

UPDATE: MODELLING THE SHORT- AND LONG-RUN IMPACT OF BREXIT

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Update: Modelling the short- and long-run impact of Brexit¹

Arno Hantsche

Introduction

This NiGEM Observation presents updated estimates of the economic impact of different Brexit scenarios based on analyses recently published by NIESR and building on earlier work on EU withdrawal by the Institute (e.g. Pain and Young, 2004; Ebell et al., 2016). It provides an overview of the assumptions we made when modelling different types of Brexit outcomes, namely continued EU membership, a soft Brexit (continued membership of the EU single market and customs union, the baseline assumption underlying recent NIESR forecasts), a UK-EU customs union, and an orderly no deal Brexit. References to recent more comprehensive reports by NIESR motivating the economic rationale behind the modelling assumptions in more detail are included.

The Observation proceeds by first focussing on the long-run economic impact of different Brexit scenarios. It then discusses the options for policymakers to respond to a no-deal Brexit in the short run presenting scenarios in which policy reacts in an accommodative way.

Modelling the long-run economic impact of different Brexit scenarios

Soft Brexit assumptions

NIESR's main forecast is based on the assumption that the UK retains access to the EU's single market and customs union. It is assumed that this outcome crystallises after a period of heightened uncertainty reflected in higher-than-average investment premiums and delayed improvements of business investment, consumption and productivity. The scenario may emerge as the result of various political developments, including a cross-party compromise, multiple votes in Parliament that lead to an elimination of other options and/or a referendum.

In our main forecast scenario the UK would exit on 31 October, enter a transition period until the end of 2020 during which details of future trading arrangements are negotiated, and after 2020 would continue to make substantial contributions to the EU budget while remaining a member of the EU's programmes. In this scenario an open border between Northern Ireland and the Republic of Ireland would be maintained but the UK would lose political influence on EU decision-making.

¹ This NiGEM Observation summarises work by Arno Hantsche, Amit Kara and Garry Young published in the National Institute Economic Review 'Prospects for the UK Economy', February (Boxes A, B) and May (Box A).

Continued EU membership

In this scenario the UK decides to stay a member of the EU, its single market and customs union. This scenario could come about as the result of decisions made by parliament and government to revoke Article 50 by the end of October 2019 and/or a referendum. Compared to our main 'soft Brexit' case, uncertainty is assumed to lift more rapidly in this scenario, the exchange rate appreciates and productivity growth recovers more strongly (see also 'Stay' scenario in Hantzsche et al., 2018).

Customs union

Similar to our main case, the UK would enter a transition period after 31 October while uncertainty remains elevated for as long as negotiations about the future trading relationship continue. After the end of a transition, the UK enters a customs union with the EU in 2021 that guarantees frictionless trade in goods. The UK would, however, exit the European single market. As a result, we assume that services trade in particular would face higher non-tariff barriers that reduce overall EU-UK trade in the long run by 30 per cent, compared to a soft Brexit or continued EU membership. Foreign direct investment, productivity and net migration would be lower in the long run compared to softer Brexit scenarios, and fiscal contributions to the EU budget are assumed to be reduced by one half. The economic rationale for these assumptions is explained in detail in NIESR's report on the economic impact on the United Kingdom of a customs union deal with the European Union (Hantzsche and Young, 2019).

Table 1. Economic impact of different Brexit scenarios

	Short-run economic impact (2019/20)	Long-run economic impact (10 years out) (relative to continued EU membership)
Soft Brexit (main forecast)	Heightened uncertainty weighs down on investment, consumption and productivity until the end of 2020	GDP: -0.4% GDP per capita: -0.4%
Customs union	Heightened uncertainty and expectations of trade frictions weigh down on investment, consumption and productivity	GDP: -3.1% GDP per capita: -2.3%
Orderly no-deal	Severe uncertainty tariff and non-tariff barriers weigh down on trade and productivity	GDP: -5.4% GDP per capita: -3.7%

Orderly no deal

If no agreement can be reached on the UK's future trading relationship with the EU and a withdrawal agreement is not ratified by 31 October, the UK might revert to trade with the EU on WTO terms. We assume that the transition is orderly: short-term contingency measures are put in place and financial stability is safeguarded. Nevertheless, uncertainty would be considerably higher in the short run, which is reflected in higher term and equity premiums and an additional drag on investment. In the long run, we assume in line with empirical evidence that EU-UK trade is 56 per cent lower compared to continued EU single market and customs union membership as a result of tariff and non-tariff barriers; net migration would be reduced by 100,000 persons a year, foreign direct investment be 24 per cent lower, labour productivity be lower by 1.6 per cent and the UK would no longer contribute

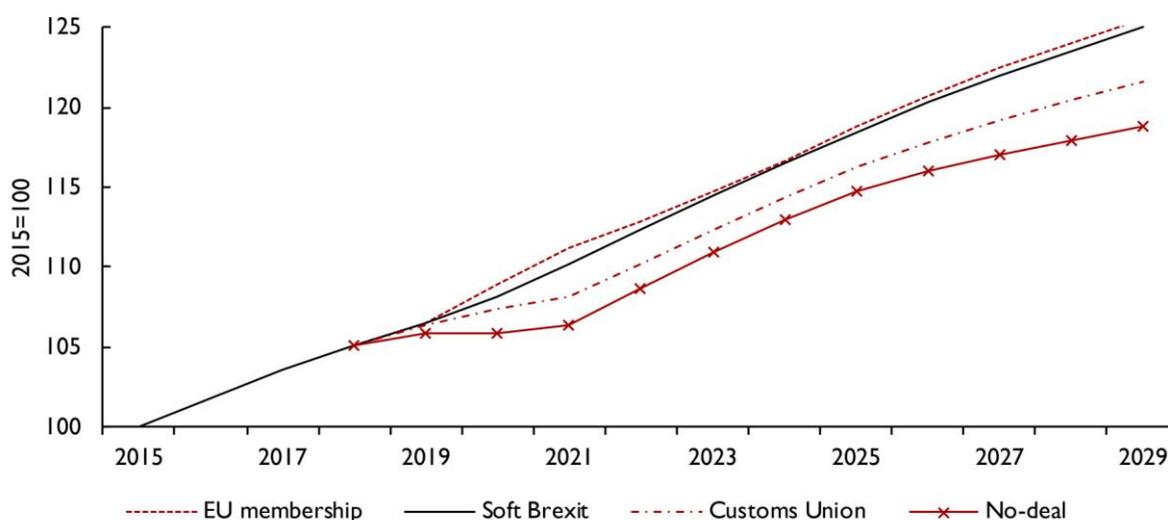
to the EU budget once outstanding liabilities were repaid (for details about these assumptions see also ‘no-deal’ scenario in Hantzsche et al., 2018).

We employ the tariff/Brexit version of NiGEM (v2.19a-tariff 1) to conduct the analysis which allows for trade share splits in import demand equations for EU countries into imports from the UK and imports from the rest of the world. Table A1 in the appendix provides a summary of our modelling assumptions. We assume that monetary policy reacts in a mechanical manner to inflation and the output gap based on NiGEM's default policy rule. Automatic fiscal stabilisers are activated but not accompanied by additional discretionary spending.

Comparing the economic impact

In the near term, our main forecast is consistent with a range of alternative Brexit outcomes, provided a transition period guarantees frictionless access to the EU single market and customs union (table 1, figure 1). If by October 2019 the UK committed to stay in the EU, we would expect the fog of uncertainty to lift more quickly than in the main forecast, providing a boost to GDP growth in the near term. By contrast, a no-deal exit by the end of the year would lead to significant disruption to trade and investment.

Figure 1. The impact of different Brexit scenarios on real GDP



Source: NIESR, NiGEM simulation.

The long-term economic implications of continued EU membership are nearly indistinguishable from the assumptions underlying our main forecast based on a ‘soft’ Brexit, though the costs of the uncertainty already incurred are not recouped. By contrast, any sizeable trade barriers would lead to less rapid improvements in income and welfare over time compared to EU membership.

As a result of non-tariff trade barriers associated with exiting the single market, GDP per capita is estimated to be 2.3 per cent lower in the Customs Union scenario relative to continued EU membership. In Hantzsche and Young (2019) we also estimate that forming a UK-EU customs union would mean tax revenue would be around £26 billion a year lower ten years after EU exit than it would

have been had the UK stayed in the EU, partly due to a lower population associated with less net inward migration.

In the orderly no-deal scenario, GDP per capita is estimated to be 3.7 per cent smaller than under EU membership, or 5.4 per cent in GDP terms. The difference is smaller than in the government's estimates from November 2018 (–6.3 per cent to –10.7 per cent, HM Government, 2018) but larger than in the IMF's recently published estimates (around –3 per cent, IMF, 2019).

Policy options for a no-deal Brexit

While we are more confident about the impact of Brexit in the long term, there is much more uncertainty about short-run effects which depend on the exact timing of any Brexit outcome and the response of policy. In this section we address the question: How will policymakers react to a no-deal scenario? Their response will depend on the scale and specific nature of the disruption and the reaction of financial markets to it (see also Chadha, 2018). We focus here on the macroeconomics, i.e. the response of inflation and output to the Brexit shock and the mitigating action that the Chancellor and the Monetary Policy Committee might take to stabilise the economy. Our main conclusion is that policymakers have room to inject monetary and fiscal stimulus in order to stabilise output if inflation expectations and wage growth are anchored (and also thought to be anchored by policymakers) at a level that is consistent with the medium-term 2 per cent inflation target, and if fiscal rules are adjusted to allow for higher government spending. Our findings suggest that policymakers are in a position to help stabilise GDP growth in the short term but not in the medium and long term. This option would not be available in a scenario where wage growth picks up and policymakers believed that inflation expectations would be dislodged if monetary policy did not actively and immediately offset a Brexit-related spike in inflation. As such, the focus in this section lies on the short run and how policymakers can ease the transition of the economy to a new trading equilibrium by delaying some of the economic impact that is bound to materialise in the future. It complements our analysis of the long-run economic impact of a no-deal Brexit. The long-run impact arises mainly from a slowdown in capital, employment and productivity growth and therefore leaves little room for monetary and conventional fiscal policy to respond.

We start with our central forecast which is conditioned on a soft Brexit outcome and apply a no-deal Brexit scenario that in the short term is characterised by an interruption to trade and productivity as well as a rise in risk premia (see above). In this scenario, the productive capacity becomes constrained immediately after exit, for instance because supply chains are interrupted and border barriers erected. Investment, interest rate and equity risk premia dampen economic sentiment and thus, aggregate demand. Policymakers have a wide range of instruments at their disposal and should deploy the tools that most effectively mitigate the dislocation. From a fiscal point of view, these tools range from tax cuts, spending measures and guarantees and from the point of view of the central bank, there are various macro-prudential measures, Bank Rate, quantitative easing, liquidity injections, foreign currency swap lines etc. Here, we focus on taxes, transfers and Bank Rate. Using NiGEM, we assess the impact of these levers on inflation and GDP growth assuming that policymakers will deploy these

tools depending on their perception of the size of the shock and the persistence of inflation. We present the results of four alternative scenarios: 1) a non-accommodative monetary policy response, 2) accommodative monetary policy with wage growth picking up, 3) accommodative monetary policy with restrained wage inflation, 4) additional fiscal expansion.

Scenario 1: Non-accommodative monetary policy response

As a result of interruptions to trade and lower confidence, GDP growth falls close to zero in the first two years after a no-deal Brexit (figure 2). This is partly due to supply-side constraints as productivity growth slows but also driven by a lack of demand in the face of heightened uncertainty. We would expect contingency measures to ease the initial adjustment somewhat but not prevent an economic slowdown. The effective exchange rate depreciates by around 5 per cent within a year after a no-deal Brexit, and on our analysis is 10 per cent lower than in the soft Brexit case within four years. As a result, import prices rise and consumer price inflation picks up by around 1 percentage point per annum one year after leaving the EU (figure 3). If the central bank fears that this rise in inflation would dislodge inflation expectations, it may respond mechanically to deviations of inflation from target and the fall in output relative to potential. The assumption of a mechanical response is made by the Bank of England (2018) in their assessment of the effects of different Brexit outcomes. Similar to their results, we find that Bank Rate would have to rise by 2 percentage points if it followed a standard policy rule. This, however, would exacerbate the economic slowdown (dashed red lines). The impact of automatic fiscal stabilisers would be small in this scenario. Therefore, scenarios based on the assumption of a non-accommodative policy response provide good tests of how resilient the economy is when faced with the worst case but not necessarily good forecasts.

Figure 2. GDP growth under no deal and different policies

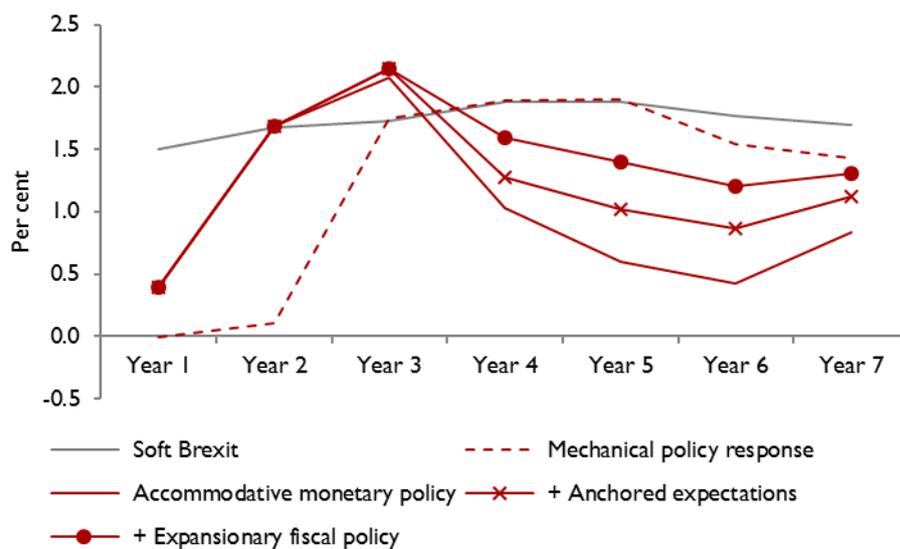
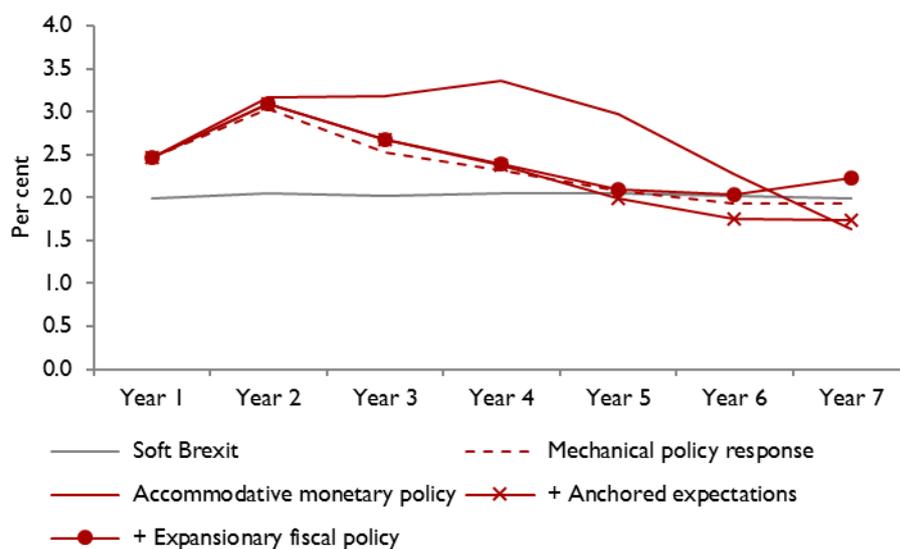


Figure 3. Inflation under no deal and different policies



Scenario 2: Accommodative monetary policy when wages respond to higher inflation

Instead, monetary policymakers have in the past often looked through episodes of temporary inflationary pressure. For instance, in response to the financial crisis, fiscal policy provided unprecedented financial support to the banking sector while monetary policy employed unconventional tools to ease economic disruption. A more accommodative stance may be appropriate also in the event of a no-deal Brexit. In this scenario, we assume that Bank Rate would not deviate from the path we project for a soft Brexit outcome during the first year of no deal and moves only little away thereafter. In other words, the central bank takes a more accommodative stance than it would take if its interest rate policy were to follow a mechanical reaction function. As a result, GDP growth could be stabilised in the short run (solid red line) and the probability of a recession substantially reduced. The risk of such a strategy is that inflation expectations may no longer be anchored, pushing up wages and prices and keeping inflation above the Bank of England's 2 per cent target for an extended period of time.

Scenario 3: Accommodative monetary policy when wage growth is restrained

However, recent episodes have shown that nominal wages may be less responsive to economic shocks than in the past (e.g. Hantzsche, 2018). Based on this evidence, we assume that nominal wage growth does not respond to the rise in inflation for an extended period of time. This would also be consistent with long-run inflation expectations being anchored. Wage setters accept reductions in real earnings for accommodative monetary policy to be effective. This is modelled by fixing nominal wages to the path they would take if monetary policy were to follow the mechanical rule described above. Under these assumptions we would expect headline inflation to subside. This would render the accommodative monetary stance effective in that initial stabilisation measures are not offset by a subsequent GDP growth slowdown (red line + crosses) and rise in unemployment.

Scenario 4: Additional fiscal loosening

Nevertheless, real disposable income will be lower than under a soft Brexit outcome, not just as a result of lower productivity growth but also because of higher import and consumer prices. This is where fiscal policy could be used to ease the burden on households. Measures could be taken that provide direct support to household income, once monetary stimulus wears off. In our analysis, we consider a combination of income tax reductions and higher transfers to households and apply it to the case where monetary policy remains accommodative while inflation expectations are anchored, assuming the government takes a more flexible approach to existing fiscal rules. We find that such a combination of expansionary fiscal measures could, while permanently increasing the public budget deficit, stabilise real disposable income, consumption and thus, GDP growth over a period of 2–3 years (red line + circles). We estimate that public sector borrowing would have to rise by 2 per cent of GDP a year to finance these policies. While such fiscal measures add up to half a percentage point to inflationary pressure, we do not find that these effects are particularly long-lasting.

This analysis suggests that a mix between accommodative monetary policy and expansionary fiscal policy has the potential to prevent the economy from a sharp slowdown in activity and should therefore be adopted in the case of a no-deal outcome, as long as wages do not respond to temporary increases in inflation and remain consistent with anchored long-run inflation expectations. It should be noted that such a policy mix will not directly resolve any disruptions to supply as a result of trade restrictions and interrupted value chains or change the fact that a no-deal Brexit would create winners and losers. But monetary and fiscal measures as ‘blunt’ instruments can be used temporarily to ease the transition of the economy as a whole to a new trading equilibrium. In the long run however, monetary and fiscal policy will not be capable of addressing structural changes arising from the new trading relationship. While leading to a somewhat smoother adjustment, expansionary monetary and fiscal policy measures would not come without a longer-term cost. As a result of looser borrowing conditions, the risk of asset price inflation rises and levels of private and public debt would increase further from currently elevated levels. Altogether this would make the economy more vulnerable to financial shocks and reduce the space available to monetary and fiscal policy to react to shocks unrelated to Brexit. The analysis could thus be extended to consider tools aimed at safeguarding financial stability, for instance using NiGEM's macroprudential modelling suite (Davis et al., 2018). The policy mix proposed here may be considerably less effective if a no-deal Brexit leads to structural disruptions to economic relationships that our modelling approach is not able to pick up.

References

Bank of England (2018), 'EU withdrawal scenarios and monetary and financial stability: a response to the House of Commons Treasury Committee', November.

Chadha, J.S. (2018), 'Economic impact of the withdrawal agreement: written evidence to Treasury Committee ahead of oral evidence session "The UK's economic relationship with the European Union"', held on 3 December 2018, NIESR Policy Paper, no. 009. See also oral evidence provided.

Davis, E.P. , Liadze, I. and Piggott, R. (2018), 'Assessing the macroeconomic impact of alternative macroprudential policies', *Economic Modelling*.

Ebell, M., Hurst, I. and Warren, J. (2016), 'Modelling the long-run economic impact of leaving the European Union', *Economic Modelling*, 59, pp. 196–209.

Hantzsche, A. (2018), 'The wage Phillips curve – another piece of the puzzle', NIESR Blog, 24 May.

Hantzsche, A., Kara, A. and Young, G. (2018), The economic effects of the government's proposed Brexit deal, NIESR report, November 2018, also published in *The World Economy*, 42(1), pp. 5–20.

Hantzsche, A. and Young, G. (2019). The economic impact on the United Kingdom of a customs union deal with the European Union.

HM Government (2018), 'EU exit – long-term economic analysis', November 2018.

International Monetary Fund (2019), *World Economic Outlook*, April 2019.

Pain, N. and Young, G. (2004), 'The macroeconomic impact of UK withdrawal from the EU', *Economic Modelling*, 21, pp. 387–408.

Appendix

Table A1. Overview of modelling assumptions

Scenarios	Continued EU membership	No deal	No deal + uncertainty	Customs union
Trade		56% reduction in trade, phased in, rigid export prices		38% reduction in trade, phased in
FDI		24% reduction in FDI (9% due to goods, 15% due to services), 3.5% reduction in PSI, corresponding BPT shock		18% reduction in FDI, 2.8% reduction in PSI, corresponding BPT shock
Budget		end in 2019q4, fully recovered into GC thereafter		after transition and paying divorce bill, half of current contributions repatriated into GC
Migration		net migration according to ONS low migration variant		midpoint between ONS principal projection and low migration variant
Productivity		TECHL shock to lower labour productivity by around 1.6% in 2030		TECHL shock to lower labour productivity by around 1% in 2030
Specifics	negative investment premium shock, negative exchange rate premium shock, TFP shock, interest rate, exports, imports fixed to base for some time		Uncertainty shock, term premium shock, equity premium shock	
Additional	Fiscal solvency rule off, monetary policy rule as default, Baseline: forecast based on soft Brexit	Fiscal solvency rule off, monetary policy rule as default, Baseline: forecast based on soft Brexit	Interest rates and exchange rates exogenous, fiscal solvency rule off, run in backward-looking mode, Baseline: no-deal scenario	Fiscal solvency rule off, monetary policy rule as default, Baseline: forecast based on soft Brexit