While this may seem implausibly steep, recall that as recently as 2003 NINO registrations for EU nationals totalled about 100,000, even with free movement in place for the EU15.

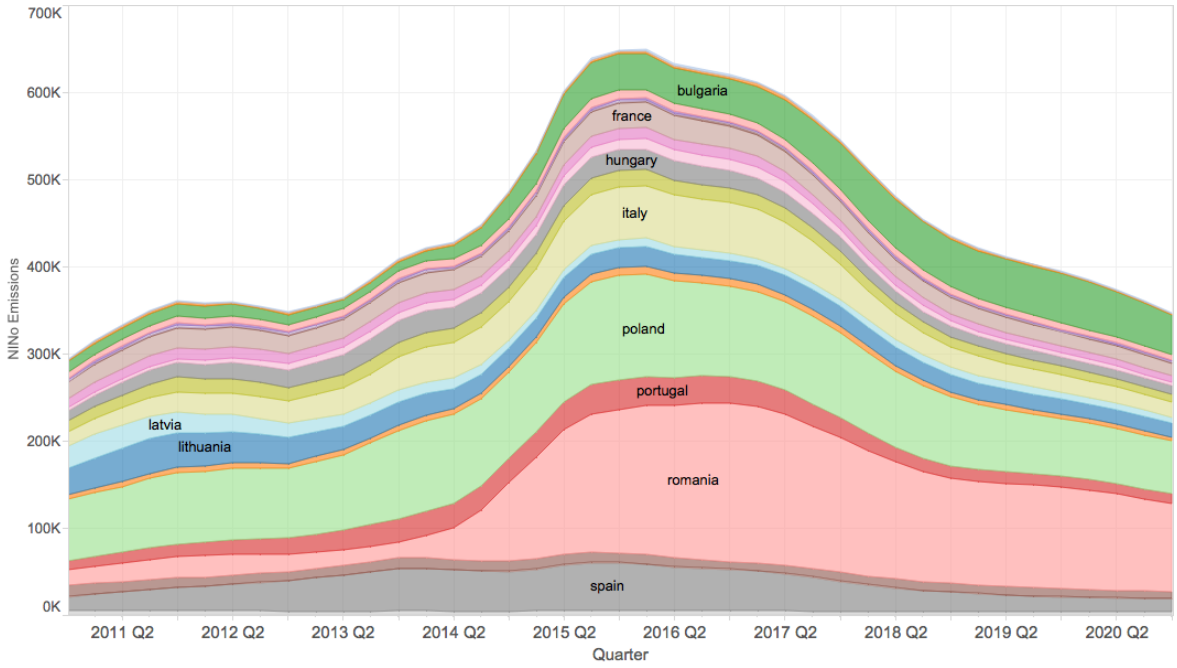

Figure 1: Forecasts assuming Free Movement coefficient sloping to 50%

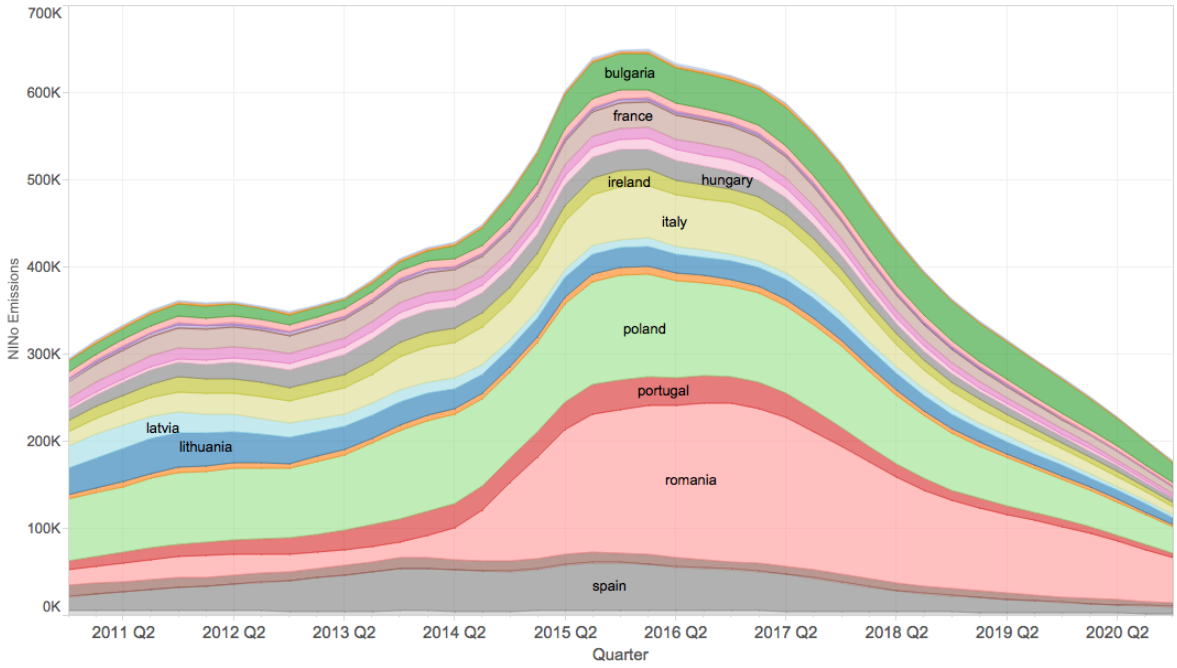

Figure 2: Forecasts assuming Free Movement coefficient sloping to 0%

Note that our estimates are for reductions in NINo registrations. For the purposes of our analysis, we need to translate these into reductions in net migration, and then into the impact on the working age population. ONS (2016) suggests that until 2014, approximately 50% of EU national NINo registrations represented short-term (less than one year) immigration. Since then, the proportion appears to have been somewhat higher, reflecting in particular strong growth in the number of Bulgarian and Romanian registrations, which did not translate into a corresponding increase in measured immigration; it is unclear if this reflects some under-recording or a structural shift in the nature of migration to the UK. (Portes, 2016c). In addition, our estimates do not take account of emigration (since NINo registrations only record new arrivals). It is likely that Brexit and economic developments will also increase emigration in the short-term; however, with inflows falling, this will over the longer term result in a fall in emigration. Assessing the interaction of these various factors is complex.

Below, we assume that falls in NINo registrations translate into a fall into net migration on a proportional basis (that is, that a fall in NINo registrations of X percent translates into a corresponding fall in net migration for the EU). While this is unlikely to be the case from quarter to quarter, it may be a reasonable rule of thumb over a longer time period. In Forte and Portes (2016) we will extend our analysis to forecasting net migration, as measured by the official yearly Long-Term International Migration statistics, and we will be able to revisit this issue at that point.

On this basis, then, our scenarios imply that net EU migration could fall by up to 91,000 in the central scenario, and up to 150,000 in a more extreme scenario, over the period from now to 2020.

How does this compare with existing estimates? Migration Observatory (2016) estimate that 19% of people born in EU countries and working in the UK are in a skilled (at least graduate level) job earning more than 20,000 per annum; the share of those who have arrived in the last 5 years meeting these criteria is only 12% (note that our estimate implies that without free movement flows would be at about 16% of current levels). Using a broadly similar approach, Migration Watch (2016) argue that applying the same migration rules to EEA nationals as currently apply to non-EEA ones, but with some more general loosening, could reduce net migration by about 100,000. This is close to our central scenario. Together, these estimates prepared using completely different methodologies to our approach give us a degree of comfort that our estimates are not unreasonable.

4 Migration impacts: existing evidence

In order to translate these scenarios of the impact of Brexit on migration flows into impacts on economic variables, we now turn to the existing empirical evidence. Over the last decade the UK resident population originally from other EU member states has more than doubled, to more than 3 million, and continues to rise rapidly. The primary motivation for migration was work, and most new migrants are in employment, with employment rates for intra-EU migrants well above rates for natives (ONS, 2016). One notable feature of migrants from the new Member States was that, although they were not necessarily low skilled, they moved primarily into low skilled employment in the UK, and were concentrated in certain sectors (for example, construction, retail, hospitality, domestic work, food processing and agriculture) (MAC, 2014).

There is a now a considerable literature analysing the impact of recent migration on the UK labour market:

- On employment, a comprehensive literature review by the UK government (Home Office/Department for Business, 2014) found that "To date there has been little evidence in the literature of a statistically significant impact from EU migration on native employment outcomes". This is also the case when focusing on specific groups who might be expected to be most adversely affected, such as young people (see, for example, Wadsworth, 2016);

- On wages, there is an emerging consensus that recent migration has had little or no direct impact overall, but possibly some-small- negative impact on low-skilled workers (and perhaps some positive impact on skilled workers). The most robust recent analysis, Nickell and Salaheen (2015), finds that a 10 percentage point rise in the immigrant share leads to approximately a 1.5% reduction in wages for

native workers in the semi/unskilled service sector.

Estimates of the impact on overall growth and GDP per capita rely, very much as with the empirical analysis on the relationships between trade and growth used for analyses of the macroeconomic impact of Brexit, on cross-country evidence. As with trade, there is strong evidence that migration has a positive impact on productivity and GDP per capita. Again, as with trade, these positive impacts must result from indirect impacts of migration ("spillovers") since they are too large to simply be driven by compositional impacts. The theoretically plausible channels are likely to be very similar; both trade and migration might enhance productivity by increasing competition (in labour and product markets) and by facilitating the growth of high-productivity clusters. Indeed, as regards the latter, they are very likely to be complementary.

Relatively few papers produce useful quantitative estimates of the likely impacts. Ortega and Peri (2014) examine the impact of both immigration and trade; they find while openness to trade and migration both boost (per capita) income, migration has considerably larger impacts than trade. This suggests that analyses of the impact of Brexit on growth which – as with the analyses cited above – focus only on trade impacts may be missing an important channel.

However, for the purposes of this paper, Ortega and Peri (2014) is unlikely to be a useful guide to estimating the quantitative impact of migration on UK growth and productivity: it is based on a very large cross-country dataset, which includes mostly developing countries, and it does not distinguish between low and high-skilled workers. More useful in this context are Boubtane, Dumont and Roualt (2015) and Jaumotte et al. (2016). While both are cross-country analyses, both focus on advanced economies; both also incorporate data on the skill composition of migration.

Boubtane et al. (*Model 1* in the figures) find that migration in general boosts productivity in advanced economies, but by varying amounts: for the UK, the estimated impact is that a 1 percentage point in the migrant share of the working age population leads to a 0.4-0.5% increase in productivity. This is higher than in most other advanced economies and reflects the relatively high skill levels of migrants to the UK. Their data set, however, only runs up to 2006.

Jaumotte et al. (*Model 2* in the figures) find that a 1% increase in the migrant share of the adult population results in an increase in GDP per capita and productivity of approximately 2 percent. This result is consistent across a variety of empirical specifications. Perhaps surprisingly, the estimated aggregate impacts of high and low skilled migration are not significantly different (although the distributional implications are). One possible, partial explanation is that low skilled migration appears to increase labour force participation among native women (a result also found in individual country studies, cf. Barone and Mocetti, 2011). This is one example of the type of complementarity or spillover effect by which migrants might indirectly increase productivity and output.

We therefore have a significant body of quantitative empirical evidence with which to assess the impact of a reduction in migration to the UK. This literature suggests that reducing worker inflows would reduce overall employment (more or less one for one, since there would likely be no significant impact on native employment), would increase (by small amounts) wages for some low-paid groups, and would significantly reduce overall GDP per capita and productivity.

Note that estimates considering spillovers differ fundamentally from those that

simply look at the impact on growth and productivity resulting solely from the direct arithmetic impact of migration on the size of the UK labour force (OBR, 2016) or compositional impacts (Lisenkova and Sanchez-Martinez, 2016); by construction, the models used in these papers omit any indirect or spillover effect on productivity. For example, the OBR forecast that Brexit-induced reductions in migration will reduce trend output growth by 0.3% per year is based solely on the impact on the growth in the labour force – it is assumed that there is no impact on productivity.

5 Economic Impacts

We now assess the impacts of Brexit-induced reductions in migration on the UK economy. We focus on two outcomes of policy concern: the impact on overall growth in GDP and GDP per capita, and the impact on wages for low paid workers, in particular those in the low- and medium-skilled service sector.

5.1 Growth and Productivity

The UK working age population is 42 million, while the adult population is just over 50 million. The vast majority, but not all EU migrants to the UK are adults; a reduction in net migration of 100,000 results in total population falling by 0.15% and the migrant share of the working age population by 0.20% (the vast majority of EU migrants to the UK are adults). Using the estimates of Boubtane et al., this would reduce GDP per capita by about 0.1%, and GDP by about 0.3%. Using those of Jaumotte et al., GDP per capita would fall by about 0.4% and GDP by about 0.55%.

We can now estimate the possible impact of falls in EU migration on GDP and GDP per capita growth between now and 2020, the same time period used for the Treasury analysis, compared to a counterfactual where EU migration remains constant. Note

that while the main impact here comes from Brexit, especially over the medium to long term impact, the short-term forecast also reflects economic developments in the UK and other EU countries, so is not strictly attributable exclusively to Brexit. We conclude that, on our central scenario, the impact would be to reduce GDP by between about 0.63% to 1.19%, while GDP per capita would be reduced by between about 0.22% and 0.78%. On the more extreme scenario, the hit to GDP per capita would be up to 1.16%. Note that the OBR assumed reductions in migration which – arithmetically – reduced GDP growth by 0.2% annually, or about 0.8% over the period.

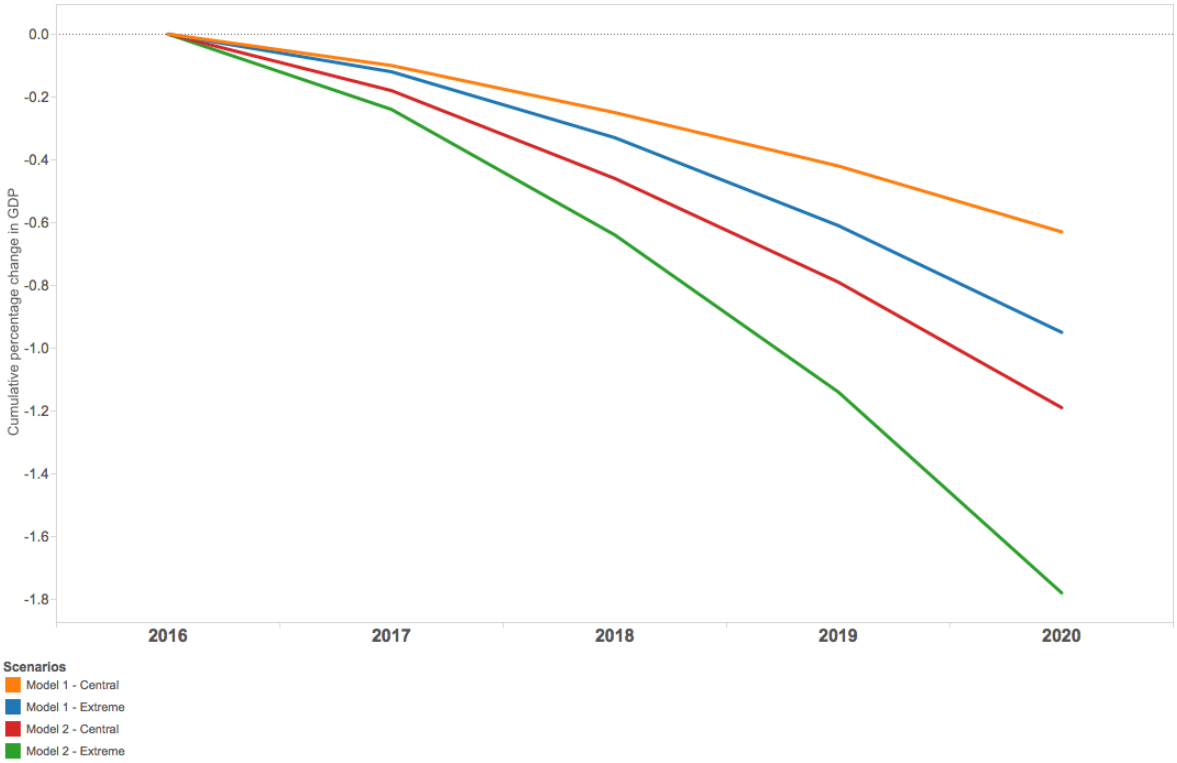

Figure 3: Scenarios of GDP dynamics

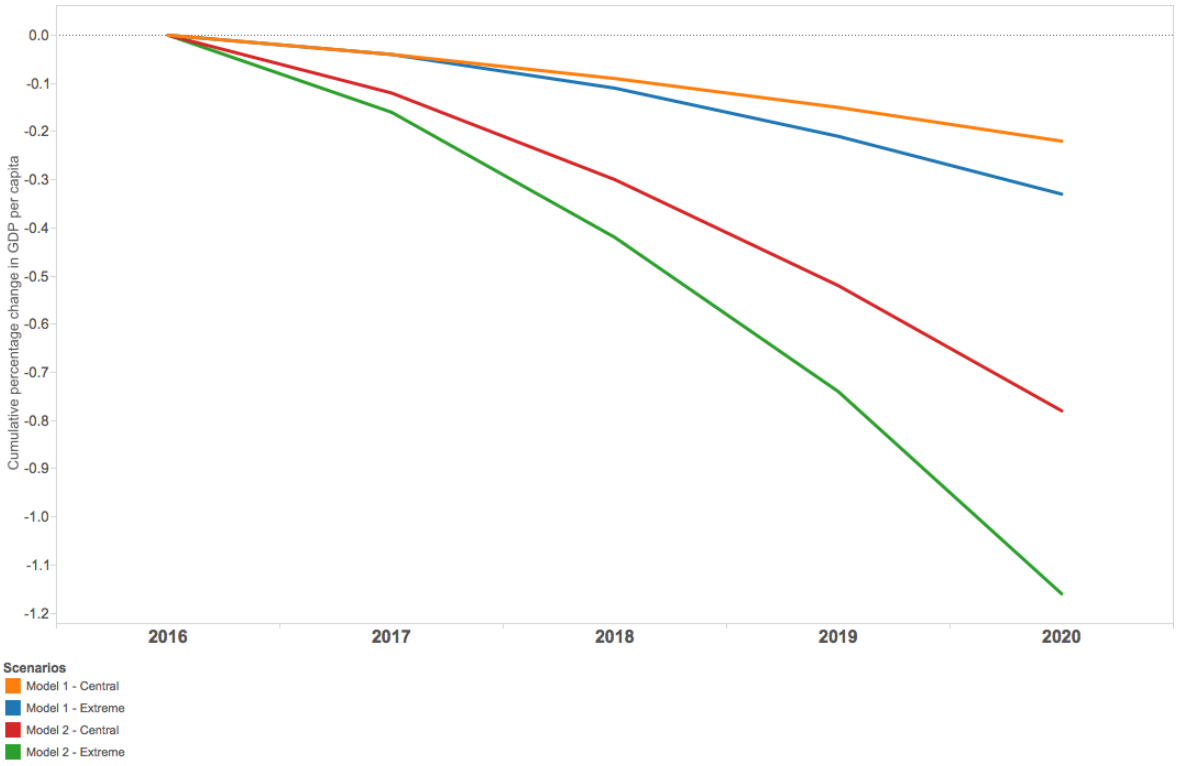

Figure 4: Scenarios of GDP per capita dynamics

In order to facilitate comparison with the estimates produced by the Treasury and others of the long-term impacts of Brexit, we also calculate the impact on GDP per capita out to 2030, assuming that migration remains flat at these reduced levels after 2020. Here the impact on GDP per capita ranges from a fall of 0.92% to 3.38% under the central scenario, and from 1.53% to 5.36% under the extreme scenario.

It is worth comparing – both quantitatively and qualitatively – these estimates of the impact of reduced migration on GDP with estimates of the impact of reduced trade. From a methodological point of view, the two approaches are very similar; regression-based predictions are made of trade or migration flows, with or without free movement/EU membership (the impact of which is captured in the regression as a dummy variable). These estimates are then translated into GDP impacts using relationships established in the existing literature between trade as a proportion of GDP, or migrants

as a share of the labour force, and productivity. In this conceptual sense, our approach is almost identical to that adopted by HM Treasury, the IMF, and OECD. The Treasurys central estimate, for example, estimated a reduction in GDP from Brexit of 6%.

Of course, the reliability of quantitative estimates generated by this methodology depends crucially on the empirical validity of the two steps described above. Here, our estimates of the impact of Brexit on migration are probably more reliable than those of the impact on trade. Notably, the top-down analyses referenced above appear broadly consistent with our estimates, based on bottom-up empirical analysis. For trade, estimates of impacts are entirely model-based. However, the estimates of the growth impact of migration are probably less reliable than those of the growth impact on trade, since the literature is more recent and less extensive.

One possible objection to our approach – less relevant for trade – is that Brexit might lead to a shift in the composition of migration, with a disproportionate reduction in unskilled migration. This assumption is in itself open to question (Portes, 2016), as it ignores the fact that EU migrants to the UK are already relatively skilled, and changes to free movement may well reduce the attractiveness of the UK to highly skilled, mobile workers. Referring again to the literature, Jaumotte et al. find that unskilled migration has almost as large a positive impact as skilled; Boubtane et al. suggest that an improved skills mix would mitigate, but not eliminate, the negative impacts.

5.2 Wages

Given the focus during the referendum campaign on the labour market impacts of EU migration, and in particular the impact on low-skilled or low-paid British-born

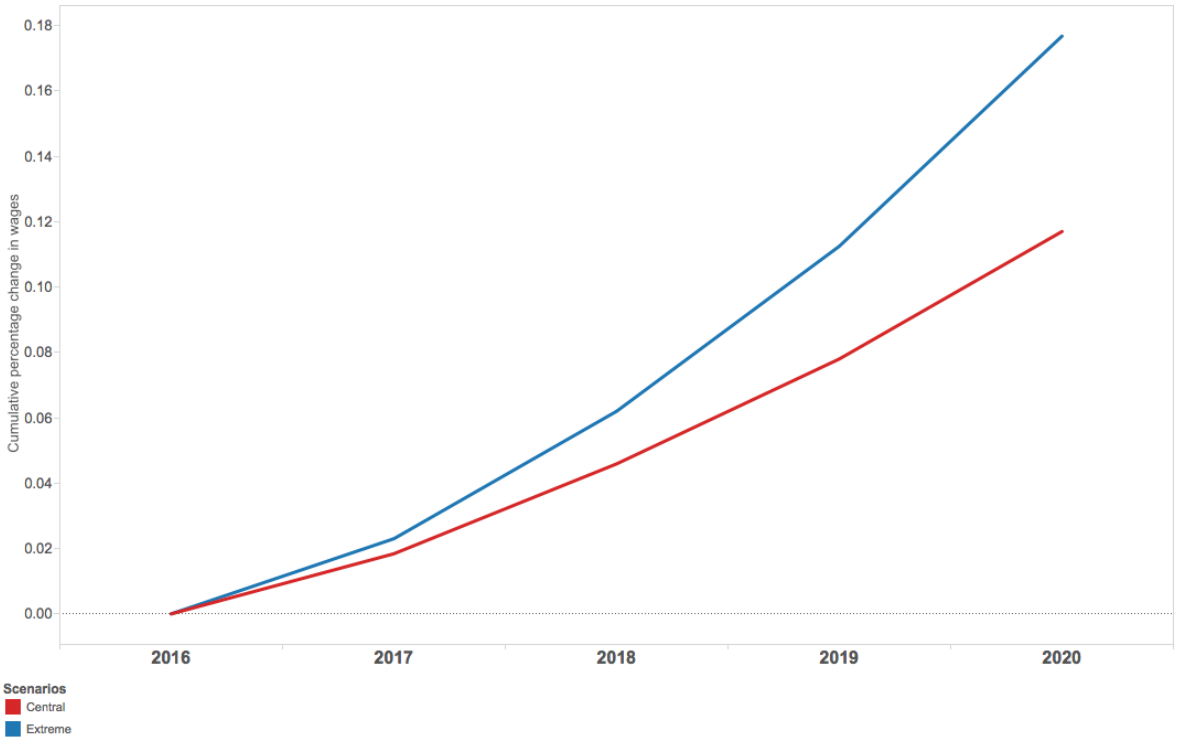

Figure 5: Scenarios of wage dynamics

workers, we also make quantitative estimates of the impact of migration on wages using the estimates from Nickell and Salaheen (2015). This finds that a 1 percentage point increase in the proportion of migrants working in the low to medium skilled service sector reduces wages by just under 0.2%. This is partly compositional, so the impact on the wages of natives in this sector is closer to 0.15%. Since EU migrants, in particular, are much more likely to be working in this sector than in other sectors, reductions in migration result in a significantly larger reduction in this sector than in the working age population as a whole. Taking account of this, we therefore calculate the (positive) impact on wages of a reduction in EU migration; in the central scenario, the resulting wage increase is 0.12% by 2020 and 0.51% by 2030. Of course, this does mean such workers would be better off over all; that would depend on how the wider economic impacts of Brexit affected them.

	Scenario	GDP	GDPpc	Wages
Model 1	Central	2.73%	0.92%	0.51%
	Extreme	4.35%	1.53%	0.82%
Model 2	Central	5.19%	3.38%	0.51%
	Extreme	8.18%	5.36%	0.82%

Table 1: Cumulative effects to 2030

6 Conclusion

In this paper we have outline the first empirically based analysis of flows of EU migrants to the UK and set out possible scenarios for the longer-term impact of Brexit on migration flows. This work is preliminary; in forthcoming work (Forte and Portes) we will extend this analysis both to non-EU countries and to alternative measures of immigration flows.

Using a methodology broadly analogous to that employed by mainstream economic forecasters to model the impact of Brexit-induced reductions in trade on productivity and growth, we also project the impact on per capita GDP and on the wages of those in the low-skilled service sector, particularly strongly impacted by EU migration. The broad scenarios (not forecasts) we depict imply that the negative impacts on per capita GDP will be significant, potentially approaching those resulting from reduced trade. By contrast, the increase in low-skilled wages resulting from reduced migration is expected to be, if at all, relatively modest.

A number of caveats apply. First, our scenarios for future migration flows are, as with any such exercise, dependent on a a number of assumptions, relating both to our

methodology and to the inherent uncertainties over future policy. They will, inevitably, prove to be inaccurate. Nevertheless we believe they are useful for illustrative purposes. Second, while the theoretical basis for the view that reductions in migration will translate into reductions in productivity is (as with trade) clear, and supported by the empirical evidence, using quantitative estimates based on historical cross-country data to construct scenarios for the impact on the UK economy going forward is inevitably speculative (again, just as it is for trade and investment flows). As with other analyses of the long-term impact of Brexit, these estimates should be viewed as an indication of the sign of the likely impact as with trade, almost certainly negative and of the plausible rough order of magnitude of the possible impacts, rather than a point estimate.

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Annex

A Data and Estimation

For the purpose of the study, we obtained the quarterly NINo series from Stat-Xplore, the online portal of the Department of Work and Pensions, while historical series and forecasts of the macroeconomic indicators for each country analysed are derived from NiGEM, the database used for General Equilibrium Modelling at NIESR. While NiGEM contains a large quantity of data on many countries, variable transformation implied the loss of some countries for which specific information is unavailable.
The specification we employ in the estimation of the coefficients presented is as follows:

$$ninopm_{it} = \beta_0 + \beta_1 ninopm_{it-1} + \beta_2 diffrgdp_{it} + \beta_3 diffemrateit + \beta_4 exchrate_{it} + \\ + \beta_5 inEU_{it} + \epsilon_{it} \tag{1}$$

where $ninopm_{it}$ is the logarithm of NINo emissions to country i at time t per million inhabitants; $ninopm_{it-1}$ it first lag; $diffrgdp_{it}$ the difference between the logarithm of UK and Origin GDP per capita; $diffemrate_{it}$ the difference between the logarithm of Origin and UK employment rate; $exchrate_{it}$ the logarithm of the exchange rate of Origin currency with the British Pound; $inEU_{it}$ a dichotomous variable taking the value 1 if free movement applies between the origin country and the UK (that is, for the EU15, EEA countries and Switzerland ,throughout the period covered; for the new Member States which joined in 2004, from 2004Q2; and for Bulgaria and Romania, from 2014Q1), 0 otherwise.

In line with Bertoli and Fernndez-Huertas Moraga (2013), in which the authors use the Pooled Common Correlated Effects Estimator (CCE) developed in Pesaran (2006)

and apply it to a dataset in many ways similar to ours, we estimate the above equation with to the Dynamic Pooled CCE estimator developed in Chudik and Pesaran (2015). Put simply, this estimator entails augmenting the equation above with (lagged) cross-sectional averages of each term interacted with dummy variables for N-1 countries, and then estimating the augmented equation by Fixed Effects. Below are the results (we report heteroskedaticity- and cross-sectional-correlation consistent FE results for a comparison):

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	DCCEP	DCCEP	DCCEP	FE (HC)	FE (HC)	FE (HC)
$NINo_{t-1}$	0.300***	0.301***	0.292***	0.692***	0.742***	0.701***
	(0.0246)	(0.0247)	(0.0249)	(0.0591)	(0.0465)	(0.0570)
GDPpc Difference	0.813**	0.824**	0.678*	-0.213*	-0.128	-0.0371
	(0.360)	(0.361)	(0.367)	(0.114)	(0.0882)	(0.0355)
Employment rate difference	2.697***	2.685***	2.853***	1.959***	1.721***	1.853***
	(0.610)	(0.610)	(0.615)	(0.511)	(0.428)	(0.447)
Exchange Rate	0.335**	0.332**	0.392***	-0.0672	-0.0911	-0.621***
	(0.137)	(0.137)	(0.142)	(0.104)	(0.0926)	(0.194)
Free Movement	1.777***	1.778***	1.787***	0.726***	0.624***	0.665***
	(0.0742)	(0.0744)	(0.0748)	(0.161)	(0.131)	(0.149)
Observations	1,566	1,566	1,566	1,682	1,682	1,682
R-squared	0.997	0.997	0.997			
CD test	-.837	-1.374	-1.439	29.532	24.583	27.109
P value	.403	.170	.150	.0	.0	.0
Countries	29	29	29	29	29	29
Quarter FE	NO	YES	YES	NO	YES	YES
Year FE	NO	NO	YES	NO	NO	YES
Number of groups				29	29	29

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

B Forecasting

While for estimation it makes sense to make use of the CCE estimator, such methodology cannot be employed in prediction as it defines the dependent variable at any time as a function of its contemporaneous cross-sectional average ($Y_t = f(\bar{Y}_t)$) which makes linear prediction impossible unless a first arbitrary step in the prediction of $\bar{Y}_t$ is taken. We explore one such two-step method in producing the forecasts for future flows: first, we predict future values of migration flows via an heterogeneity- and autocorrelation-consistent FE estimator; secondly, we apply our preferred DCCE specification to the prediction-augmented sample to obtain cross-sectionally consistent fits. This methodology, while completely tentative, yields what we believe are reasonable estimates of future flows for all countries but one, Bulgaria (we will look into analysing this anomaly in the upcoming paper).