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Modelling the long-run economic impact of leaving the European Union

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ABSTRACT

We model the long-term implications of leaving the EU for the UK economy using NiGEM, the National Institute's large scale structural global econometric model. We examine a scenario in which the UK has no free trade agreement with the EU, focusing on four key shocks: a permanent reduction in the size of the UK's export market share in EU member countries, an increase in tariffs, a permanent reduction in inward FDI flows and the repatriation of the UK's projected net contributions to the EU budget. We calibrate the size of the shocks on a synthesis of the academic evidence. We explain how each of these four shocks is implemented in NiGEM, as well as examining the key mechanisms by which they are propagated through the model. The export market share channel is the main mechanism by which leaving the EU leads to declines in GDP and consumption relative to the long-run baseline, accounting for a long-run decline in GDP of 2.1% relative to the baseline value, out of a total projected reduction in GDP relative to the baseline of 2.7%.

1. Introduction

The aim of this paper is to analyse the long-term implications of leaving the EU for the UK economy. A key question concerns the counterfactual: What would the relationship between the UK and the rest of the EU, and the rest of the world, look like after a UK exit from the EU? In this article, we focus on a 'WTO' scenario, in which the UK no longer has a free trade agreement for goods or services with the EU.[1]

We model the impact of leaving the EU on the UK economy using NiGEM, the National Institute Global Econometric Model, a multi-country structural Keynesian-style general equilibrium model. NiGEM's global nature and explicit trade linkages make it particularly well-suited to modelling the impact on the UK economy of shifts in trade policy. NiGEM is general equilibrium in nature, so that both prices and quantities adjust over time. Moreover, it incorporates endogenous monetary and fiscal policy responses, which are clearly important when dealing with the kinds of adjustments that leaving the EU might bring. NiGEM was also used in unconnected studies by the OECD (2016) and HM Treasury (2016) for their analysis of the same question.[2] It has also been used to analyse a wide range of important issues in macroeconomics, including monetary policy coordination (Barrell et al., 2003) and international spillovers from fiscal policy (Dreger and Zhang, 2014). We provide a more detailed overview of NiGEM and its properties in the technical appendix.

We focus on four of the best understood economic implications of leaving the EU: reductions in trade with EU member countries, a modest increase in tariffs, a reduction in inward FDI flows and the repatriation of the UK's projected net contributions to the EU budget. For each of these four shocks, we present the size of the shocks, how they are implemented, and the key mechanisms by which they are propagated through the model.

The reduction in trade with the EU, modelled as a decline in the UK's export market share in the EU, is by far the most quantitatively important channel by which leaving the EU affects the UK economy. This reduction works like a demand shock to UK exports, and is accompanied by declines in UK export prices and a sharp depreciation in Sterling.[3]

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[1] In Ebell and Warren (2016), published in the May issue of the National Institute Economic Review, we also present results from scenarios involving continued close trading links with the EU, based on Norway's EEA membership and Switzerland's bilateral agreements.

[2] Pain and Young (2004) base their estimates of the GDP impact of leaving the EU on NiDEM, a predecessor of the current NiGEM model which included greater detail on the UK domestic economy, but which is no longer supported.

[3] It is important to emphasize that all declines are relative to the baseline of remaining in the EU.

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The depreciation in Sterling feeds through into higher import prices, and inflation. The higher import prices and lower export prices lead to a persistent deterioration in the terms of trade. That is, the loss in market access to the EU leads the UK to both trade less, and to benefit less from that trade which remains. As a result, GDP, consumption and real wages all fall compared to the counter factual of remaining in the EU.

The resulting negative demand shock, coupled with the surge in inflation, would also put the Bank of England in a challenging position in the years immediately after a decision to leave the EU. We assume that the Bank would 'look through' the rises in inflation during this transition period, but would tighten policy once it reverts to a Taylor rule (calibrated with parameters from the Bank's Compass model) beginning in the third quarter of 2018. The decline in demand for UK exports is more persistent than the inflationary effect from Sterling's depreciation, so in the long term we see a modest loosening of monetary policy due to the trade impact of leaving the EU. However, this loosening is unable to fully counteract the long-run declines in economic activity relative to the baseline of remaining in the EU.

The repatriation of EU contributions does have a positive impact on GDP. However, the size of the UK's net contributions to the UK, estimated to be 0.3% of GDP in the relevant time frame, is simply too small to outweigh the negative impact of reduced trade and FDI, and increased tariffs.

Taking all of the shocks related to leaving the EU together, we find that in the long run, defined as being 15 years after a decision to leave the EU, GDP is projected to be 2.7% lower than in the baseline forecast in which the UK remains in the EU. Real wages fall somewhat more, by between 4.6%. Consumption is also hit somewhat harder than GDP, falling by 4.0%.

In this article, we focus on the modelling of long-run shocks to the UK economy after leaving the EU in NiGEM, and on the mechanisms by which each of these shocks affects the model economy. NiGEM allows the UK economy to adjust to its new situation in a variety of ways, and some of these adjustments tend to temper the negative impacts of Brexit in the long run. We first briefly present the scenario and its assumptions, before discussing the modelling of the shocks and the economic mechanisms at work in detail. Then, we bring all the shocks together and show the relative contributions of each shock to the final impacts on GDP and other key macroeconomic variables. Next, we examine the sensitivity of our analysis to the flexibility of export prices. Finally, we compare our modelling approach and results to the OECD (2016) and HM Treasury (2016), the two other studies which used NiGEM to model the potential impact of leaving the EU on the UK economy in the long run. We attribute much of the difference in results to the productivity shock included in these two comparator studies. Indeed, introducing a 5% productivity shock into our WTO scenario brings our results into line with those of the OECD (2016) and HM Treasury (2016). The final section offers some conclusions.

2. The WTO scenario

In this article, we focus on a WTO scenario in which the UK has no free trade agreement with the EU.[4] In this scenario, we focus on four clear economic implications of leaving the EU: reductions in trade with EU member countries, a modest increase in tariffs, a reduction in inward FDI flows and the repatriation of the UK's projected net contributions to the EU budget. We base the size of each shock based on a synthesis of the academic evidence.[5]

Table 1 summarises the magnitudes of our four shocks. We base the size of the reduction in trade with EU member countries on gravity model estimates of the impact of leaving the EU, treating goods and services separately. We base our estimate of the reduction in goods trade with the EU on the evidence presented in Baier et al. (2008), whose estimates imply that leaving the EU would be associated with a decline in EU trade of between 50% and 56%. We take the midpoint of 53%. We base our estimate of the reduction in services trade with the EU on van der Marel and Shepherd (2013), whose estimates imply that leaving a free trade area would lead to a reduction in services trade of 43%. We take a weighted average of these two figures, taking into account that in 2014, 72.4% of trade with the EU was in goods. The resulting decline in total UK trade in goods and services with the EU is 50%.[6]

Table 1
WTO scenario, assumptions.

Shock	Magnitude
Reduction in UK export market share in EU	50%
Increase in tariffs on UK trade with the EU	5%
Reduction in inward FDI flows to the UK	24%
EU budget savings, % of GDP	0.3%

In addition, if the UK no longer had a free trade agreement with the EU, we would expect tariff barriers to rise on EU trade. The average WTO most-favoured-nation (MFN) import tariff is 9%. We assume that an average tariff of 5% would be applied to trade in goods and services with the EU.

A large body of empirical evidence links inward foreign direct investment (FDI) flows to openness. We base our estimates of the impact of leaving the EU on inward FDI flows on the estimated relationship between openness (measured as the trade share of GDP) and FDI reported in Ramasamy and Yeung (2010). Their estimates imply that leaving the EU would reduce inward FDI to the UK by 24%, which corresponds to a reduction in UK private sector investment of 3.5%.[7] We note that HM Treasury (2016) arrives at similar magnitudes based on its reading of the evidence from gravity models of FDI flows, as does the synthetic control approach favoured by Bruno et al. (2016).

Finally, we base our estimates of the size of repatriated net contributions to the EU on the average of the Office for Budget Responsibility's projections for the UK public sector net contributions between 2017 and 2020, which corresponds to 0.42% of GDP.[8] We also add a projection of UK private sector receipts from the EU (mainly research funding) of 0.08% of GDP, based on their average value between 2009 and 2015 from European Commission accounts. Thus, the projected savings in net private and public sector contributions to the EU is 0.34%, which we round to 0.3%.

3. Modelling the economic implications of leaving the EU

In the simulation, the shocks are applied onto the baseline forecast created from the short-run analysis, described in Baker et al. (in this issue). Specifically, with the introduction of each new set of shocks (two trade effects, FDI and changes to the budget) we create a new baseline and revert any model changes from the previous shock back to the standard set of simultaneous equations. This allows us to partial out the impact of each shock separately. We then proceed to adjust the model as required for the next set of shocks, we repeat these steps for each set of shocks. Once all the sets of shocks have been run, we compare the final results to the original forecast baseline (April 2016). Tables 2a and 2b provide an overview of the total impact of all four shocks together on key macroeconomic and trade variables.

[4] In Ebell and Warren (2016), we also consider scenarios involving continued close trading links with the EU, based on Norway's EEA membership and Switzerland's bilateral agreements.

[5] We present a summary of this synthesis of the evidence here. For more detail, see Ebell and Warren (2016).

[6] In Ebell and Warren (2016) we also consider 'pessimistic' scenario that total trade in goods and services with the EU declines by 72%, based on estimates in Egger et al. (2011).

[7] See Ebell and Warren (2016) for a more extensive overview of the empirical FDI literature and a more detailed explanation of Ramasamy and Yeung (2010)'s implications for the UK's inward FDI flows if it were to leave the EU.

[8] Webb and Keep (2016). Also, see Ebell and Warren (2016) for a more extensive treatment of the UK's net contributions to the EU.