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**Research Report**

## Brexit and the UK's public finances

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# Brexit and the UK's Public Finances

## IFS Report 116

Carl Emmerson  
Paul Johnson  
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# Preface

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# Executive Summary

If the result of the referendum on 23 June leads to the UK leaving the EU, there will be impacts on the UK public finances. This report aims to set out the possible impacts, focusing particularly on the short run, given that the Chancellor wishes to achieve a budget balance by the end of this parliament. We also look at possible long-run consequences.

The overall impact on the public finances will depend on two distinct components, each of which is uncertain to some degree:

- **The mechanical effect.** As a net contributor to the EU, leaving the EU would strengthen the public finances because our net contribution would fall. But given uncertainty over the form of any subsequent arrangement with the EU, it might not necessarily fall to zero.
- **The national income effect.** Any effect of leaving the EU on UK national income would affect the public finances. A rise in national income would strengthen the public finances, a fall would weaken them.

## The mechanical effect

The UK's notional gross contribution (i.e. ignoring the UK's rebate) in 2014 was £18.8 billion, which is about 1% of GDP. It is by dividing this number by 52 weeks that one comes to the widely-reported figure of over £350 million a week as the UK's contribution to the EU. But in this context, ignoring the rebate is clearly inappropriate. It is equivalent to suggesting that were the UK to leave the EU and not make any financial contribution to the EU's budget then remaining EU members would continue to pay the rebate to the UK. That is clearly absurd. The correct figure to use for the UK's gross financial contribution takes account of the rebate. It stood at £14.4 billion, or 0.8% of GDP, in 2014.<sup>1</sup> (This is equivalent to around £275 million a week.)

In principle, the UK's public finances could be strengthened by that full £14.4 billion a year if we were to leave the EU. However, the EU returns a significant fraction of that each year. The amount varies, but on average our *net* contribution stands at around £8 billion a year. That is £8 billion a year that we could use to fund other spending, cut taxes or reduce the deficit. Table 1 shows these direct, mechanical effects on the UK's budget.

If we decided to spend less on agriculture, rural development, regional support or university research, we would be able to boost the £8 billion of available money – though obviously at the expense of current recipients who would lose out from such a change.

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<sup>1</sup> Figures from HM Treasury (2015).

Table 1. The UK's financial contribution to the EU Budget, 2013 and 2014

	% of GDP	£bn	£m per week
<b>2013</b>			
Gross contribution	1.0	18.1	350
Contribution net of rebate	0.8	14.5	275
Contribution net of rebate and spending by the EU in the UK	0.5	9.1	175
<b>2014</b>			
Gross contribution	1.0	18.8	350
Contribution net of rebate	0.8	14.4	275
Contribution net of rebate and spending by the EU in the UK	0.3	5.7	100
<b><i>Approximate likely contribution net of rebate and spending by the EU in the UK going forwards</i></b>	<i>0.4</i>	<i>8</i>	<i>150</i>

Note: Full details available in Browne, Johnson and Phillips (2016). Spending per week rounded to the nearest £25 million.

There is uncertainty about what trade deal we would negotiate after leaving the EU. Key Brexit campaigners seem to have ruled out any deal that would involve membership of the European Economic Area (EEA), like Norway. In part, that is because the UK would likely have to make a significant contribution to the EU budget in those circumstances. If the UK were to make proportionally the same net contributions that Norway makes, for instance, these might amount to about half our current net contribution, leaving us with a strengthening of the public finances of around £4 billion. The precise amount would depend on negotiations and what, if any, EU programmes the UK decided to participate in. (The actual financial flows between the EU and Norway are more opaque than one might expect.)

Looser arrangements such as those agreed with Canada could allow the UK to avoid paying into the EU budget but would entail less access to the EU's markets, especially in services. It is worth noting that no country outside the EEA has full access to the EU's financial services markets – not even Switzerland, which does contribute to regional development funding (albeit to a lesser extent than EEA members such as Norway).

## The national income effect

If leaving the EU were to have no effect on national income, then the public finances would be unambiguously strengthened. However, the public finances are sensitive to even relatively small changes in national income. So if the economy were to be just 1% bigger or smaller, then borrowing as a share of national income could in today's terms be around £14 billion less or more as a result. If



leaving the EU were to reduce national income by just 0.6%, that would be enough to outweigh the positive effect on the public finances of freeing up the net £8 billion that we currently contribute to the EU. Clearly if we were to strike a deal similar to the Norwegian one that involved us continuing to make a net financial contribution to the EU, then even smaller negative GDP effects would be enough to overwhelm the direct effect.

The precise effect of leaving the EU on national income is uncertain. There is uncertainty about the precise deal we would reach on trade; there is uncertainty about how much of the freedom to, for example, change regulations (including immigration policy) would be used; and there is uncertainty over the effects of each of these on growth. When thinking about the effects on national income, it also matters whether we are looking at a short-term or a long-term effect. A number of studies have been carried out on the likely effects on national income. There is a range of estimates for each.

## Short-term effects

Of the 14 organisations we have been able to find that have quantified the short-run effects on national income, 12 suggest the effects would be negative, one (broadly) neutral, and one (Economists for Brexit) suggests a positive effect on national income. This does not include the Bank of England, which, whilst not quantifying the likely effect, has nevertheless made it clear that it believes there could be a significant negative effect (Bank of England, 2016).

These negative effects in the first few years following a vote to leave are driven by a combination of an increase in uncertainty, a likely fall in the value of sterling and increase in inflation, an increased cost of borrowing, and the first impacts of the 'longer-run' effects on, among other things, trade (see below). The increase in uncertainty in particular would be likely to drive a reduction in both consumption and investment, particularly foreign direct investment, with a direct effect on GDP as well as, in the case of the latter, a potential longer-term negative effect on productivity.

The estimates of short-run effects range from reducing GDP by 6% (Société Générale and the Treasury's 'severe shock' scenario) to increasing it by 1.6% (Economists for Brexit). Within these estimates, those by the National Institute of Economic and Social Research (NIESR) are based on a particularly comprehensive economic modelling exercise. Its estimates also happen to lie towards the middle of the range of estimates. NIESR's most optimistic scenario – one that depends on the UK signing up to the EEA – implies a GDP loss of 2.1% in 2019 relative to what GDP would have been had we stayed in the EU. The most pessimistic scenario it reports, which assumes no special free trade deal with the EU, would see GDP 3.5% lower than otherwise in 2019. This latter scenario is also modelled by the Treasury as a 'severe shock', which suggests a 6% hit to GDP two years after a Brexit vote.

We estimate that if NIESR has broadly the right range of possible outcomes for GDP, then the budget deficit in 2019–20 would be between about £20 billion and £40 billion higher than otherwise. In the Treasury's analysis, they estimate that their short-term hit to GDP results in a much smaller increase in public sector net borrowing than our estimates imply. This is because their shock involves much higher inflation, which they implicitly assume leads to spending by Whitehall departments on the delivery and administration of public services being less generous in real terms. In other words, they have built a significant real cut to public spending into their numbers.

In any of these scenarios, the government would fail to reach a budget surplus in 2019–20 unless it were willing to raise taxes or cut spending by more than is already planned. In the most optimistic scenario, an additional fiscal tightening of 0.8% of national income (£15 billion in today's terms) – on top of what is already planned for this parliament – would be required just to get to budget balance. That is roughly the amount that would be saved if the government undertook a combination of measures such as: increasing the cuts to day-to-day spending by central government on public services planned for this parliament by 40% (from £12 billion to £17 billion); increasing the size of the planned cuts to social security benefits and tax credits by 40% (from £12 billion to £17 billion); and increasing both the basic and higher rates of income tax by 1p (which would raise an estimated £5½ billion). Even this would only achieve a forecast budget balance. To restore the 0.5% of national income surplus that the Chancellor is currently aiming for would require a further £10 billion of spending cuts and tax rises to be found.

A more likely response might be to delay the target to reach budget balance. In this case, spending cuts (or tax increases) at the same rate as we are experiencing over this decade would need to be implemented for an additional year or two years (depending on whether the more optimistic or pessimistic scenario turns out to be correct).

Lower growth would also lead to public sector net debt falling less quickly as a share of national income. Under the most optimistic NIESR scenario, public sector net debt would fall by just 2.2% of national income between 2015–16 and 2019–20, with half of this decline coming in the current financial year, before most of the hit to national income would occur. This compares with the OBR's latest forecast for public sector net debt to fall by 6.7% of national income over this period.

## **Long-run effects**

In the long run, the effects of uncertainty recede and trade effects dominate, with most models suggesting a negative effect from reduced access to EU goods and services markets. Some loss of foreign direct investment also has a negative effect, while some positive effect is possible from some reduction in regulation. If inward migration is reduced, models suggest a further negative effect.

Again, of all the studies we are aware of that quantify a long-run effect on national income, Economists for Brexit are an outlier in suggesting a positive central estimate. This derives largely from their assumption that UK exports would be unaffected by leaving the EU and that, if we came out of the EU, we would embark on a policy of unilateral free trade – i.e. completely drop our tariffs on imports without necessarily receiving reciprocal agreements for our exports. They suggest such a policy could significantly reduce import prices, boost national income by 4%, and increase the size of our highly productive service sector, at the expense of our agricultural and manufacturing sectors. Other studies – for example, those by the Centre for Economic Performance (CEP) and Open Europe – also look at the impact of unilateral free trade but find much smaller effects.

With the exception of Open Europe (which suggests the effect could be marginally positive or negative), all other quantitative analyses suggest that GDP would be materially lower in the long run if we were to leave the EU. There is significant variation in the scale of the negative effects, driven by two considerations. First, most of the models suggest that the more we can replicate current access to the single market – for example, by membership of the EEA – the lower the cost of exit will be. By contrast, the further we move from that model – for example, relying on World Trade Organisation (WTO) rules – the greater the cost. Second, it matters a great deal whether ‘dynamic’ effects of trade are included in the models. That effectively means taking account of the knock-on effects of less openness and less trade on productivity across the economy. That such effects exist is not controversial, but there is much uncertainty over their size. Taking account of these dynamic effects, and assuming WTO rules, NIESR, CEP and HM Treasury all find that GDP could be more than 7% less in the long run than it would otherwise have been.

In the long run, a neutral assumption for the public finances is that tax and spending will remain at a constant level as a proportion of GDP. If GDP is lower, then public spending will be lower in cash terms. If the GDP effect were to be in line with NIESR’s more pessimistic scenario, this could lead to public spending being £48 billion lower than otherwise in 2030. On more optimistic assumptions, the effect could be much smaller – just £7 billion.

## Conclusion

The mechanical effect of leaving the EU would be to improve the UK’s public finances by in the order of £8 billion – assuming the UK did not subsequently sign up to EEA or an alternative EU trade deal that involved contributions to the EU budget. However, there is an overwhelming consensus among those who have made estimates of the consequences of Brexit for national income that it would reduce national income in both the short and long runs. The economic reasons for this – increased uncertainty, higher costs of trade and reduced FDI – are clear. The only significant exception to this consensus is ‘Economists for Brexit’.

In the short run, our estimates therefore suggest that the overall effect of Brexit would be to damage the public finances. On the basis of estimates by NIESR, the effect could be between £20 billion and £40 billion in 2019–20, more than enough to wipe out the planned surplus. In the long run, lower GDP would likely mean lower cash levels of public spending.

To put this in context, dealing with the public finance effect would require at least an additional one or two years of 'austerity' – spending cuts or tax rises – at the same rate as we have experienced recently to get the public finances back to balance (should that remain the government's priority). Following this path would also mean government debt remaining higher than otherwise, and additional debt interest payments.

These are important costs that would mean difficult decisions on tax, benefits and public services, but are not unmanageable if we wanted to pay them. The fiscal effects of leaving the EU would, of course, be only one part of the wider economic, social and political impacts of Brexit, all of which need to be taken into account.

# 1. Introduction

If the UK were to decide to leave the European Union, many aspects of political and economic life would be affected. One of those would be the UK's public finances. This would happen in a direct way. We are currently a net contributor to the EU budget and, in that respect, leaving the EU would strengthen our public finances. The amount we currently contribute, and could potentially save, is arithmetically quite straightforward to calculate. But public finances depend crucially on the strength of the overall economy, and if the economy were to be stronger or weaker outside the EU than within it then this effect would be likely to overwhelm the direct effect.

In this report, we consider both the possible direct and indirect consequences of a Brexit for the UK's public finances. In Chapter 2, we look at the direct effects. Were we to leave the EU and not join the European Economic Area (EEA) or similar arrangement, these effects are fairly clear. But there remains the possibility that in a post-Brexit world, the UK would sign up to all or some of the responsibilities that would go with joining the EEA, so we also look at what effects that might have.

Chapter 3 looks at the now considerable literature and results from modelling the possible economic consequences of leaving the EU. It sets out the scale of trade with the EU and other partners and the role of tariffs – and other non-tariff barriers – and looks at the different options in terms of trade agreements following a leave vote. It then looks at both the short- and long-term possible economic effects of leaving the EU, drawing on the various studies and explaining the possible roles of uncertainty, trade, foreign direct investment, regulation and immigration.

Chapter 4 goes on to use the analysis in the two previous chapters to look at possible public finance impacts in the short and long runs. Because there are no quantified economic scenarios from the Office for Budget Responsibility (OBR) or the Bank of England, we use some of the most credible independent economic forecasts to look at these possible public finance outcomes.

Chapter 5 concludes.

Finally, by way of introduction, it is important to stress that we are here looking at only one aspect of the Brexit debate. The economics and public finances matter, but they are by no means the only things that matter. We hope that what we have here will help inform that particular element of the debate for others to weigh up alongside all the other issues that will count in coming to a decision over our future membership of the EU.

## 2. The Direct Impact of Brexit on the Public Finances

If the UK were to leave the EU, the direct impact on the public finances (i.e. regardless of any impact via, for example, changes in national income) would come from the end of existing contributions to the EU budget. This would give rise to a reduction in UK public spending, although replacing at least some of the spending that is currently undertaken by the EU in the UK would presumably offset some of this fall. Furthermore, some form of contribution to the EU budget might be required if the UK wanted continued access to the EU's single market, particularly in services, which would further offset budgetary savings. This chapter looks at the potential size of this direct impact on the public finances and sets it in the context of overall UK government spending and borrowing. (The indirect impact on the public finances of the UK leaving the EU – that is, taking into account any change in national income – both in the short and long runs, is considered in Chapter 4.)

### 2.1 How much does the UK contribute to the EU and how does it affect the public finances?

The size and composition of the EU budget, the methods of calculating the financial contributions of each member, and the resulting level of contributions from each member are all described in detail in Browne, Johnson and Phillips (2016). This section provides a summary of the key numbers relating to the UK's contribution. Section 2.2 describes the contributions to the EU budget currently made by some countries that are outside the EU.

The overall EU budget accounts for about 1% of gross national income (GNI) across the 28 member states. UK Treasury figures suggest that the UK's gross contribution (i.e. ignoring the UK's rebate) in 2014 was £18.8 billion, which is about 1% of GDP. It is by dividing this number by 52 weeks that one comes to the widely-reported figure of over £350 million a week as the UK's contribution to the EU. But in this context, ignoring the rebate is clearly inappropriate. It is equivalent to suggesting that were the UK to leave the EU and not make any financial contribution to the EU's budget, then remaining EU members would continue to pay the rebate to the UK! After taking account of the rebate, the UK's contribution in 2014 was – again on the basis of Treasury figures – £14.4 billion, or 0.8% of GDP.<sup>2</sup> This is equivalent to around £275 million a week.

Given that the UK has an above-average level of GDP per capita, it is perhaps surprising that its contribution, net of the rebate, is lower than the EU average. But it is also important to consider the amount of spending that is done in the UK

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<sup>2</sup> Figures from HM Treasury (2015).

by the EU. In 2014, the UK received the lowest per-capita spend from the EU of any member state. This explains why the UK negotiated to receive a rebate on its contribution back in the 1980s (that remains in place to this day). After taking this spending into account, figures from the EU suggest that the UK's net contribution – i.e. net in the sense of being the total amount the UK paid into the EU budget less the amount of spending that was done by the EU in the UK – amounted to £5.7 billion.<sup>3</sup> This is equivalent to 0.3% of national income, or just over £100 million per week.

This implies that had the UK not contributed at all to the EU budget in 2014, and had it chosen to continue to fund all those payments and services that are currently paid for by the EU directly, then public spending (and therefore public sector net borrowing) would have been £5.7 billion lower. Looking forwards, the equivalent number looks likely to be bigger than this; the EU budget fluctuates from year to year and 2014 appears to be a year when the UK's net contribution, when measured on this basis, was relatively low. For example, in 2013, the amount that the UK paid into the EU less the amount of spending that was done by the EU in the UK was £9.1 billion, or £175 million per week. On average over the next five years, it seems likely to average around £8 billion a year.<sup>4</sup> This is about 0.4% of national income, and is equivalent to about £150 million a week.

**Table 2.1. The UK's financial contribution to the EU budget, 2013 and 2014**

	% of GDP	£bn	£m per week
<b>2013</b>			
Gross contribution	1.0	18.1	350
Contribution net of rebate	0.8	14.5	275
Contribution net of rebate and spending by the EU in the UK	0.5	9.1	175
<b>2014</b>			
Gross contribution	1.0	18.8	350
Contribution net of rebate	0.8	14.4	275
Contribution net of rebate and spending by the EU in the UK	0.3	5.7	100
<b><i>Approximate likely contribution net of rebate and spending by the EU in the UK going forwards</i></b>	<i>0.4</i>	<i>8</i>	<i>150</i>

Note: Full details available in Browne, Johnson and Phillips (2016). Spending per week rounded to the nearest £25 million.

<sup>3</sup> Source:

<http://ec.europa.eu/budget/library/biblio/documents/2014/Internet%20tables%202000-2014.xls>.

<sup>4</sup> Source: Box 6.1 of Browne, Johnson and Phillips (2016).

These different figures for the UK's financial contribution to the EU budget are summarised in Table 2.1.

This assumes that all of the spending that the EU funds that takes place in the UK would be replaced with funding by one tier or another of government in the UK. To the extent to which the UK chose not to fund these schemes, the direct impact of the UK leaving the EU on the public finances would be greater. That is to say, the direct reduction in public spending, and therefore in public sector net borrowing, would be greater. One reason this might be the case is that the UK might, for example, decide to spend less on supporting agriculture in the UK than is currently the case under the EU's Common Agricultural Policy. But the reduction in public spending, and therefore in borrowing, could also be smaller, for at least two reasons:

- First, there is some overseas aid spending that is funded by the EU that is scored as being conducted on the UK's behalf. If the UK wished to continue funding this amount of aid spending – which it would have to do were it to continue to comply with the stated desire of both the government and the opposition, now set in legislation, to spend at least 0.7% of GNI on overseas aid – then the direct improvement in the public finances would be less than £8 billion.
- Second, it would also be lower than £8 billion if the UK did continue to make some contribution to the EU budget – for example, in return for gaining preferential access to some aspects of the EU's single market (see Section 2.2).

Bearing this in mind, the possible direct impact on the public finances of the UK leaving the EU is now considered. The analysis assumes that Brexit would lead to an £8 billion reduction in public spending from 2018–19 onwards. As total public spending is forecast to be £801 billion in that year, this is equivalent to a 1% reduction in spending (to £793 billion). As shown in Figure 2.1, this would lead to spending being forecast to be 0.4% of national income lower, at 37.6% instead of 38.0%.

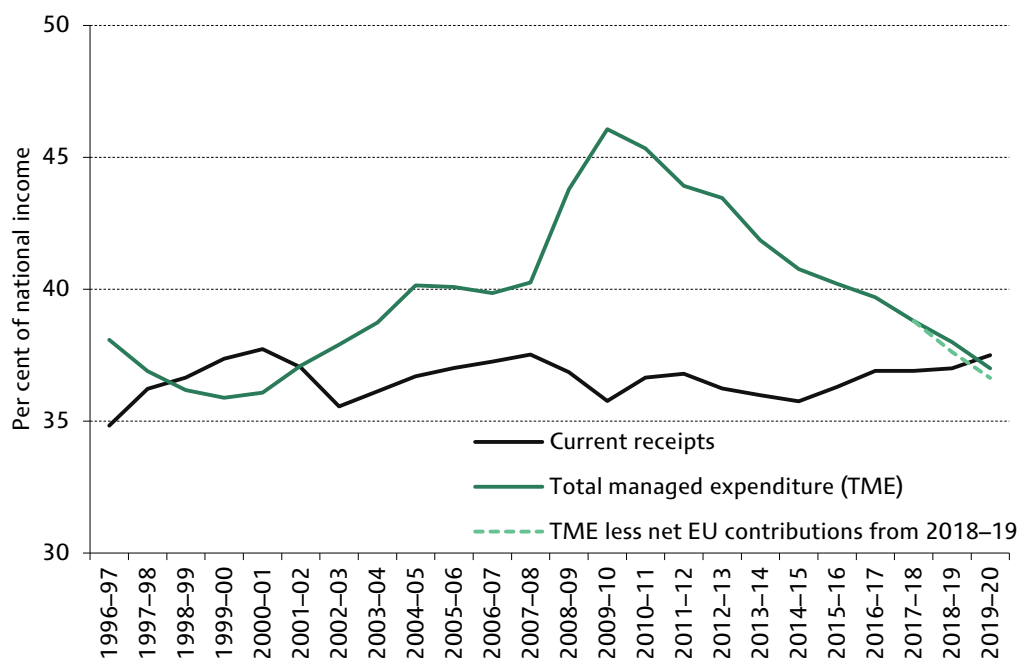
A lower level of public spending would also reduce the gap between public spending and total receipts, i.e. it would reduce public sector net borrowing. This can be seen in Figure 2.1 and is shown more clearly in Figure 2.2. If public spending in 2018–19 were reduced by £8 billion, this would reduce forecast public sector net borrowing from £21.4 billion to £13.4 billion or, when measured as a share of national income, from 1.0% of GDP to 0.6% of GDP. In 2019–20 – the first year that the Chancellor's fiscal target to achieve an overall budget balance could apply<sup>5</sup> – it would increase the forecast surplus from £10.4 billion to £18.4 billion (or from 0.5% to 0.9% of national income).

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<sup>5</sup> The fiscal target applies to each year from 2019–20 unless growth over four quarters appears to have dropped, or is forecast to drop, below 1%. For a discussion, see Crawford et al. (2016).

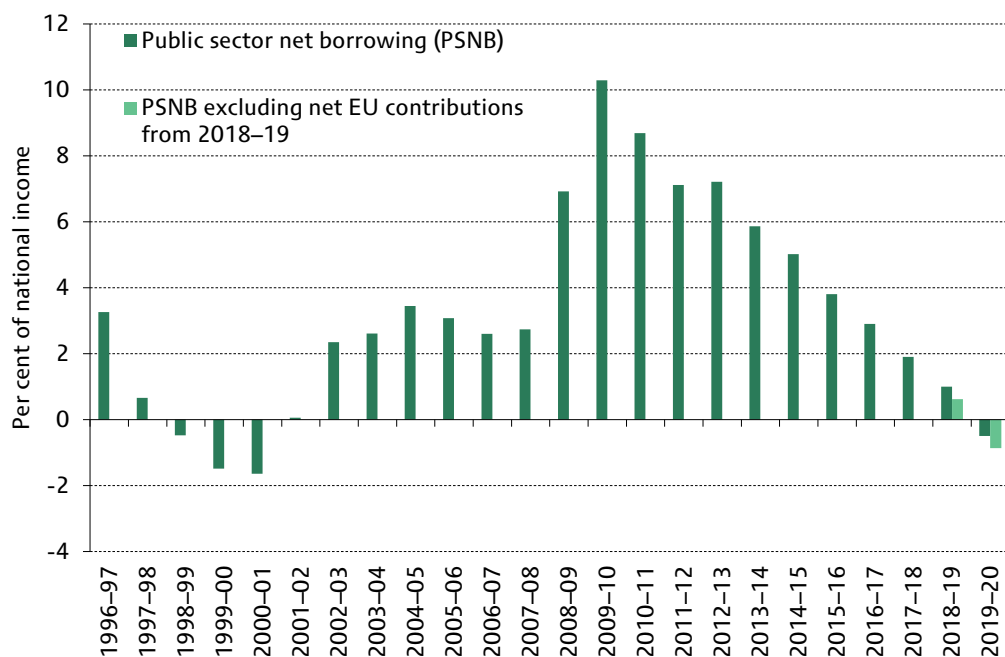


Figure 2.1. UK public spending with and without net EU contributions from 2018–19 onwards (% of national income)



Source: Office for Budget Responsibility, *Public Finances Databank*, 16 March 2016, <http://budgetresponsibility.org.uk/data/>; authors' calculations.

Figure 2.2. UK public sector net borrowing with and without net EU contributions from 2018–19 onwards (% of national income)



Source: Office for Budget Responsibility, *Public Finances Databank*, 16 March 2016, <http://budgetresponsibility.org.uk/data/>; authors' calculations.

Alternatively, of course, the UK government might decide to spend any additional resources either on reducing the scale of cuts to public spending or on tax cuts. The latest spending plans imply day-to-day spending by central government on the delivery and administration of public services being cut by £12 billion (or 3.7%) between 2015–16 and 2019–20.<sup>6</sup> An additional £8 billion could therefore be used to reduce the scale of these cuts by two-thirds (or from an average 3.7% cut to an average 1.3% cut). Similarly, the announced cuts to social security benefits and tax credits for this parliament are estimated to reduce spending, relative to what it would otherwise have been, by £12 billion by the end of this parliament.<sup>7</sup> Therefore an £8 billion reduction in spending on the EU could allow two-thirds of these cuts to be cancelled. In terms of tax cuts, £8 billion would be sufficient, for example, to finance a cut to both the basic and higher rates of income tax of 1.4p.<sup>8</sup>

As we shall see later, however, it is important to be clear that this direct effect on the budget would easily be overwhelmed by only modest changes to national income arising from a decision to leave the EU.

## **2.2 What can other countries tell us about what the UK might contribute to the EU following Brexit?**

If the UK votes to leave the EU, its existing contributions to the EU budget would cease. However, depending on the type of access to the EU's single market the UK government wanted, and the deal it was able to negotiate, a contribution to the EU budget, although likely lower, may need to be made. In this section, we briefly discuss the deals non-EU countries have obtained, and the contributions they make to the EU's budget and receipts they receive.

Such contributions take two main forms. First, countries outside the EU can become associate members of particular EU programmes (such as Horizon 2020), contributing to them on the basis of their gross national income – the same basis on which the bulk of EU members' contributions are calculated. These countries are then eligible for funding from these programmes too. Second, the richer countries with the greatest market access to the EU – such as Norway and Switzerland – pay for additional direct grants to poorer EU member states to bolster development.

Unfortunately, the EU does not appear to publish figures on net budgetary contribution figures for these non-member countries (nor do the relevant national governments), or at least not in an easily accessible form. This lack of transparency is far from ideal and, as a result, any figures reported below are

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<sup>6</sup> This is the cut to resource departmental expenditure limits (RDEL) as of the March 2016 Budget. Source: Crawford, 2016.

<sup>7</sup> See, for instance, Hood (2015).

<sup>8</sup> <https://www.gov.uk/government/statistics/direct-effects-of-illustrative-tax-changes>.

calculated using rather ad-hoc methods and should be treated as indicative only. As a result, in many instances, we can only make qualitative statements.

## **Contributions of EEA members**

If the UK were to leave the EU, membership of the European Economic Area (EEA) would be the option that represented the smallest change to both trading arrangements and, in all likelihood, budget contributions. Currently, EEA membership comprises Iceland, Liechtenstein and Norway (in addition to EU member states).

These three EEA member countries have, with the exception of agricultural and fisheries products, tariff-free access to the EU's markets, although customs checks and documentation are required to ensure that goods satisfy 'rules of origin' designed to stop exports from third countries entering the EU tariff-free via these countries (since the EU and these countries operate their own external tariff systems).<sup>9</sup> Perhaps in recognition of this preferential access to the EU's single market, the EEA countries' agreement with the EU entails them contributing to economic and social programmes in 15 of the least prosperous EU member states in order to 'alleviate social and economic disparities'.<sup>10</sup> They also have the ability to sign up to contribute to specific EU programmes and, as a result, gain access to funding from these programmes.

In the case of Norway, contributions will take three main forms over the period between 2014 and 2020 or 2021:<sup>11</sup>

- the general EEA Grants scheme, amounting to around €212 million a year, on average;<sup>12</sup>
- the additional Norway Grants scheme, amounting to €179 million a year, on average;
- contributions to a number of EU programme areas, most notably in the area of science and education, amounting to €447 million a year, on average (rising from €306 million in 2014 to €550 million in 2020).

This means a gross contribution to the EU budget, or directly to poorer EU member states, amounting to €837 million a year, on average, over this period (although perhaps more like €700 million in 2014).<sup>13</sup> This is around £125 per

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<sup>9</sup> The three countries also have to meet the vast majority of EU regulations, especially in relation to trade, despite having no formal say in the setting of these regulations, and accept free migration of EU citizens (and vice versa). Chapter 3 provides further details.

<sup>10</sup> For further information, see [http://eur-lex.europa.eu/resource.html?uri=cellar:02eed2b7-da51-11e5-8fea-01aa75ed71a1.0011.03/DOC\\_1&format=HTML&lang=EN&parentUrn=CELEX:52016PC0084](http://eur-lex.europa.eu/resource.html?uri=cellar:02eed2b7-da51-11e5-8fea-01aa75ed71a1.0011.03/DOC_1&format=HTML&lang=EN&parentUrn=CELEX:52016PC0084).

<sup>11</sup> Figures available at <http://www.eu-norway.org/eu/Financial-contribution/#.Vzx5rXotFLg>.

<sup>12</sup> Iceland and Liechtenstein together contribute around €9 million a year to this general grant.

<sup>13</sup> Unfortunately, figures are not available for the Norway and EEA Grants schemes on an annual basis. The figure for 2014 is therefore based on the reported contribution to the EU programme

Norwegian per year over the period as a whole, based on current exchange rates (and perhaps £105 per year in 2014).<sup>14</sup> These amounts compare with a gross contribution forecast to be around £215 per person per year over the same period for the UK (which, as a member of the EU, participates in many other programmes, including the Common Agricultural Policy).<sup>15</sup>

Unfortunately, official figures for net contributions to the EU budget are not available for Norway or the other EEA countries. However, an analysis of science funding – the main area Norway contributes to – during the period between 2007 and 2013 suggests Norway received back slightly more than half of what it contributed to that funding area.<sup>16</sup> If this were replicated across all spending areas and were to continue during the 2014 to 2020 funding period, then Norway's net contribution would amount to around £91 per person per year, on average.

Exactly what the UK would contribute if it opted for EEA membership would depend on negotiation over its contributions to poorer areas of the EU, on what EU programmes it decided to participate in, and its success in winning funding from those programmes. However, if it contributed and received back the same proportion of national income as Norway, the UK's net contribution would be around £52 per person (£3.3 billion in aggregate) per year, compared with a UK net contribution to the EU budget forecast to be around £121 per person (£8 billion in aggregate) per year over the same period if we remain part of the EU.<sup>17</sup> The case of Norway therefore suggests that the UK's net contributions to the EU could be expected to be substantially lower if it left and joined the EEA than if it remained part of the EU, but could still be significant.

## Contributions of Switzerland

Switzerland is not a member of the EEA, but it is a member of the broader European Free Trade Area (EFTA). This provides it with tariff- and quota-free access to the EU's markets for manufactured goods, although, as with EEA members, customs checks and documentation are required. Switzerland does not have full access to markets in services; instead, it has negotiated a series of deals

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areas in that year, and the average figure for between 2014 and 2021 for the Norway and EEA Grants schemes.

<sup>14</sup> Calculated using out-turn and projection figures for Norway's population: <http://www.ssb.no/en/befolkning/statistikker/folkfram/aar/2014-06-17>.

<sup>15</sup> Authors' calculations using OBR forecasts for UK contributions to the EU and ONS UK population projections, available at <http://budgetresponsibility.org.uk/efo/economic-fiscal-outlook-march-2016/> and <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/>.

<sup>16</sup> Source: Authors' calculations; [http://europa.eu/rapid/press-release\\_IP-14-566\\_en.htm](http://europa.eu/rapid/press-release_IP-14-566_en.htm); [http://www.efta.int/sites/default/files/documents/advisory-bodies/parliamentary-committee/jpc-reports/EEA\\_JPC\\_Report\\_EU\\_Programmes.pdf](http://www.efta.int/sites/default/files/documents/advisory-bodies/parliamentary-committee/jpc-reports/EEA_JPC_Report_EU_Programmes.pdf).

<sup>17</sup> Norwegian GNI per person is around 1.75 times that of the UK.

with the EU for particular sectors such as insurance, which leaves out many financial services. Switzerland also participates in and contributes to a number of EU programmes, such as Horizon 2020,<sup>18</sup> and provides grants to those countries that have joined the EU since 2004, which amount to approximately £900 million in commitments over five years (with actual payments spread over ten).<sup>19</sup>

Unfortunately, figures on the overall contributions made by Switzerland – either gross or net – to the EU or directly to EU members are not readily available. However, the Swiss government has reported that Switzerland was a net beneficiary of research funding in the period 2007–13, paying in 2.3 billion and receiving back 2.5 billion Swiss Francs.<sup>20</sup> The smaller payments to poorer EU members, and greater success at winning research money, mean Switzerland's net contribution is almost certainly significantly lower than Norway's.

## Other countries

Many other countries have bilateral agreements with the EU giving some form of preferential access to the EU's markets, and some of these also participate in EU programmes.

Turkey, for instance, has tariff- and quota-free access to the EU's market in goods, with the exception of raw agricultural produce. As part of the EU's customs union, it applies the EU's external tariffs, meaning customs checks for most goods are not required. However, it does not have access to the EU's services market. It participates in a number of EU programmes such as Horizon 2020 and the Erasmus+ scheme, contributing on the basis of GNI. In addition to being eligible for funding under these programmes, as a membership candidate, Turkey is eligible for funding under the EU's pre-accession arrangements. This funding is set to amount to €631 million in 2016,<sup>21</sup> which means Turkey is a net recipient of EU funding. The same is true for other poorer European states that are also candidates for EU membership: Serbia, Albania, Macedonia, Kosovo, Bosnia and Montenegro (although these countries are not also part of the EU's customs union). Of course, were the UK to leave the EU, it would not be a candidate for EU membership.

Finally, the EU has a range of trade deals with other countries, which differ in significant ways, providing different degrees of access to each others' markets in goods and services.<sup>22</sup> One example that has been cited during the EU referendum

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<sup>18</sup> Although, following the Swiss people's decision to restrict EU migration rights, full participation in and contribution to these programmes are on hold.

<sup>19</sup> <https://www.eda.admin.ch/erweiterungsbeitrag/en/home/the-swiss-contribution/kurzportraet-erweiterungsbeitrag.html>.

<sup>20</sup> <http://www.sbf.admin.ch/aktuell/medien/00483/00594/index.html?lang=en&msg-id=60389>.

<sup>21</sup> [http://ec.europa.eu/enlargement/instruments/overview/index\\_en.htm](http://ec.europa.eu/enlargement/instruments/overview/index_en.htm).

<sup>22</sup> A full list is available at <http://ec.europa.eu/trade/policy/countries-and-regions/agreements/>.

debate is that with Canada, which is the most comprehensive free trade deal the EU has agreed to date. It provides tariff- and quota-free access for the vast majority of goods, including significant areas of agricultural products, although some tariffs remain (e.g. on automotive vehicles). Significant areas of services are covered by the deal, but there are exceptions including financial services. The key thing to note for this discussion is that the Canada–EU deal entails no budgetary contributions to the EU. But, of course, for many reasons – not least geography – the degree to which the EU will trade with Canada in future will likely be far less than the degree to which the UK, whether or not in the EU, would trade with the EU. The extent to which the Canada deal offers a template for the UK is therefore debatable.

## **Lessons for the UK**

The above discussion highlights the array of trade arrangements the EU has with non-members and the budget contributions that are associated with these arrangements. The EEA countries, which have the greatest access to the EU's single market, are obliged to contribute grants to poorer parts of the EU. Switzerland also provides funding to poorer EU members, although the scale of this funding is proportionately smaller, via a series of bilateral agreements with the specific countries rather than with the EU. It is therefore not clear whether Switzerland's preferential access to the EU's markets should be seen as contingent on this funding.

Other countries with which the EU has trade deals are not obliged to contribute to the EU budget. However, like the EEA members and Switzerland, some participate in EU programmes and thus contribute to them and receive funding from them.

What does this mean for the UK? First, if it wished to join the EEA and have the greatest access to the EU's markets, then contributions to poorer EU members would almost certainly be required. These – and any contributions to EU programmes the UK wished to participate in – would be less than the current net contribution, but could still be substantial. If the UK opted for a looser relationship with the EU via a bilateral trade deal, then things are less clear. Ultimately, whether, and if so how much, the UK would have to contribute would be decided by bilateral negotiations, the outcomes of which it is difficult to predict in advance with any degree of confidence. It is worth noting, however, that no country outside the EU or EEA – even Switzerland, which does contribute some funds to poorer EU members – has full access to the EU's internal services market, including financial services. This suggests the UK might have to accept restrictions on its access to the EU's markets in key sectors if it did not wish to provide at least some funding to EU member states.

## 3. Brexit and the UK's National Income

The impact of Brexit on the UK's public finances will depend largely on how it affects the state of the economy, rather than on the direct budgetary scenarios identified in Chapter 2.

This chapter reviews the economic estimates of the effect of leaving the EU. It sets out different authors' estimated impacts (Section 3.1), looks at the UK's economic relationship with the EU (Section 3.2) and the alternative policy options (Section 3.3), and identifies and assesses the main economic issues (Section 3.4). The concluding section identifies the estimates of impacts on national income that feed into the next chapter, which presents the public finance implications.

### 3.1 Overview of economic assessments of Brexit

A wide range of academics, consultancies, think tanks and others have made substantive quantitative economic assessments of the UK leaving the EU over both the short term and the long term. Table 3.1 summarises the substantive modelled estimates from the last two years.

The scenarios and coverage of the studies differ significantly. Most studies refer to the three potential trade scenarios for the UK – EEA (European Economic Area) membership, FTA (Free Trade Agreement) with the EU, and WTO (World Trade Organisation) membership. We set out the different policy possibilities in Section 3.3, but the studies make different assumptions about what these scenarios mean (for example, in the WTO scenario, some studies assume that the UK unilaterally removes restrictions on imports, while others assume the UK would apply tariffs according to the ceilings set by the WTO).

Table 3.1 also sets out the main impacts assessed by each study. All of the studies assess the trade and budgetary impacts for the UK. Over half consider the impact on foreign direct investment (FDI) and some assess the impact on productivity, migration and regulation. Similarly, all of the studies listed here use macroeconomic models to assess the impacts on GDP (gross domestic product) and other economic variables. Note that when looking at the short-term impact on public finances in Chapter 4 (see Table 4.2), we consider a slightly broader range of quantitative estimates.

Table 3.1 reports long-term estimates in terms of GDP as this is our main concern for forecasts of the public finances. Some studies also make separate estimates of GDP per person. These are generally similar to the overall GDP estimates.<sup>23</sup>

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<sup>23</sup> In some estimates, scenarios with different patterns of migration imply marginal differences between GDP and GDP per head figures.

Table 3.1. Assessments of 2030 economic impact of Brexit

Organisation	Scenario	Estimate (% GDP)	Range	Impacts modelled
CEP (2016a)	Dynamic EEA/FTA	-7.9	(-6.3 to -9.5)	Budget, trade, productivity
	Static EEA	-1.3	N/A	Trade only
	Static WTO	-2.6	N/A	Trade only
HM Treasury	EEA	-3.8	(-3.4 to -4.3)	Budget, trade, FDI, productivity
	FTA	-6.2	(-4.6 to -7.8)	
	WTO	-7.5	(-5.4 to -9.5)	
OECD	WTO/ FTA	-5.1	(-2.7 to -7.7)	Budget, trade, FDI, productivity, migration, regulation
NIESR	EEA	-1.8	(-1.5 to -2.1)	Budget, trade, FDI
	FTA	-2.1	(-1.9 to -2.3)	
	WTO	-3.2	(-2.7 to -3.7)	
	WTO+	-7.8	N/A	Adds productivity
PwC/CBI	FTA	-1.2	N/A	Budget, trade, FDI, regulation
	WTO	-3.5		
Oxford Economics	FTA <sup>a</sup>	-2.0	(-0.1 to -3.9)	Budget, trade, FDI, migration, regulation
Open Europe	FTA	-0.8 to +0.6	(-2.2 to 1.6)	Budget, trade, migration, regulation
Economists for Brexit	WTO	+4.0	N/A	Budget, trade <sup>b</sup>

<sup>a</sup> FTA with moderate policy scenario used as central estimate; range includes 'liberal customs union' (-0.1) to 'populist MFN scenario' (-3.9).

<sup>b</sup> Regulation impacts assessed separately.

Note: Estimates are for impact on GDP in 2030.

Source: Estimates from organisations above. Authors' assessment of impacts modelled.

Of the eight studies considered, six see a negative economic impact of Brexit in their central estimates. Indeed, even using the ranges around the estimates, none of these six identifies a positive impact. Two studies, by Open Europe and Economists for Brexit, highlight a potential positive impact, and only Economists for Brexit have a positive figure as their central estimate.



In order to make an informed assessment of the public finance impacts of Brexit, in the remainder of this chapter we consider the policy scenarios, assumptions and approaches to the key issues of these different studies.

## 3.2 Economic relationship with the EU

This section gives an overview of the UK's existing trade and investment relationship with the EU.

Many studies identify trade shifts as the most important dimension of the economic impact of Brexit, so we spend some time considering these estimates and why they differ.

### Overview of trade patterns and trends

Table 3.2 sets out the UK's export and import trade patterns, highlighting that, in 2015, 44% of exports (in goods and services) went to the EU while 53% of imports came from the EU.

Table 3.2. UK trade value and EU share, 2015

	Exports		Imports	
	£bn	Share	£bn	Share
EU	223	44%	291	53%
US	95	19%	60	11%
Rest of the world	193	38%	197	36%
Total	511	100%	548	100%

Note: Shares may not sum due to rounding.

Source: Bank of England, 2016.

The US is our second-largest destination for exports, and Switzerland is our third-largest, at £18.8 billion (3.7% of UK exports). China's consumption of UK exports has grown rapidly over the last decade and now amounts to £15.9 billion, or 3.1% of UK exports (our fourth-largest destination).

In addition, a substantial portion of UK exports – 44% in 2015 – are in services (see Table 3.3) and, as service imports are much smaller, this strengthens the UK's balance of trade, with net service trade of £89 billion accounting for some 5% of GDP. The EU accounted for nearly 40% of our services exports. The US, the next biggest destination for service exports, accounted for 21%.

Services tend not to suffer from import tariffs in the same way as goods, partly because of the difficulty for authorities identifying the trade. But there are substantial non-tariff barriers to trading in services – for example, licensing regimes – which add to the costs of exporting services. The EU's single market seeks to reduce these costs through harmonising regulations around service provision, and some trade agreements can also seek to mitigate these differences.

Table 3.3. UK service trade and EU share, 2015

	Exports		Imports	
	£bn	Share	£bn	Share
EU	89	39%	68	50%
Rest of the world	137	61%	69	50%
Total	226		137	

Source: Authors' calculations; ONS balance of payments data, <https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/datasets/unitedkingdomeconomicaccountsbalanceofpaymentscurrentaccount>.

As well as the exports that go directly to the EU, the UK benefits from trade deals the EU has struck. The EU currently has 33 preferential trade deals with 62 other countries.<sup>24</sup> Open Europe (2016), uses ONS data for 2014 to calculate the proportion of the UK's trade covered by the EU and its trade deals with third countries. It estimates that these agreements currently cover nearly 63% of Britain's global trade and that this would rise to 65% once agreements with Canada and Singapore come into force. (The remainder is the UK's trade with non-EU countries with which the EU has not negotiated favourable terms.) If the Transatlantic Trade and Investment Partnership (TTIP) between the EU and the US were agreed, Open Europe estimates coverage would rise further to 78%.

A further important element of the UK's economic relationship with other countries is the foreign investment made by the UK overseas and made by other countries in the UK, i.e. foreign direct investment (see Table 3.4).

Table 3.4. UK foreign direct investment (FDI) stock, as at end 2014

	FDI in the UK		UK FDI overseas	
	£bn	Share	£bn	Share
EU	496	48%	404	40%
US	253	24%	240	24%
Rest of the world	286	28%	371	37%
Total	1,035	100%	1,015	100%

Note: Shares may not sum due to rounding.

Source: Bank of England, 2016.

UK FDI inflows are high relative to other EU countries. OECD (2016) shows that in 2014, the UK accounted for the largest share, and over 30%, of inflows to EU15 countries.<sup>25</sup> Overseas investment is an important driver of economic activity and is also linked to higher productivity through the transfer of skills and ideas

<sup>24</sup> Different estimates exist for the level of coverage; we draw on the Open Europe (2016) estimate for consistency here.

<sup>25</sup> The OECD defines this group as the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom.

(OECD, 2016). If investors perceive that the UK's economic prospects or access to markets has diminished, this would likely reduce UK FDI. We return to this issue below.

Overall, then, the EU is the UK's largest trading partner, comprising around half of all trade, and also its biggest investment partner. The EU is also the UK's largest service exports destination. Services account for some 44% of total UK exports and make a substantial positive contribution to the UK's trade balance and therefore to national income.

## **EU trade policy and tariff levels**

Trade with and beyond the EU contributes significantly to national income, and the level of 'openness'<sup>26</sup> of an economy to trade has also been shown to increase national income (OECD, 2016; CEP, 2016b).

Within the EU, the UK enjoys tariff- and customs-free access to a 'single market', which uses common regulatory standards in many sectors. In addition, the EU has struck 35 Free Trade Agreements<sup>27,28</sup> (FTAs), and plans to strike more, with a range of other countries, and the UK benefits further from these arrangements. The five main trade characteristics of EU membership are:

- tariff-free access to EU markets;
- no customs checks at borders within the EU (i.e. no 'rules of origin' checks);
- single market with common regulatory standards;
- access to more than 55 other markets through a range of EU FTAs;
- common external tariffs on imports to the EU from non-EU countries.

Tariffs are set by the EU according to World Trade Organisation rules (see below). In practice, this means that some goods imported from outside the EU (and beyond its FTA partners) face an 'import tariff' levied on the value of the import. This import tariff is known as the 'most favoured nation' (MFN) tariff as WTO rules require that, outside of trade agreements, all countries must face the same tariff as the 'most favoured' nation. The WTO calculates the average level of tariffs applied across all imports and also weights according to their value. For the EU, the simple average of applied tariffs was 5.3% in 2014, and on a trade-weighted average this was 3.6% (2013). Tariffs are substantially higher on agricultural goods (see Table 3.5).

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<sup>26</sup> Trade openness is defined as the total value of exports and imports expressed as a proportion of a country's GDP.

<sup>27</sup> See [http://ec.europa.eu/trade/policy/countries-and-regions/agreements/index\\_en.htm](http://ec.europa.eu/trade/policy/countries-and-regions/agreements/index_en.htm).

<sup>28</sup> Note that most trade agreements are known as 'free trade agreements' even when some tariffs and other costs to trade remain.

Table 3.5. MFN tariffs on imports applied by the European Union

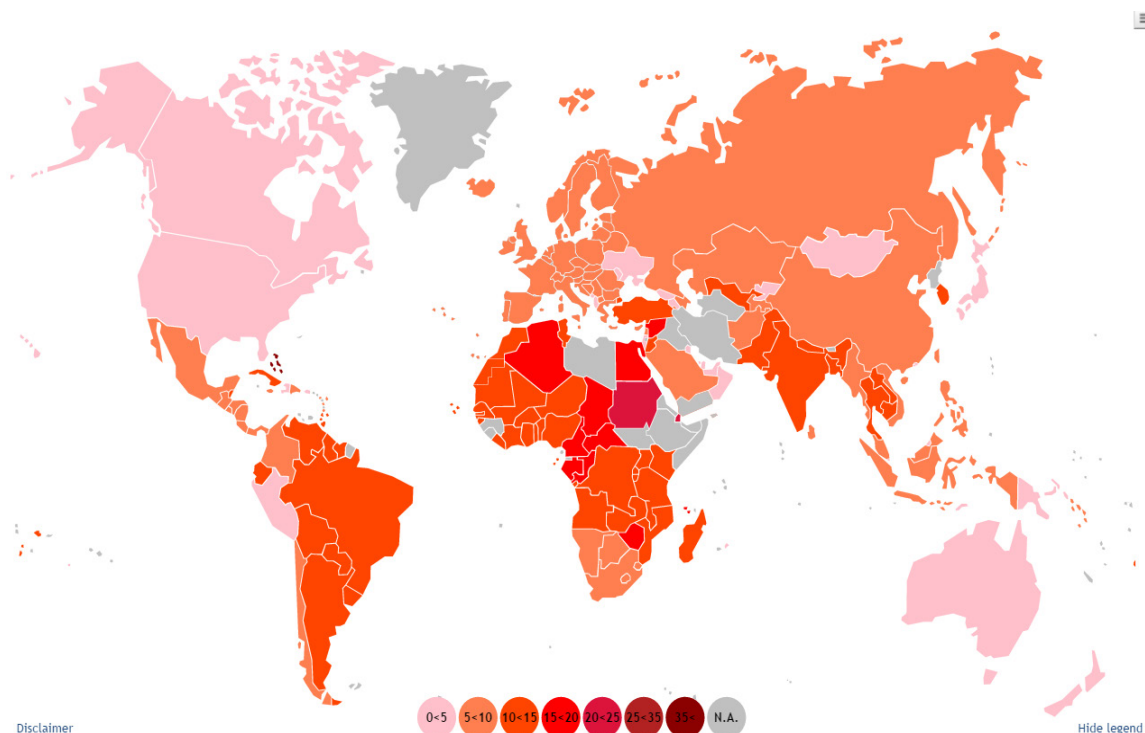
Tariff type	Total	Agriculture	Non-agricultural
Simple average MFN <sup>a</sup> applied (%), 2014	5.3	12.2	4.2
Trade-weighted average (%), 2013	3.6	22.3	2.3
Imports in billion US\$, 2013	1,996.5	128.7	1,867.8

<sup>a</sup> 'Most favoured nation' (MFN) means that the country that is the recipient of this treatment – in this case, tariff levels – must, nominally, receive equal trade advantages to those of the 'most favoured nation' by the country granting such treatment. In practice, this means that, outside of trade deals, all countries facing import tariffs face the same level of tariffs.

Source: WTO, 2015.

These are the (average) tariff levels faced by importers to the EU unless they agree a Free Trade Agreement, which could reduce some or all of the tariffs. These compare with an overall average tariff of around 9%<sup>29</sup> applied by WTO members (2013) to imports (see Figure 3.1).

Figure 3.1. Simple average applied (MFN) tariff (all products)



Source: World Trade Organisation, 'International Trade and Market Access Data', latest available data (2013 and 2014),

[https://www.wto.org/english/res\\_e/statis\\_e/statis\\_bis\\_e.htm?solution=WTO&path=/Dashboards/MAPS&file=Map.wcdf&bookmarkState={%22impl%22:%22client%22,%22params%22:{%22langParam%22:%22en%22}}](https://www.wto.org/english/res_e/statis_e/statis_bis_e.htm?solution=WTO&path=/Dashboards/MAPS&file=Map.wcdf&bookmarkState={%22impl%22:%22client%22,%22params%22:{%22langParam%22:%22en%22}}).

<sup>29</sup> [https://www.wto.org/english/thewto\\_e/20y\\_e/wto\\_20\\_brochure\\_e.pdf](https://www.wto.org/english/thewto_e/20y_e/wto_20_brochure_e.pdf).

If the UK faced the EU's external tariffs following exit, Open Europe (2015) estimate that 35% of UK exports to the EU would face relatively high tariffs.<sup>30</sup> For example, Car and Chemical exports from the UK to the EU were worth £8.6 billion and £28.0 billion respectively and would face respective tariffs of 10% and 4.6%.

### Importance of non-tariff measures to goods and services trade

Over the last half-century, tariff levels have been reduced significantly and non-tariff measures (NTMs)<sup>31</sup> are seen as increasingly important (CEP, 2016a; Open Europe, 2016). Non-tariff measures and regulatory divergence are restrictions to trade in goods, services and investment. In a comprehensive study assessing non-tariff measures between the EU and the US, ECORYS (2009) find that the tariff-equivalent of NTMs is around 10%. That is, NTMs are equivalent to a trade tariff of 10% – this is almost double the level of tariff measures applied by the EU. Whereas tariffs only affect goods, non-tariff measures also affect services. As we have seen, services trade is particularly important to the UK.

## 3.3 Policy options for the UK outside of the EU

This section identifies the potential economic and trade policy options for the UK outside of the EU. If the UK left the EU, it would potentially have a range of options, with trade-offs between EU market access and the degree of shared sovereignty and integration.

### Policy options

Were the UK to leave the EU, then there would be four broad options for its trade policy within and beyond the EU. These are explained below and summarised in Table 3.6.

**1. European Economic Area<sup>32</sup> membership** (for example, Norway) – EEA membership is the option closest to membership of the European Union.<sup>33</sup> Trade

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<sup>30</sup> The WTO identifies that 46 per cent of agricultural and 61 per cent of non-agricultural imports to the EU were duty-free in 2013 (<http://stat.wto.org/CountryProfile/WSDBCountryPFView.aspx?Language=E&Country=NZ,E28>).

<sup>31</sup> Non-tariff measures can be defined as 'all non-price and non-quantity restrictions on trade in goods, services and investment, at federal and state level. This includes border measures (customs procedures, etc.) as well as behind-the border measures flowing from domestic laws, regulations and practices' (ECORYS, 2009). In other words, non-tariff measures and regulatory divergence are restrictions to trade in goods, services and investment at the federal or (member) state level.

<sup>32</sup> EEA members (Iceland, Norway and Liechtenstein) are all members of the European Free Trade Association along with Switzerland.

<sup>33</sup> The EEA Agreement does not cover the following EU policies: common agriculture and fisheries policies (although the EEA Agreement contains provisions on trade in agricultural and fish products); customs union; common trade policy; common foreign and security policy; justice and home affairs (the EEA EFTA states are, however, part of the Schengen area); direct and indirect taxation; or economic and monetary union. See <http://www.efta.int/eea/eea-agreement/eea-basic-features#5>.

with the EU is largely tariff-free<sup>34</sup> but border checks are additionally required to ensure the origin of goods, placing an additional cost on exports to the EU. EEA members enjoy substantial access to the single market but have to make budget contributions (as described in Chapter 2), meet the vast majority of EU regulations and accept free movement of people. Despite this, EEA members have virtually no say in how EU regulations are set. Finally, in terms of trade with countries outside the EU, this is governed by the European Free Trade Association (EFTA), which has 26 FTAs covering 37 countries. These are separate from the EU's FTAs and include, for example, Canada, Singapore (which the EU's FTAs do not yet) and Mexico (where the EU has a separate agreement). Several commentators (Oxford Economics, Open Europe) have suggested EEA membership is an unlikely option for the UK on exit, as it involves many of the same benefits and costs of EU membership but with less influence over its direction. HM Treasury (2016a) also makes this point.

**2. An EU-UK Free Trade Agreement (FTA)** with the EU, like Canada (see below for variants). This option covers a broad range of possibilities but would involve tariffs and potentially other barriers being lowered from the 'most favoured nation' (MFN) level faced by those exporting to the EU without a trade deal. In addition, it could enable the UK to strike its own deals with other countries, including with those countries the EU has an existing deal with (potentially 'grandfathering' them on similar terms). Outside of trade deals, other countries would levy tariffs on their imports from the UK up to the levels agreed at the World Trade Organisation (WTO) and the UK could set its own tariffs on imports in the same way. This option is unlikely to involve budget contributions, accepting free movement of labour or EU regulation (though see below). It is likely to mean that UK exports to the EU face customs checks, adding a friction to trade. Finally, UK exporters would not automatically be able to provide services in the EU as now. This could particularly affect service providers, who would need to meet EU standards as now but may also face more onerous requirements (for example, licensing) to enable them to trade.

*FTA variants* – Switzerland has a bilateral trade deal with the EU that includes the right to supply the EU tariff-free and without restrictions in a number of sectors (though customs checks still apply to goods). In those areas, Switzerland is bound by EU regulation (though has very limited say in it) and, as part of the wider agreement, accepts free movement of people. Still, Switzerland does not have access on financial services.<sup>35</sup> The UK may wish to attempt to retain access to part of the single market in a similar way, though of course this implies agreeing to adopt EU regulations, and perhaps to free movement of people.

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<sup>34</sup> Agriculture is excluded from tariff-free trade in EEA agreements.

<sup>35</sup> In practice, to serve EU customers, this has meant Swiss companies establishing subsidiaries within the EU, and in particular in London. This increases their costs, and displaces economic activity that might otherwise have occurred in Switzerland.

Table 3.6. Overview of potential economic and trade policy scenarios

Scenario	Features	Obligations and issues
<b>EU</b>	<ul style="list-style-type: none"> <li>- No tariffs on goods</li> <li>- No customs costs</li> <li>- Full access to single market including financial services</li> <li>- Shape EU rules</li> <li>- 35 FTAs and more planned</li> </ul>	<ul style="list-style-type: none"> <li>- Meet EU regulation</li> <li>- Budget contribution</li> <li>- Common tariff on imports</li> <li>- Free movement of people</li> </ul>
<b>European Economic Area (EEA)</b>  Norway	<ul style="list-style-type: none"> <li>- Limited tariffs on goods</li> <li>- Near-full access to single market including financial services</li> <li>- Agree trade deals as part of EFTA</li> <li>- 26 EFTA FTAs and more planned</li> </ul>	<ul style="list-style-type: none"> <li>- Agriculture and fisheries face tariffs</li> <li>- Customs costs</li> <li>- EU rules with no influence</li> <li>- Free movement of people</li> <li>- Budget contribution</li> <li>- No access to 35 EU FTAs</li> </ul>
<b>Trade Agreement I</b>  Switzerland (bilateral deal)	<ul style="list-style-type: none"> <li>- Limited tariffs on goods</li> <li>- Some sectoral access to single market</li> <li>- Limited budget contribution</li> <li>- Agree trade deals as part of EFTA</li> <li>- 26 EFTA FTAs and more planned</li> </ul>	<ul style="list-style-type: none"> <li>- Agriculture and fisheries face tariffs</li> <li>- Customs costs</li> <li>- EU rules in sectors with access</li> <li>- Free movement of people</li> <li>- Reduced access to single market</li> <li>- No access to 35 EU FTAs</li> </ul>
<b>Trade Agreement II</b>  Turkey (customs union)	<ul style="list-style-type: none"> <li>- Limited tariffs on goods</li> <li>- No customs costs (see obligations)</li> <li>- No budget contribution</li> </ul>	<ul style="list-style-type: none"> <li>- No access to 35 EU/EFTA FTAs</li> <li>- Cannot make trade agreements</li> <li>- EU common tariff on imports</li> <li>- Adopt many EU rules</li> <li>- No special access to single market</li> </ul>
<b>Trade Agreement III</b>  Canada (FTA)	<ul style="list-style-type: none"> <li>- Limited tariffs on goods</li> <li>- Potential to agree sector-by-sector access to EU single market</li> <li>- Can agree other trade deals</li> <li>- Can set own import tariffs</li> </ul>	<ul style="list-style-type: none"> <li>- No access to 35 EU/EFTA FTAs</li> <li>- Customs costs on EU trade</li> <li>- No special access to single market</li> </ul>
<b>WTO</b>	<ul style="list-style-type: none"> <li>- Free from rules, including free movement</li> <li>- Can agree other trade deals</li> <li>- Can set import tariffs</li> <li>- Could cut import tariffs and customs checks (unilateral free trade)</li> </ul>	<ul style="list-style-type: none"> <li>- Face EU external tariffs</li> <li>- Face non-EU external tariffs</li> <li>- No special access to single market</li> <li>- No influence over rules</li> </ul>

Note: This table necessarily simplifies the issues and bullet-points are not representative of benefits.

Turkey has a trade deal with the EU that grants tariff- and customs-free access beyond agriculture and fisheries. However, Turkey does not automatically access the EU's trade deals and must apply external tariffs to imports from non-EU countries at or above the level the EU applies to its imports. This weakens Turkey's ability to strike trade deals and also puts Turkish exporters at a disadvantage in countries where the EU has an FTA and Turkey does not.<sup>36</sup> Albania's EU Stabilisation and Association Agreement has eliminated all EU tariffs on Albania's exports (though customs checks still apply). Albania also has access to the single market but the agreement requires Albania to harmonise its policies with the EU over time. Ukraine agreed a 'Deep and Comprehensive Trade Agreement', which reduces tariffs with the EU and requires Ukraine to incorporate EU regulations into its legislation. However, these trade deals are available to lower-income countries on a pathway to full EU membership and it is unclear that these options would be available to richer countries leaving the bloc.

**3. WTO (World Trade Organisation)** – under this scenario, the UK would set its own tariffs on imports from other countries up to ceilings allowed by the WTO. The WTO sets binding limits on import tariffs, and unless these are part of an FTA, then tariffs must be the same for all countries (i.e. the same as the 'most favoured nation'). So, if no FTA were in place with the EU, the UK would face the EU's MFN tariffs – the EU would be obliged to levy these tariffs unless and until an FTA was in place. Similarly, the UK would face other countries' external tariffs on UK exports. This option would give the UK the ability to strike its own trade deals and would not involve budgetary contributions, EU regulation or free movement of people. However, to strike trade deals that go beyond tariffs into, for example, investment and services, some degree of sovereignty would be ceded in agreeing common rules with another trading partner.

**4. Unilateral 'free trade'** is usually a variant of the WTO option<sup>37</sup> and describes a situation where exports would face the trade tariffs agreed at the World Trade Organisation but the UK 'unilaterally' removes all tariffs, and probably customs checks, on its imports. In effect, this is one scenario of many under WTO rules where the UK sets its own import tariffs. Relatively few countries have taken this approach – New Zealand has unilaterally reduced tariffs in a wide range of sectors throughout the 1980s and 1990s,<sup>38</sup> with some success in driving productivity improvements in its domestic sectors. Singapore and Hong Kong are even closer to unilateral free trade, with average tariffs near zero. Of course,

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<sup>36</sup> See World Bank evaluation of EU–Turkey customs union, <http://www.worldbank.org/content/dam/Worldbank/document/eca/turkey/tr-eu-customs-union-eng.pdf>.

<sup>37</sup> The UK could unilaterally lower its tariffs on imports after agreeing trade deals (with the EU or others). Still, after doing so, trade deals would be more difficult to agree as the UK cannot offer to reduce tariffs further in exchange for better trade access. The section on trade impacts in Section 3.4 considers some of these scenarios.

<sup>38</sup> New Zealand's simple average of applied tariffs is just 2.0%, compared to 5.3% in the EU, and around 9% globally.



unilateral liberalisation does not reduce non-tariff barriers, which will remain important, especially to trade in services.

Many of the studies cover the first three possibilities (albeit with different assumptions) though, as above, the commitments in the first are so similar to EU membership that it is difficult to see how this could be preferable to remaining in the EU. The second and third options are to some extent overlapping – outside the EU, the starting point for both is WTO membership and the related ‘most favoured nation’ (maximum) tariffs on imports (from the UK and to it). It would be possible to strike trade deals with the EU and others. In the fourth option, again the starting point is the WTO position, but the UK sets its own import tariffs to zero. This could happen after it had agreed other trade deals giving it greater access to other markets (i.e. combined with option 2). Still, after the UK dropped its import tariffs to zero, it would have much less to offer in exchange for other countries reducing their trade barriers, meaning that trade deals would potentially be much more difficult. Those that model unilateral free trade recognise it could be politically difficult given the disruptive effects of cheaper imports on UK sectors such as manufacturing and agriculture.

### **Leave campaign proposals**

Recently, the Leave campaign (Gove, 2016) said ‘There is a free trade zone stretching from Iceland to Turkey that all European nations have access to, regardless of whether they are in or out of the euro or EU. After we vote to leave we will stay in this zone’. This statement includes countries within and beyond the EEA and so could imply the second of the above options – a free trade deal with the EU (and others) but outside of the EEA or the ‘single market’. Being in a ‘free trade zone’ is likely to differ from being in the single market in the following ways:

- Customs checks would apply to trade (Turkey is the exception, but as a condition cannot access trade deals with non-EU countries, and has a limited ability to strike its own deals).
- Exports, especially services,<sup>39</sup> from UK businesses would face additional barriers to supplying the EU (they may need to establish an EU subsidiary, meet licensing conditions, or only provide services on a time-limited basis<sup>40</sup>).
- The UK would not be obliged to meet EU regulations but may be expected to accept free movement of labour if it wishes to mitigate the barriers in option 2.

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<sup>39</sup> In particular, financial services would no longer benefit from its ‘passport’, which means that once a firm is authorised in one member state it can provide its authorised services across the EU without further authorisations in other member states.

<sup>40</sup> As is the case for Switzerland (Open Europe, 2015).

- The UK's trade relations with non-EU countries would at least initially face additional tariffs and barriers, or UK trade policy would need to be agreed with the other members of an existing trade bloc (i.e. most likely with the EFTA members, Norway, Switzerland, Liechtenstein and Iceland).

In conclusion, there remains significant uncertainty about the detail of which policy options would be available or pursued in the event of a vote to leave. Each of the options involves a trade-off between the level of retained freedom in policy and the likely level of access to markets. There are no agreements that provide the level of market access EU membership confers without accepting free movement of labour or EU regulation. We have avoided speculating on the EU's negotiating stance if the UK were to leave, but any new trade deal with the UK would require unanimous agreement by remaining members.

### 3.4 Key issues and why the assessments differ

There is broad agreement on the main issues affecting the economic assessment. In addition to the budget impacts (considered in Chapter 2) and the impact of uncertainty, the main economic variables impacted are trade, foreign direct investment, regulation and migration. Changes in these variables will affect the level of national income, and potentially how quickly it grows. We begin with the impact of uncertainty before considering each of these other variables in turn.

#### Uncertainty and short-term impacts

The prospect of the UK leaving the European Union is likely to have an economic effect both in advance of the referendum and, in the event of a vote for exit, in the period following it while the UK and the EU agree on the plans and terms for exit.

The UK economy is already seeing some of these effects with sterling volatility rising (NIESR, 2016). The Bank of England's May quarterly inflation report notes sterling is 9% below its November peak and concludes 'there is evidence to suggest that roughly half of that decline reflects perceived risks associated with the referendum'. Following an out vote, there would be an effect from uncertainty about the specifics of the UK trade and policy framework. In this section, we consider these impacts, which in general are anticipated to apply from now up to around 2020.

#### *The exit process*

After a vote to exit, the UK would notify the EU of its intention to withdraw – though not necessarily immediately – and the process is then governed by Article 50 of the Lisbon Treaty. The UK has a two-year window to negotiate a withdrawal agreement, although most commentators recognise that, given the time taken over most trade agreements, this could be extended. Free Trade Agreement negotiations typically take a number of years to agree, with OECD (2016) suggesting that at least three years (for example, US–Australia) are needed, with Switzerland–China and EU–Mexico both taking four years, EU–Canada taking over five years and EU–Switzerland taking 10 years.

### *Uncertainty and its impact on the economy*

There are several mechanisms by which this uncertainty affects current and near-term economic variables. Uncertainty is likely to lead to both companies and households delaying their investment or spending decisions. Sterling would lose value in light of anticipated or actual reductions in demand from investors for sterling-based assets. A reduction in demand for UK assets may also affect the government's borrowing costs if demand for gilts falls (which reduces the price or – in other words – pushes up the interest rate). This would in turn reduce the spending power of households as the cost of borrowing and the price of imported goods rise. Exports may see some benefit (notwithstanding any reduction in investment from increased uncertainty that occurs within export-orientated industries) if sterling is weaker, with a potential improvement in the UK's trade balance.

### *Estimated short-term impacts on national income*

A number of economic forecasters consider the short-term impacts of Brexit, focusing on the impact of uncertainty on the value of sterling, investment and borrowing costs. Table 3.7 highlights organisations that include an explicit quantitative estimate of uncertainty in their forecasts.

**Table 3.7. Selected estimates of the effect of Brexit on UK GDP in 2020 (percentage difference from baseline, i.e. the UK remaining in the EU)**

Organisation	FTA	WTO
NIESR	–1.7 to –1.9	–2.5 to –3.3
OECD	–3.3	–5.1
PwC/CBI	–3.1	–5.5
HM Treasury <sup>a</sup>	–3.6	–6.0

<sup>a</sup> HM Treasury figures are the 'peak impact over two years' rather than for 2020. FTA corresponds to its 'shock' and WTO to its 'severe shock'.

Note: These studies explicitly incorporate the effect of uncertainty within these overall estimates.

The OECD assumes that the financial shock is a similar magnitude to that seen in the euro crisis (2011–12), but much smaller than in the financial crisis (2008–09). This results in a range of increases in borrowing costs for government, businesses and households, and there is some impact on other EEA country borrowing costs. For households, it also assumes a 1 percentage point increase in the saving rate reflecting increased precautionary saving. It estimates a 10% fall in sterling (on top of the 9% fall since the November peak) which fades over the period to 4% from 2018 onwards, noting that this depreciation mitigates some of the other effects identified, at least for the UK. Finally, some of the long-run impacts of trade and reduced EU migration estimated by the OECD (see the section on migration below) impact the pre-2020 period.

NIESR (2016) considers the economic literature on how uncertainty impacts on investment decisions and economic activity more generally. It finds strong support for empirical links and uses these in its estimates. NIESR estimates sterling would depreciate by about 20% immediately following the referendum

(by comparing current volatility with that observed in the financial crisis and estimating how it evolved in 2008). It also predicts a tightening in credit conditions – demand for government bonds would fall and, using estimates of elasticities from the economic literature, NIESR suggests this will push up gilt yields by 100 basis points (bps; 1 percentage point). It also estimates that the cost of corporate and household borrowing will increase by 50 basis points with the same premium on equity borrowing. Taken together when input to the NiGEM<sup>41</sup> macroeconomic model, in 2020 this leads to downward impacts on investment (down between 8.1% and 9.0%) and GDP (between –2.5% and –3.3%), and increases in inflation, compared with the baseline forecast (i.e. the UK remaining in the EU).

The Treasury's publication on the immediate economic impact of leaving the EU (HM Treasury, 2016b) takes a similar approach to assessing how measured uncertainty impacts on economic variables. Its analysis leads to increases in borrowing costs for government, corporates and households. However, its estimates differ – in its FTA ('shock') scenario, it identifies smaller increases for government (40 bps) and greater increases for corporates and households (70 to 130 bps), i.e. the reverse of the NIESR analysis. HM Treasury (HMT) also identifies a sterling depreciation (from a review of other forecasts) of some 12% for FTA and 15% for WTO. The HMT estimates for the short-term hit to GDP exceed those of NIESR for several reasons. First, the 'transitional effects' in the HMT paper are on a path towards much more significant economic losses in the long-term estimates.<sup>42</sup> Second, the higher borrowing costs for consumers and corporates used by HMT are likely to outweigh the higher costs of government borrowing that NIESR supposes. Third, the smaller depreciation in sterling offers less of a cushioning effect via the boost to exports. Finally, in HMT's 'severe shock' scenario, assumed borrowing costs are much higher across the board, and there is also an increase in EU financial risk premiums (i.e. an element of financial contagion to the EU, which reduces EU GDP by 1% with further reduced demand for UK exports). Although the contributions of these different factors are not separately identified by HMT, it seems likely that they relate back to household, business and market expectations about the long-term impacts, where HMT incorporates more of the potential negative impacts (as we discuss in subsequent sections) with a consequent bigger effect.

PwC/CBI also models uncertainty through increased risk premiums and with a resulting increase in the cost of capital. Feeding this increase into its general equilibrium model suggests UK GDP around 2–2.5% lower in 2020 in the two (FTA and WTO) scenarios due to uncertainty alone. By 2030, this impact is

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<sup>41</sup> NiGEM is a peer-reviewed quarterly global econometric model based on real economic data. It is used by organisations including OECD, Bank of England and the European Central Bank. <https://nimodel.niesr.ac.uk/nigem-intro/nigemintro.php>

<sup>42</sup> In the FTA scenario for example, HMT envisages a central long-term impact of –6.2%. As we discuss below, NIESR quantifies fewer of the dynamic trade effects in its central scenario and suggests –2.1%.

almost entirely reduced as the UK's post-exit relationships with the EU and other countries are settled.

Economists for Brexit (and specifically Minford and Hodge's forecasts) note that short-term uncertainty exists and agree that sterling will depreciate, with a rise in inflation in the short term and slightly higher interest rates in the long term. Little detail is available, but they suggest that these effects will be significantly more than offset by longer-term gains beginning to be felt, and suggest GDP would be 1.7 percentage points higher in 2020 under a Brexit scenario.

JP Morgan (2016) analyses 12 views from financial institutions and others collated in HM Treasury (2016a) and finds broad agreement that the predicted effect on GDP would be a 1 percentage point reduction in growth per year that the uncertainty persists. JP Morgan also looks at previous episodes of uncertainty, finding that an increase of one standard deviation over a year depresses GDP growth by 1 percentage point and concluding that this is an appropriate estimate. It expects the effect to persist until the UK's new relationships with the EU and others are established, implying two to three years of negotiation would leave GDP 2–3% lower.

In conclusion, there is wide agreement that a vote to exit the EU would result in increased uncertainty that would have negative impacts on national income as investment slows, sterling depreciates and borrowing costs rise. The extent of the impacts depends on how long uncertainty persists over the UK's relationship with the EU and other countries. Most studies see the uncertainty effect level off by 2020. This uncertainty effect is often incorporated alongside other effects in forecasts, though in broad terms it reduces GDP growth by 1 percentage point per year it persists – so, for three years, national income would be 3 percentage points lower than it would otherwise have been. If consumers, businesses and markets anticipate larger negative long-term impacts – for example, because a WTO-type scenario becomes seen as being more likely – then higher estimates of the impact are plausible.

## Trade impacts

There are two key elements to the impacts on trade: first, how overall levels of trade will be affected and, second, what knock-on those changes will have on the economy. This subsection looks at how trade patterns might be affected, the different types of models used to assess changes, and the potential economic impact in each of the potential trade policy scenarios. It then considers whether trade impacts could also affect productivity levels.

In all of the options available outside of the EU, UK trade with the EU would face additional frictions in terms of tariffs, customs checks or potential inability<sup>43</sup> to provide services in the EU single market. Even if the UK were able to strike a new

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<sup>43</sup> For example, Switzerland's agreement only establishes the right to provide cross-border services 'for a period not exceeding 90 days of actual work in a calendar year'.

Free Trade Agreement with the EU, this would not address all of these frictions. As such, in the face of these additional costs, some trade would become unprofitable and overall trade with the EU would be lower as a result. As around half of our current trade is with the EU (44% of exports, 53% of imports; see Table 3.2 earlier), this could affect a significant proportion of trade.

What about trade beyond the EU? If the UK is able to agree trade deals with non-EU countries, this could increase our trade with those countries. Trade deals tend to focus on tariff measures (for example, taxes on imports); harmonising non-tariff measures (for example, product regulation) tends to take longer and involve aligning regulatory approaches (Open Europe, 2016). Tariffs have reduced significantly over recent decades, and non-tariff measures are increasingly seen as important to increased trade (CEP, 2016a). So, even as we look below at the potential to strike trade deals with other countries, we need to keep in mind that, unless the UK would share sovereignty with those non-EU countries (in a similar way to the EU), then the trade agreements would not provide equivalent access to those markets.

In terms of UK trade beyond the EU, it could be possible for the UK to strike better, or faster, trade deals than the EU could. The EU has a head start in that it already has deals with over 55 countries. The UK may be able to 'grandfather' these deals, i.e. quickly strike very similar deals. But this is not guaranteed. More generally, the UK would have less to offer countries in terms of access to its own market (the UK's economy is only around a sixth of the EU's), but granting access to the UK would be less of a threat to countries keen to protect their own industries. As a single country, the UK may also have less difficulty in reaching a deal.

It seems likely that, over time, the UK would, if it wanted, strike bilateral Free Trade Agreements with big countries (Canada and Australia have done so with the US). Switzerland has agreed a deal with China<sup>44</sup> ahead of the EU. It is important to be clear that, despite the name, such 'free trade agreements' do not go as far as the full market integration offered by EU membership. New deals would likely cover a smaller proportion of trade than the EU and its current deals (HM Treasury (2016a) estimates the EU and its trade agreements cover 56% of UK exports and 63% of imports). It is therefore likely that overall trade would still fall (see modelling estimates in Table 3.8). Still over, say, a 30-year horizon, the make-up of our trade partners could change. For example, continued fast growth of China (the destination for 3.1% of exports in 2015; see Section 3.2) could lead to a fivefold increase in its GDP by 2050.<sup>45</sup> However, the key consideration in non-EU trade is not only whether non-EU economies would become more important economically, but whether EU membership or Brexit is likely to confer better access to those markets. Given the EU's head start, larger

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<sup>44</sup> Open Europe, 2016.

<sup>45</sup> PwC/CBI, 2015, table B-1.

market but more diverse needs, this is difficult to predict. So, overall on non-EU trade prospects, in the short term the UK would struggle to achieve similar access to that which it currently enjoys as part of the EU and its existing FTAs. In the long term, the situation is much harder to predict. In terms of a combined EU and non-EU trade picture, it therefore seems clear that non-EU trade deals would not compensate for the loss of EU trade in the short term and would, perhaps, be unlikely to do so even over a longer time horizon.

The third option (WTO) would mean UK exports effectively faced the 'most favoured nation' tariffs agreed at the World Trade Organisation. These are by definition higher than would be faced under trade agreements and would act as a friction or barrier to exports and reduce them from current levels. The UK could nevertheless choose what level of tariffs to apply to imports and the 'unilateral free trade' option would reduce these to zero and potentially eliminate border checks. This would reduce the costs of imports to both producers and consumers, and increased imports would apply competitive pressures to UK producers with a knock-on to productivity levels. We return to the economic impact of this later.

**Table 3.8. Modelling estimates of impact of Brexit on Trade and FDI**

Organisation	Scenario	Trade reduction (%)	FDI reduction	Notes
CEP	Dynamic EEA/FTA	-12.6	None	FDI effect captured in trade
	Static EEA	-8	None	Assessed separately
	Static WTO	-14.5	None	Assessed separately
HM Treasury	EEA	-9	-10	
	FTA	-14 to -19	-15 to -20	
	WTO	-17 to -24	-18 to -26	
OECD	WTO/FTA	-10 to -20	-10 to -45	
NIESR	EEA	-11 to -16	-10	
	FTA	-13 to -18	-17	
	WTO	-21 to -29	-24	
	WTO+	-22	-24	

Source: NIESR (2016) summary of modelling results; CEP (2016a and 2016b).

Overall on trade patterns, any exit scenario is almost certain to reduce UK trade with our current biggest trade partner, the EU, and potentially with the (over 55) countries the EU has an existing trade deal with. Estimates available from the studies, as shown in Table 3.8, suggest overall trade would fall by between 8 and 29%. In scenarios where the UK could make its own non-EU trade deals, perhaps it could strike quicker or better deals than the EU, and non-EU trade could grow more quickly and eventually offset at least some of this decline. On balance, Brexit offers a chance of non-EU trade increasing more quickly in the long term



but the strong likelihood of an ongoing reduction in trade with the EU. Finally, 'unilateral free trade' would have some positive knock-ons to competitiveness and productivity through cheaper imports, but exports would face significant additional tariff and non-tariff measures.

In summary, it is likely the UK would see a material reduction in trade. These changes would also reduce 'openness' of the UK's economy, in terms of trade as a proportion of GDP, at least into the medium term. Estimating how much trade would reduce, and what impact this would have on the economy, involves relatively sophisticated modelling, and we next consider the different approaches, before examining the economic impacts.

### *Approach to modelling trade impacts*

How do the studies use trade models to consider the impact of new trade agreements on trade and the economy?

The studies agree that a reduction (increase) in trade would reduce (increase) GDP and most recognise two channels – the direct impact of exports and imports, and the knock-on impact of the reduced openness on innovation, specialisation and economies of scale and therefore productivity.

The direct impacts are mainly calculated using computable general equilibrium (CGE) models and gravity models, sometimes in combination. Both are widely used in trade policy analysis (see Piermartini and Teh (2005)). CGE models consider how the economy will look in the future and can be used to gauge the trade and income effects of trade policy changes (such as a proposed trade agreement). They provide ex-ante assessments and are forward-looking.

Gravity models are so-named because they mirror Newton's theory of gravity – that is, trade (gravity) increases with the size of economies (objects) and decreases with the distance (which can be measured in different dimensions) between them. Gravity models explain the pattern of bilateral trade among nations, including over time, in terms of certain fundamental variables such as economy size, distance, and common languages and history. Gravity models provide ex-post assessments of trade policy assessments (i.e. backward-looking evaluations).

More recently, CGE models have been developed to incorporate gravity relationships. That is, they relate more closely to the relationships that have been observed in trade data. These are recognised (for example, see Head and Mayer (2014)) as providing a more realistic view of policy impacts and avoid some of the unrealistic assumptions of earlier CGE models. For example, some CGE trade models ignore differences in the quality of traded goods and services, which means that trade movements are heavily dependent on tariff levels in a way that is not reflected in real-world data.

In the case of Brexit, these models can be used to look back at the impact of the EU on UK trade relative to what it might otherwise have been, and also to assess



how the UK (and global) economy looks under hypothetical or new and more detailed trade relationships.

### ***Economic impact of trade by policy scenario***

Most of the studies we consider estimate the trade impacts of Brexit under one or more variants of the scenarios identified in Section 3.3. Here we compare these estimates and identify whether and why they differ.

#### **EEA scenario**

Each of the studies considering this scenario (HMT, NIESR) sees it as the least economically damaging. Whilst this scenario introduces frictions in trade with the EU, in particular in terms of customs checks, these lead to smaller trade losses than in other scenarios, as single market access is retained. Still, the requirement for budgetary contributions, the need to meet EU regulations and the free movement of people, without having a role in shaping EU policies, suggest this may be an unrealistic option.

#### **EU-UK Free Trade Agreement ('FTA')**

Several studies consider this scenario, and model trade based on continued access to EU markets but with the additional costs of customs checks, and potential changes to the tariff the UK would apply to imports.

One difference in assumptions is whether the UK is able to replicate the EU's existing free trade deals. HMT assumes not, while NIESR, Open Europe, Oxford Economics and PwC/CBI assume this happens immediately. Unfortunately, none of the studies flexes this assumption in its sensitivity analysis, so we cannot be sure how important it is in terms of describing the reduction in trade. However, the overall similarities in the model results for this option suggest it is not a dominant factor.

There is virtually no forward-looking analysis of the effect of potential trade deals with countries that would be the most important economic powers in the coming decades. Open Europe cites Ciuriak et al. (2015), who suggest in a 'back-of-the-envelope' calculation that 'an Australia-like run of FTAs with the major East Asian economies (China, Japan, India, and the Association of Southeast Asian Nations [ASEAN]) should generate something on the order of a net of 0.6% of GDP for the UK'. Still, this estimate appears to be on current economy sizes and would, in any case, only arise as a benefit in this analysis if the EU failed to reach a similar agreement.

In summary, within this option, the studies that report trade impacts broadly agree on the level of reduced trade at around 15% (see Table 3.8). Most suggest direct negative impacts on GDP through reduced trade of between 1 and 2% (see Table 3.1 earlier) and Ciuriak et al. (2015), whose analysis underpins Open Europe's work, suggest that the direct trade impact is also -1%. Despite some differences in assumptions over how quickly or ably the UK can strike further trade deals, these analyses reinforce the conclusion earlier that the loss of EU trade is likely to dominate the overall trade impact.

### **WTO scenario**

The WTO scenario is modelled by several studies and assumes MFN tariffs apply to countries' imports from and exports to the UK. This scenario is also unlikely to exist in practice, as either the UK would strike trade deals, as in the above scenario, and/or it might reduce at least some of its tariffs on imports. Still, the estimates are useful as a reference point.

In short, this scenario is the most damaging to trade, and therefore to GDP. HMT suggests trade will fall by between 17 and 24%, while NIESR expects a fall of 21–29%. In terms of GDP impacts, CEP suggests the direct trade effect alone reduces GDP by 2.6% in 2030 and Ciuriak et al. (2015) expect a reduction of 2.8%. Other studies incorporate other impacts (for example, FDI) but are all above this level (for example, NIESR also incorporates some FDI impacts to estimate a static fall of 3.2%).

### **Unilateral 'free trade'**

This scenario can be combined with other scenarios above. It is modelled by three studies and attracts the widest range of estimates. In terms of the 2030 GDP impact relative to remaining in the EU, Economists for Brexit / Minford (2015) suggest substantial economic gains to the UK of some 4%, Open Europe suggests a boost of 0.75% to its Brefta scenario<sup>46</sup> that leaves GDP down 0.25% in net terms (Ciuriak et al., 2015), and CEP also sees a positive boost, of 0.3%, and suggests a net negative impact of at least 1%. Given these inconsistencies, we have considered the models in more detail.

Minford suggests that, as the UK leaves the EU and removes tariffs and other barriers to imports, it is able to access goods on the world market at lower cost. These cheaper imports in agriculture and manufacturing bring the relevant UK prices down to the world level and move significant land and labour resources into the more productive services sector, leading to large economic gains.

To quantify this effect, Minford estimates that agriculture and manufacturing import prices each fall by 10%. However, for at least agriculture, this seems too high – EU agricultural prices are pushed up by less than 5% above world levels according to OECD (2015) consumer support estimates. On manufacturing, the assumption is that the UK's non-tariff measures<sup>47</sup> would fall to US levels – but there is no explanation of what this would entail and why it is plausible. The CGE model used by Minford suggests that these higher import prices result in a smaller UK service sector than would otherwise be the case – specifically, these tariffs lead to a 32% reduction in the size of the service sector. Removing the

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<sup>46</sup> This scenario has the UK joining the European Free Trade Association (EFTA) with no new tariffs and limited increases in non-tariff barriers with the EU. Customs checks and rules of origin compliance costs do apply. This scenario also assumes the UK 'grandfathers existing bilateral trade deals'.

<sup>47</sup> Defined as policy measures other than ordinary customs tariffs that can potentially have an economic effect on international trade in goods, changing quantities traded or prices or both (UNCTAD/DITC/TAB/2009/3).

tariffs would therefore see the service sector expand and the manufacturing and agricultural sectors would diminish. In the short term, there would be significant transition costs here, which are not accounted for in the model. Finally, Minford argues that there would be no impact on UK exports from leaving the EU, which, even with an EU–UK trade deal, seems implausible. This conclusion appears to arise from the model structure and assumptions where goods are homogeneous and, under perfect competition, therefore find a new overseas market even when new tariffs are imposed in one country.

In summary, whilst Minford's theoretical argument – that low import prices would drive competition and efficiency improvements – is sound, the empirical estimates appear to overstate the import price falls the UK would enjoy as well as their knock-on to UK output. The approach also ignores what would be substantial adjustment costs and the likely loss of trade with the EU.

Another estimate based on a unilateral free trade assumption is that of Open Europe, who commissioned Ciuriak et al. (2015); Ciuriak is a Canada-based trade-focused consultancy who used the 'GTAP' model to assess the impact of unilateral liberalisation on the UK economy. This CGE model is widely used in the economics profession using a common set of data and model structures and has been used to assess various trade deals (Hertel et al., 2003; Piermartini and Teh, 2005). The scenario considered assumes the UK immediately dismantles industrial and agricultural tariffs against all of its trading partners, including the remaining restrictions on imports from current FTA partners. Economic gains arise from both lower import prices and savings from removing country-of-origin checks (potentially equivalent to a 4% price decrease). In addition, in this scenario, Ciuriak et al. assume that no non-tariff barriers emerge between the UK and the EU and that the UK is able to grandfather the EU's existing FTAs and simultaneously drop all import tariffs. Whilst illustrative, these assumptions are optimistic and perhaps unlikely. Together, they reduce the negative impact of this scenario and are likely to account for Ciuriak et al.'s estimates being less negative than CEP's. Ciuriak et al. also point out that autonomous liberalisation was responsible for two-thirds of global trade liberalisation in the 10 years to 2003. Even Open Europe, who commissioned the Ciuriak work, makes clear, however, that unilateral free trade would be politically very difficult to achieve. It provides case studies of steel and agriculture (Open Europe, 2016) and also notes the level of popular opposition to the proposed, and much-less disruptive, EU–US deal.

CEP also includes the unilateral removal of import tariffs in its scenarios. It combines this move with both its EU–UK FTA scenario and the WTO scenario and finds that the direct cost of Brexit is reduced by 0.3 percentage points in both scenarios (to –1.0% and –2.3% respectively). It notes that WTO tariffs are already low (3% on a weighted basis) and that further reductions do not make much difference. CEP does not include the removal of customs checks in its modelling and, according to Ciuriak et al.'s assumptions, these are at least as important as

tariffs. CEP highlights that economic integration depends on aligning regulatory differences, which cannot be achieved unilaterally.<sup>48</sup>

Overall on unilateral free trade then, if the UK moved unilaterally to drop all its tariffs and customs checks on goods, especially on the back of having agreed trade deals that achieve access to the EU and elsewhere, it could lead to modest economic gains. However, these are unlikely to outweigh the other negative trade impacts in this scenario. In any case, the political barriers to undertaking such a move are significant, as illustrated by recent concerns in the steel industry and ongoing support for protection to agriculture.

### **Summary of trade impacts**

Broadly speaking, estimates that assume EEA or EU-UK trade agreement scenarios find negative economic impacts, which look relatively modest in 'static' models (but more significant when dynamic effects are taken into account – see below). But these modest losses are also predicated on relatively modest gains in control and reductions in contributions to the EU. Moving to WTO rules leads to more significant economic losses, but greater gains in terms of sovereignty. There is more dispute about the effects of going for unilateral free trade – i.e. the UK dropping all tariffs on imports while accepting whatever tariffs are imposed on its exports. This might plausibly have positive effects in the long run, but the short-run disruption would likely be significant and the political barriers to such change would likely be insuperable.

### **Trade openness and productivity**

The previous subsection considered how changed trade patterns would directly affect the UK's economic output (for example, through reduced exports to the EU). This one looks at what impact reduced trade could have on UK productivity levels.

A country's openness to trade is widely recognised (CEP, NIESR, HMT) as having a causal impact on its productivity levels. In particular, through trade, companies and other actors are able to realise economies of scale, identify technological improvements from access to a wider pool of goods and services, benefit from higher competition levels and enhance management skills (OECD, 2016).

HMT, CEP and OECD (as well as NIESR in its WTO+ scenario) develop and draw on estimates in the economic literature on how a country's openness<sup>49</sup> to trade affects productivity levels.<sup>50</sup> These produce relatively high elasticities of

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<sup>48</sup> Minford (2015) has questioned whether the gravity-based model underpinning CEP's estimates (see Costinot and Rodriguez-Clare (2013)) is appropriate for looking at transformational change in trading relationships. However, as a CGE model, the CEP model incorporates all equilibrium effects and is therefore in principle capable of considering transformational changes. The CEP work draws extensively from the recent economic and trade literature, which confirms the appropriateness of employing its CGE gravity model in trade policy questions.

<sup>49</sup> Measured as imports plus exports expressed as a percentage of a country's GDP.

<sup>50</sup> Causality could run in reverse such that high productivity leads to trade openness and so the cited studies (for example, Feyrer (2009)) use 'instruments' that are believed to affect only trade

productivity with respect to openness (i.e. for a percentage point increase in trade openness, the size of the resulting boost to GDP). NIESR (2016) collates these estimates as OECD (0.27–0.39), CEP<sup>51</sup> (0.50–0.75) and HMT (0.32–0.42). NIESR's own estimate produces a figure of 0.13–0.14. However, NIESR stops short of estimating a direct effect of Brexit on productivity. This is because the existing evidence is not UK specific and there may be particular concerns to applying it to the UK at the moment given the ongoing 'productivity puzzle'.

As an illustration of the impact on GDP from potential trade openness, taking the lower end of the HMT and OECD estimates of 0.3 and applying this to the changes in trade identified above (typically a 15% fall for an FTA, or around 23% for the WTO) suggests dynamic trade impacts on GDP of –4.5% and –6.6% respectively.

In summary then, there is wide agreement that trade has beneficial impacts on productivity levels and this is supported by several empirical estimates in the economic literature. These estimates are the key element behind the larger estimates of economic harm from exit. Such estimates may overstate the impacts, but overall it seems clear that reductions in trade openness would have a material impact on productivity levels that should be factored in as a likely downside risk of exit.

## Foreign direct investment

Foreign direct investment directly increases national income and can also have subsequent beneficial impacts on productivity levels. Investments made in the UK by entities or companies outside of the UK can raise productivity through bringing new ideas and approaches (which may spill over to other firms) or simply being productive themselves and raising the overall average. Several studies consider how the reduced access to the single market could affect foreign investment in the UK, and how this would affect UK national income and productivity. Here we examine the recent trends in FDI, consider the potential direct effect of Brexit on FDI and national income, and look at how FDI could affect productivity levels.

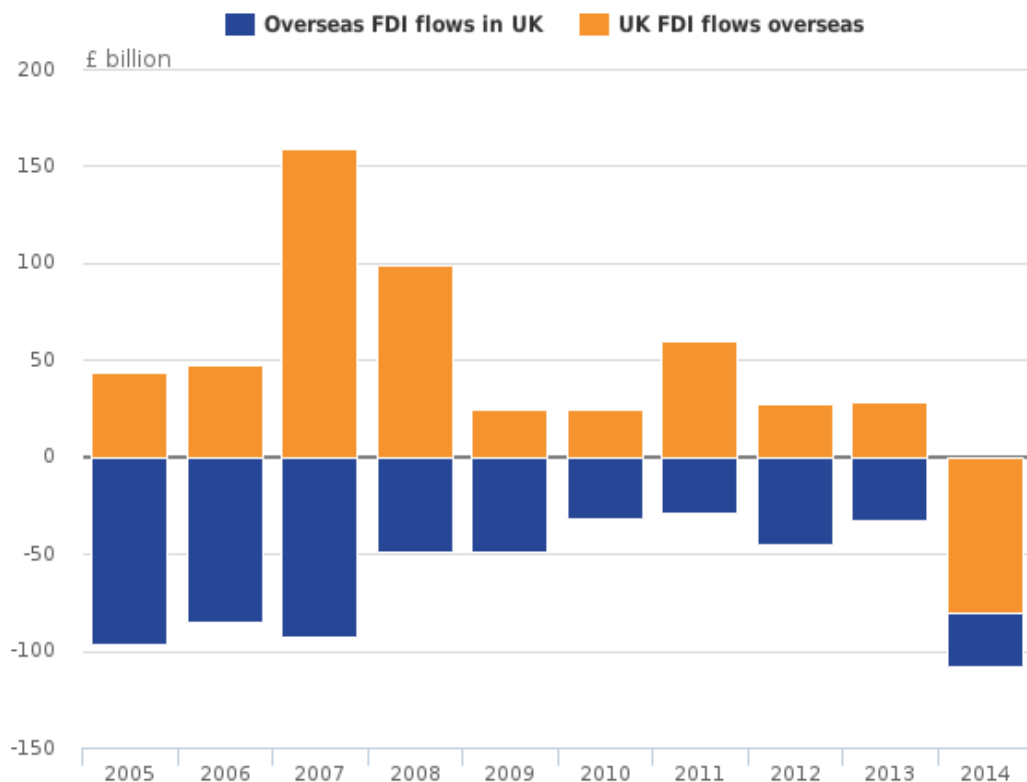
Table 3.4 highlighted the 48% of UK FDI stock from the EU, and also the 40% share of UK FDI invested in the EU, at the end of 2014. UK FDI inflows are also high relative to other EU countries. OECD (2016) shows that in 2014, the UK accounted for the largest share, and over 30%, of inflows to EU15 countries.

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in an attempt to ensure the effect of trade on productivity is picked up and not the reverse. The OECD uses a similar approach

<sup>51</sup> The approach to LSE's estimate also means the elasticity implicitly captures the FDI-productivity elasticity discussed below.

Figure 3.2. UK outward and inward FDI flows, 2005 to 2014



Note: Overseas FDI flows in UK multiplied by -1. All values are at current prices.

Source: ONS,

<http://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/bulletins/foreigndirectinvestmentinvolvingukcompanies/201>.

Positive net inflows of FDI contribute directly to GDP – if inward FDI to the UK were £54 billion (the average over the period 2005–14; see Figure 3.2), this would equate to almost 3% of GDP. These flows also add to the *stock* of FDI, which is much larger – with around £1 trillion of overseas-owned assets held in the UK and a very similar number of UK assets owned overseas (see Table 3.4 earlier). The Bank of England (2016) has noted that an abrupt decline in inward capital flows and/or an increase in overseas investors looking to reduce their holdings of UK assets could pose a major financing difficulty with knock-on impacts on the exchange rate, and asset prices and inflation. We return to these issues in the section above on uncertainty and short-term impacts.

#### Impact on inward FDI of EU exit

Membership of the EU might impact on FDI into the UK either because the EU does not place restrictions on the movement of capital, which might make it easier for EU countries to invest in the UK, or because the free trade in goods and services makes the UK a more attractive destination for FDI. This could affect the flows of new investment to the UK (for example, to support a new product from the UK), or there could be changes to the existing stock (for example, relocating a UK headquarters).

HMT, CEP (2016c), OECD, Oxford Economics, PwC/CBI and NIESR (2016) explicitly consider how FDI flows would be affected by Brexit and the knock-on impact on national income. The OECD draws on separate econometric gravity model<sup>52</sup> work by Fournier (2015), which establishes a strong relationship between the commonality of regulatory frameworks and the level of bilateral FDI, and also specific estimates of the effect of the EU single market. The OECD interprets this as implying a reduction in the inward flow of FDI by 30% (between 10 and 45%) following exit. CEP undertakes (CEP, 2016d), and draws on, similar econometric work (for example, Baier et al. (2008)) that suggests similar effects of EU membership, to imply that FDI inflows would fall by 22%.

HMT takes a similar approach to the gravity model used by CEP. It also identifies a wide range of supporting analysis to show that inward investors value UK access to the European market and that UK inward FDI has been the highest in the EU. HMT combines its own modelling and estimates from the literature to take forward a range of effects of exit on FDI inflows from a 10% reduction (EEA membership) to a 26% reduction (WTO).

Economists for Brexit argue that FDI tied to EU access would be diverted from 'EU-protected' sectors into newly expanding sectors. However, as we saw for trade above, the creation of significant new markets to offset the reduced access to EU markets is very uncertain, and is unlikely at least in the short to medium term.

PwC/CBI draws on a study of Dutch EU membership (Straathof et al., 2008) to identify a similar effect on FDI levels. Oxford Economics also estimates a substantial reduction in FDI.

NIESR reviews available studies, including HMT's, on the impact on FDI of EU membership and free trade areas more generally. Using Ramasamy and Yeung (2010), it notes that service trade is a much more important driver of FDI than goods trade. It estimates similar falls in FDI as a result of exiting the EU to those estimated by other studies (see Table 3.9) and also estimates that the resulting reduced FDI would decrease GDP by between 0.2% (EEA) and 0.5% (WTO).

In addition to this consensus that leaving the EU would have a negative effect on FDI, there is evidence linking FDI to higher productivity. Multinationals tend to be more productive through enhanced use of technologies, a higher propensity to undertake R&D and improved management. These effects can also spill over to domestic firms (Criscuolo, 2005; CEP, 2016b). Of the various studies we consider, some report direct impacts on GDP and some an impact through lower productivity, as summarised in Table 3.9. The relatively big effects estimated by CEP (2016d) take specific account of the importance of the UK financial sector. Otherwise, a plausible central estimate of the impact of reduced FDI on GDP would appear to be a loss of about 1% in the medium term, though in some

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<sup>52</sup> See the above discussion on modelling trade impacts.

scenarios some of that effect could be offset by increased access to other markets and FDI in other sectors over time.

**Table 3.9. Summary of impacts on FDI and knock-on to GDP/ productivity**

Organisation	Scenario	FDI (% reduction)	Direct GDP impact	FDI–productivity impact on GDP
CEP (2016d)	Separate publication	–22%	N/A	–3.4% (–1.8 to 4.3%)
HMT	EEA	–10	Not reported	–0.4%
	FTA	–15 to –20	Not reported	–0.7%
	WTO	–18 to –26	Not reported	–1%
OECD	WTO/FTA	–10 to –45	Not reported	–0.9%
NIESR	EEA	–10	–0.2%	None
	FTA	–17	–0.35%	None
	WTO	–24	–0.5%	None
	WTO+	–24	–0.5%	Not reported but as HMT

Source: As table; authors' calculations.

## Regulation

The EU sets regulation in a range of areas – for example, on environment and climate, financial services, and social, employment and health & safety issues. Many of these regulations are related to the single market – ensuring a common regulatory standard to support the free movement of goods and services. Indeed, in some exit scenarios, such as membership of the European Economic Area, these standards would largely still apply. For businesses, over-regulation in general, and EU regulation in particular, are clearly a stated source of concern. For example, the Institute of Directors found 60% of its members wanted to 'reduce the volume of unnecessary EU red tape' as the chief aim of the UK's reform drive.<sup>53</sup>

Regardless of the scenario, UK businesses exporting to the EU would still need to meet relevant EU standards, but in an agreement without full single market access domestic producers would face UK legislation. In these scenarios, there would appear to be scope for the UK to achieve improvements to regulation and several studies have made an attempt to quantify these effects. That said, surveys suggest that UK product and labour markets are already among the least regulated internationally and so potential savings may be limited.

<sup>53</sup> 'IoD calls on all parties to accept need for EU reform', 28 September 2015, <http://www.iod.com/influencing/press-office/press-releases/iod-calls-on-all-parties-to-accept-need-for-eu-reform>.



Open Europe examines UK government impact assessments of the costs and benefits of the 100 most-expensive EU-derived regulations. It goes on to identify candidates for reform and quantify the possible savings. The costs of EU regulation according to this approach are £33.3 billion, while the benefits are £58.6 billion – so overall benefits outweigh costs. On this assessment, though, there are some regulations that could be scrapped with a net saving of £12.8 billion (0.7% of GDP). Open Europe's suggestions include scrapping the Agency Workers Directive and much of the Working Time Directive. Since the first of these in particular was opposed by the UK government, such a change is certainly possible post Brexit and official estimates suggest modest economic gains from abolishing it. More radical scenarios suggest that greater savings might be feasible, though these estimates include the assumption that the UK would back away from, for example, most climate change legislation. Since our current domestic legislation is more constraining than EU legislation, such a change is unlikely – or at least would require a reversal of policy at least some of which would be possible even within the EU.

Gains may also be possible from changes to financial services regulation. Open Europe suggests these might be of the order of £1.4 billion, while Congdon (2013) posits significantly greater possible gains. There are indeed some areas of financial services regulation that might be liberalised in the wake of leaving the EU, but again there are clearly substantial areas where domestic policy in recent years has been to increase rather than reduce regulation. Across a broader sweep, Congdon considers costs, or potential future costs, of EU social, financial, environmental and product regulations, and argues that substantial gains could be made from their removal. This approach finds much higher regulatory costs than other studies, disregards any benefits associated with the regulations and ignores the likely costs of alternative domestic regulation. As such, they are not a reliable guide to the scale of regulatory gains outside the EU. Minford (2015) suggests that very big gains may be possible. The scale of his estimates appear to derive from a combination of assuming a starting point in which there is a considerable increase in EU regulation, a modelling strategy that imposes these regulations on what is otherwise effectively a perfectly functioning competitive economy, and some somewhat ad-hoc methods of taking account of these regulations in the model.<sup>54</sup>

Among other studies, CEP cites the same (Open Europe) work but argues that the UK government would not make the potential savings because governments of both main parties have legislated for renewable energy and workers' rights above and beyond what is mandated by the EU. The OECD also considers the potential for regulatory reform. It notes that the UK has relatively low regulation in its network industries (energy, transport and communications) with limited scope for further reduction. It also argues that the UK can already make further reforms – for example, on post and road regulation – to bring it into line with the

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<sup>54</sup> The Economists for Brexit (2016) analysis models the savings as being equivalent to a 2 percentage point increase in National Insurance rates.

best performers, several of whom are in the EU; so remaining in the EU ought not to mean these gains are unattainable (or, conversely, the UK leaving the EU ought not to make them any more attainable). Nevertheless, the OECD assumes some reduction in regulatory restrictiveness following a Brexit. After 10 years, this would lead to a 0.31% increase (our calculation) in total factor productivity (or twice that in the optimistic scenario). This figure is incorporated into its macroeconomic model and therefore is not separately reported, but the above estimate provides a guide to the possible regulatory contribution.

Oxford Economics also includes regulatory reform within its policy scenarios and this has a direct bearing on productivity as well as through a higher level of domestic investment. In the most aggressive deregulatory scenario, it estimates this boosts GDP by up to 0.4%. PwC/CBI also uses the Open Europe work to assume a £12.6 billion saving in its modelling (where it improves input efficiency) while also noting this saving may not prove to be forthcoming for political and other reasons.

Overall then, most analyses recognise there is some potential for regulatory savings with potential benefits for productivity. There is a particularly big gap in estimates between the very large benefits that Patrick Minford and Tim Congdon suggest might be available and the much more modest estimates of other researchers. It is possible that big gains could be found. But the UK already enjoys a relatively low level of regulation compared with comparable countries and recent governments of all stripes have done little to reduce those regulations, so the political scope for radical change may be limited. In addition, the scale of the potential benefits, whilst not trivial, is unlikely to be huge – and probably under 1% of GDP.

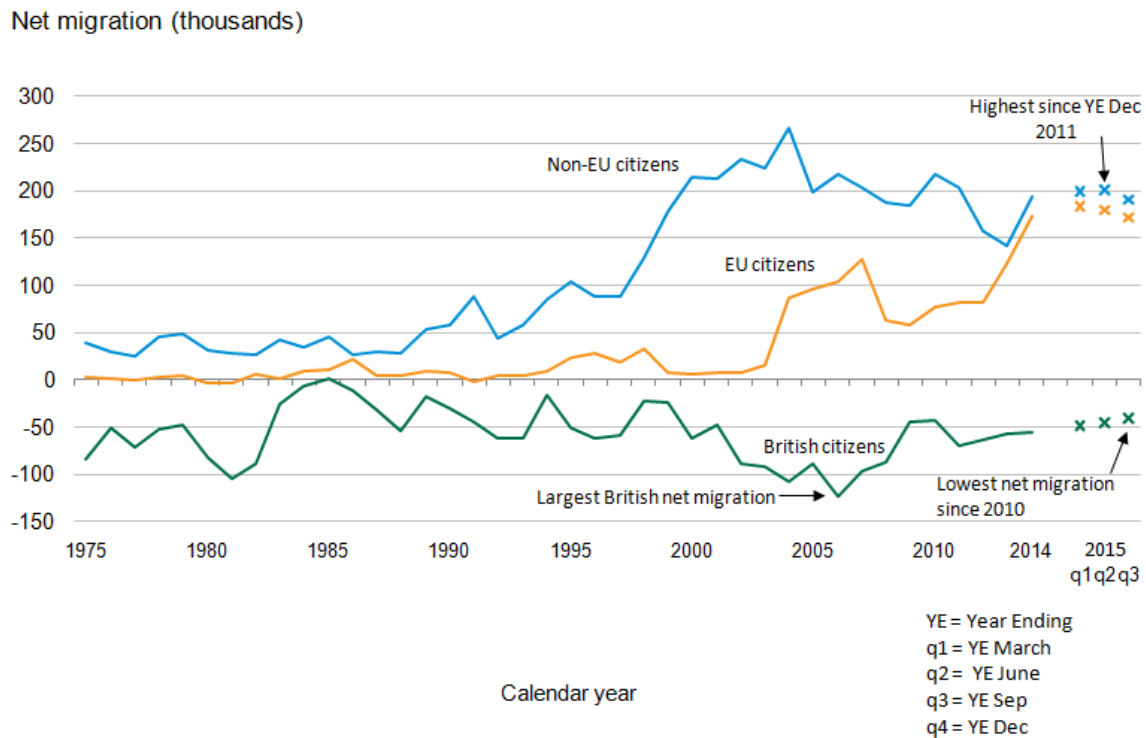
## Migration

Migration policy is an important part of the public debate on Brexit and migration is also an important factor in the economic impact. However, in the exit scenarios, it is not clear what migration policy would be pursued and this adds considerably to the uncertainty.

Within the EU, free movement of labour is a requirement of the single market and gives a right to live in and work in any member state. Further, those countries in the EEA and EFTA also accept free movement as part of their single market access. The UK, though, is not part of the Schengen Agreement that removes border checks.

In the five years to 2014, net immigration from the EU has fluctuated between 58,000 in 2009 up to 174,000 in 2014 (and a very similar number in the year to the third quarter of 2015). This compares with net immigration of between 142,000 (2013) and 217,000 (2010) from the rest of the world over the same period (see Figure 3.3). Around 3 million people living in the UK in 2014 were citizens of another EU country (Vargas-Silva and Markaki, 2015).

Figure 3.3. Long-term international net migration by citizenship, UK



Source: ONS, *Migration Statistics Quarterly Report: February 2016*, which uses International Passenger Survey (IPS), <http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/bulletins/migrationstatisticsquarterlyreport/february2016#net-migration-to-the-uk>.

Aside from a scenario where the UK accepts free movement as an EEA member or in a trade deal, there are broadly two possible scenarios considered by the economic analyses of exit: first, that the UK leaves the EU and reduces the overall number of immigrants; and second, that overall migration levels are maintained. Either scenario could also involve a change in the mix of migrant skills, perhaps with a points-based system of granting entry.

The OECD notes that EU migrants in the UK have relatively high employment rates and make a positive net contribution to the public finances (also see appendix A). It also expects immigration to the UK to fall in the event of Brexit. It notes the potential for a points system to increase skill levels amongst migrants, but notes that a smaller pool would offset this. In its quantitative modelling, annual net migration falls by 56,000, 84,000 or 116,000. However, the individual contribution of this reduction is not elaborated.

Oxford Economics considers a range of policy responses on a points-based system of migration, which range from modest control to more aggressive reduction (from a baseline figure of 142,000, the latter reduces EU migration to 77,000). It makes a range of detailed assumptions about the number and skills mix of EU net migration including dependants. These translate into 2030 GDP being between 0.2% and 1.1% lower.

Open Europe takes the view that migration levels would not alter much given business and fiscal requirements. Still, it notes that a points-based system could achieve a more productive balance between EU and non-EU migrants.

PwC/CBI undertakes a careful analysis of migrant numbers and skills, considering how the current system of tiers for non-EU migrants would apply. It suggests this system would effectively remove new low-skilled EU migrants and estimates an immigration-driven reduction in overall labour force of between 0.7% (FTA scenario) and 1.4% (WTO scenario) in 2030 but with an increase in high-skilled inflows (of 1.4%) in the former scenario. Still, the reduction in the labour force means that GDP is respectively 1% and 1.6% lower in 2030 as a result.<sup>55</sup>

The studies assume that the existing stocks of EU migrants in the UK and of UK migrants in the EU are unaffected. Some of the studies mention productivity spillovers from migrants (for example, PwC/CBI), but none estimates this quantitatively.

Overall, it is clear that an immigration policy that affected net EU inflows would impact on GDP, the public finances and potentially productivity if skills increase or labour flexibility is reduced. If overall migration levels were similar but shifted to a points system that achieved higher skills, this could incrementally lift GDP and productivity, although there are no quantitative estimates of such an effect. In a scenario where net migration falls, a sensible upper estimate may be from PwC/CBI's work of up to –1.6% of GDP, while a central estimate of –0.7% seems plausible.

### 3.5 Conclusion on short- and long-term economic impacts

This section brings together our review of the different assessments and provides estimates to be taken forward into Chapter 4 on the impacts of changes in national income on the UK's public finances.

#### Summary of key issues and impacts

Table 3.10 summarises the different areas of impact, gives a rating for the degree of uncertainty in each and provides a short commentary highlighting some of the most plausible impacts. It uses the estimates in relation to an FTA scenario. In general, an EEA scenario produces smaller economic impacts and a WTO scenario produces larger economic impacts.

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<sup>55</sup> The PwC/CBI study is one of the few studies to explicitly identify the impact of GDP per capita. In studies where immigration patterns are unaltered, GDP impacts are equivalent to GDP per capita impacts. However, in these scenarios with reduced migration, the population is lower. This means the impact on GDP per capita is slightly less negative – for example, PwC's overall FTA impact is –0.8% on a per-head basis compared with 1.2% on GDP overall.

Table 3.10. Synthesis of key issues and indicative impacts in FTA scenario

Issue	Uncertainty in estimates	Summary assessment
<i>Short-term impacts (2020)</i> Uncertainty	Low	Wide agreement that there would be a negative economic impact from increased uncertainty. Several studies suggest –1% for each year it takes to agree a new relationship with the EU
<i>Long-term impacts (2030)</i> Budget	Low	If UK does not join the EEA, there would be direct budgetary savings of 0.4% of GDP
Trade	Low	Robust estimates suggest reduced trade, with NIESR suggesting a central estimate of just greater than –1.8%
Trade openness and productivity	High	Strong link between trade openness and productivity but little UK-specific evidence; still, this represents a significant downside risk that HMT plausibly estimates at around –4.5%
Foreign direct investment (FDI)	Low	Wide agreement on impact on FDI flows with a direct knock-on to GDP which NIESR estimate at just greater than –0.2%
FDI and productivity	Medium	Evidence that FDI improves productivity; a downside risk that HMT estimates would be –0.7%
Regulation	Medium	UK lightly regulated but scope for some improvements, contributing perhaps +0.3% (OECD) to 0.7% (Open Europe)
Migration	High	Significant reductions in migration are a downside risk, which PwC/CBI estimates at –0.7%; also the possibility of improving skills mix of migrants, which could have a smaller but unquantified impact
<i>Overall impact</i>		<p>NIESR's estimates of uncertainty, budget savings, trade and FDI impacts suggest GDP would be 2.1% lower. We focus on its estimates in Chapter 4.</p> <p>There is more uncertainty over the other impacts. OECD and Open Europe highlight upside risks of improvements to regulation, and perhaps migration, but these seem unlikely to exceed 1% of GDP. The downside risks are more significant – if trade or investment falls affect UK productivity, then GDP could plausibly fall by a further 5%.</p>

## Conclusion

What would happen after a Brexit is, of course, not knowable in any precise sense. But it is nevertheless possible to draw some important conclusions from the now considerable body of research looking at this:

- In the medium to long run, the main economic effects would arise from changes in costs of trade, in FDI, in migration and potentially from a different approach to regulation.
- In the short run, there would be additional, perhaps substantial, negative effects associated with increased uncertainty.
- There is broad agreement that, in the longer term, effects on trade are likely to be quantitatively most important in considering the effects on GDP. In most estimates, in most possible states of the world, these effects will be negative as costs of trade increase. The effects are bigger in a world in which the UK does not join the EEA and biggest if it cannot agree a trade deal with the EU.
- In the long run, it is possible that unilateral free trade would result in an increase in national income through a reduction in the size of agricultural and manufacturing sectors and a concomitant increase in the more economically productive services sector. But this would likely involve substantial short- and medium-term costs and politically may be unattractive.
- Foreign direct investment is an important contributor to the UK economy and feeds through into higher productivity. Most estimates suggest that FDI inflows would be reduced if the UK were to leave the EU and this would have a negative effect on national income.
- It is possible that leaving the EU would result in a reduction in financially costly regulation, though quite how much appetite there would be for deregulation is uncertain. We start with an economy that is relatively lightly regulated by international standards and we know that recent governments have chosen more, not less, regulation in key areas over which we do have control.
- The impact of Brexit on migration is uncertain. Reducing immigration would likely reduce national income and if it were to have an effect on national income per capita it would more likely reduce it than increase it, though that would depend on the exact nature of policies put in place.

Putting all this together, leaving the EU would lead to a period of uncertainty, which would likely be followed by a subsequent reduction in the level of UK trade and investment. Even with some budgetary savings, this would lead to a reduced level of national income, which NIESR plausibly suggests would reduce annual national income by just over 2% in the medium term in a scenario where the UK could agree an FTA with the EU. There are potential economic opportunities in regulation and migration, but these are small relative to the risks, in particular

arising from reduced openness in trade and lower investment impacting future UK productivity levels.

Given the robust approach taken to the modelling, and its focus on estimated impacts where there is a higher level of certainty, in Chapter 4 on the public finance impacts we place a particular emphasis on the NIESR estimates.

## 4. Brexit and the UK's Public Finances

Chapter 2 of this report described the direct impact on the public finances of the UK leaving the EU. This set out a scenario in which total public spending – and therefore public sector net borrowing – would be around £8 billion a year, or 0.4% of GDP, lower. This assumed that the UK did not make any financial contribution to the EU budget but did choose to fund all of the transfers and services in the UK that the EU currently finances.

Chapter 3 then described various estimates, including those produced by HM Treasury and from outside of government, of the impact on the size of the UK economy of the UK leaving the EU. These estimates covered a wide range of possibilities. But if leaving the EU did – as seems more likely than not – increase uncertainty in the short term and, over the longer term, lead to a reduction in trade and foreign direct investment, then it would be reasonable to expect this to lead to the UK economy being smaller in future than it otherwise would have been. That is the prediction of the large majority of those who have modelled the likely effects.

This chapter takes account of both the direct improvement in the public finances that would result from lower EU contributions and the various estimates for the impact on the size of the UK economy of the UK leaving the EU and describes what effect these could be expected to have on the public finances. Section 4.2 focuses on the short term and, in particular, the period through 2019–20, describing the size of any changes to tax or spending that might be necessary if borrowing were to be reduced by the end of this parliament as is currently planned. Section 4.3 turns to look at the longer term. First, however, Section 4.1 describes the mechanisms by which changes in the size of the economy feed into changes in the public finances and presents a sense of scale of how large these effects might be and how they compare with the potential £8 billion reduction in borrowing set out in Chapter 2. Section 4.4 provides a brief conclusion.

### 4.1 Impact of changes in national income on the public finances

The most obvious impact of a larger or smaller economy is, in cash terms, to increase or reduce the level of tax receipts. If the average tax rate on economic activity remained constant, then cash receipts would grow in line with the economy. So, for example, if tax receipts were 40% of national income and the economy grew by an additional 1%, we might expect tax receipts also to grow by an additional 1% and tax receipts as a share of national income to remain unchanged at 40%. However, this would ignore the fact that in progressive tax systems, such as the UK's, the average tax rate rises with growth in the tax base. So, for example, if tax receipts were expected to be 40% of national income and the economy grew by an additional 1%, we would expect tax receipts to grow by more than 1% and tax receipts as a share of national income to edge above



40%.<sup>56</sup> Conversely, if the economy grew by less than expected, then we would also anticipate tax receipts to be a smaller share of the resulting national income.

On the spending side, for the large parts of the public sector where cash budgets have been set, there is, by default, no impact of economic growth on spending in cash terms. This means that, for example, if public spending were forecast to be 40% of national income and the economy turned out to be 1% smaller than expected, then (if the forecast for public spending in cash terms proved correct) this would lead to public spending as a share of national income rising to 40.4% of national income (as  $40/0.99 = 40.4$ ). There is an additional impact on public spending as spending on social security benefits, tax credits and debt interest would be greater in cash terms if the economy were smaller than expected.<sup>57</sup> This would push spending up further as a share of national income.

The scale of these effects in the UK has been estimated by the Office for Budget Responsibility (OBR), updating previous analysis done by HM Treasury, in order to assess the extent to which the ups-and-downs of the economic cycle flatter or depress headline measures of the public finances.<sup>58</sup> A summary of the findings is presented in Table 4.1. This shows the impact on current receipts (that is, total tax and non-tax receipts flowing to the public sector), total managed expenditure (that is, total public spending) and public sector net borrowing (which is the difference between total managed expenditure and current receipts) of a 1% reduction in national income. All the estimates are measuring how these fiscal aggregates are affected in terms of their share of national income.

**Table 4.1. Illustrative impact on the public finances of a 1% reduction in national income (% of national income)**

<b>Fiscal aggregate</b>	<b>Year 1 effect</b>	<b>Additional year 2 effect</b>	<b>Total effect</b>
Current receipts	−0.1	−0.1	−0.2
Total managed expenditure	+0.4	+0.1	+0.5
Public sector net borrowing	+0.5	+0.2	+0.7

Source: Helgadottir et al. (2012); authors' calculations.

<sup>56</sup> Income tax is the obvious example where this happens. When a basic-rate income tax payer receives an additional £100 of income, they will (if they remain a basic-rate income tax payer) pay additional income tax at their marginal tax rate of 20% which, due to the presence of the personal allowance, is much higher than their average income tax rate. Similar effects apply to some other taxes, such as capital gains tax and inheritance tax.

<sup>57</sup> For social security benefits and tax credits, this is because the targeting of benefits on those with lower incomes – such as those who are unemployed or in households with relatively low income – means that they are greater when incomes are lower. Higher cash spending on debt interest arises from the fact that borrowing has been pushed up in cash terms (from the lower level of cash tax receipts and higher spending on social security benefits and tax credits).

<sup>58</sup> For the OBR's estimates, see Helgadottir et al. (2012). The previous HM Treasury estimates were produced by Farrington et al. (2008). References in those pieces provide details of earlier HM Treasury estimates from 2003, 1999 and 1995.

These estimates suggest that for current receipts, a 1% fall in national income would reduce taxes as a share of national income by 0.2 percentage points, with half of this effect felt in the first year and half felt in the second year. This timing effect is because some taxes – in particular, self-assessment income tax receipts – operate with a lag. This 0.2% of national income fall in tax receipts is, in 2016–17 terms, equivalent to £4 billion. But overall the cash level of receipts would be reduced by £12 billion. Of this, £8 billion would represent the fall in cash receipts that one would expect if taxes remained constant as a share of national income.<sup>59</sup> The additional £4 billion is the cash equivalent to the fall in tax receipts *as a share of national income*. In other words, if national income disappointed by 1% and one wanted to leave the level of taxes as a share of national income unchanged from what had previously been intended, then a £4 billion discretionary tax rise would be required. If, on the other hand, one wanted to raise as much tax in cash terms as before in order to spend the same cash amount, then a discretionary tax rise of £12 billion would be required.

As discussed above, changes in the expected size of the economy have a larger impact on spending as a share of national income than they do on receipts as a share of national income. In the first year, having 1% less national income than expected is estimated to increase public spending as a share of national income by 0.4 percentage points. This is entirely consistent with cash spending plans being unchanged and spending being (roughly) 40% of national income.<sup>60</sup> In the following year, there is an additional increase to spending as a share of national income as cash spending on social security benefits and debt interest rises.<sup>61</sup> This cash increase in spending, of 0.1% of national income, is equal to £2 billion in 2016–17 terms. Overall, therefore, a 1% disappointment to national income can be expected to increase public spending by 0.5% of national income. Of this, one-fifth represents higher actual cash spending on social security and debt interest, while the other four-fifths arises as a direct result of the lower level of national income. In other words, if national income disappointed by 1% and one wanted to leave the level of spending as a share of national income unchanged from what had previously been intended, then a £10 billion discretionary spending cut would be required.

This estimated relationship between the UK public finances and economic performance can be used to look at what has happened to the public finances since the Great Recession. The most recent set of official forecasts is for the UK's GDP in 2019–20 to be 14.1% below the level implied by the (pre-crisis) March

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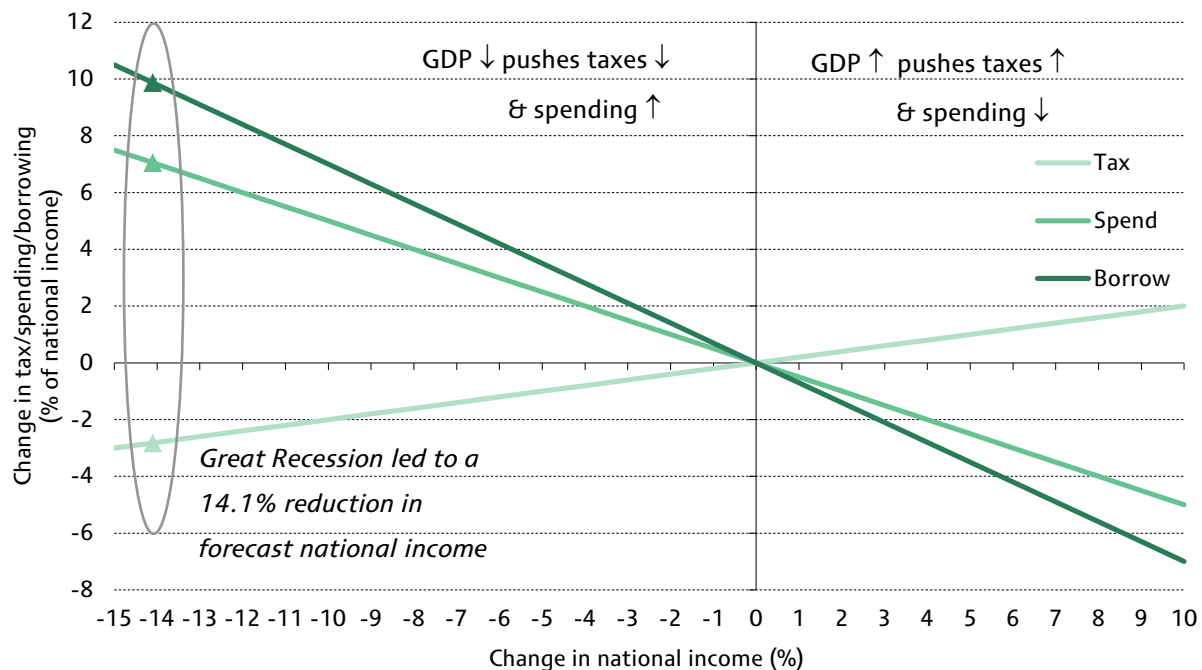
<sup>59</sup> Based on GDP in 2016–17 of £1,943 billion and assuming that taxes are roughly 40% of GDP gives a fall in tax receipts of  $0.01 \times 1943 \times 0.4 = £8$  billion.

<sup>60</sup> The model suggests that the number is 0.44, which is very close to the 43% average level of spending as a share of national income over the period from which it is estimated. The estimate is rounded to 0.4 (from which it is not statistically significantly different). See table 2.9 of Helgadottir et al. (2012).

<sup>61</sup> The reason this effect is lagged can be rationalised by the fact that unemployment typically lags the economic cycle, and debt interest payments follow the debt to which they relate.

2008 Budget.<sup>62</sup> The relationships in Table 4.1 imply that this would increase public sector net borrowing by 9.9% of national income, with 7.1 percentage points of this coming from public spending rising as a share of national income and 2.8 percentage points coming from tax revenues being reduced as a share of national income.<sup>63</sup> Of the 7.1 percentage point increase in public spending as a share of national income, the majority – 5.7 percentage points – is the ‘denominator effect’ of a given amount of cash spending representing a larger share of (a lower level of) national income, with the smaller remainder – 1.4 percentage points – coming from cash spending being pushed up.

Figure 4.1. Estimated implications of a change in GDP for taxes, spending and borrowing as a share of national income



Source: Helgadottir et al. (2012); authors' calculations.

Taking the estimates presented in Table 4.1, it is a straightforward exercise to give a sense of scale on the extent to which changes in national income will lead to different levels of tax receipts, public spending and – therefore – public sector net borrowing relative to the size of the economy. These are presented in Figure 4.1. The figures on the vertical axis show the change in fiscal aggregates, as a share of national income, that could be expected to result from the different

<sup>62</sup> Source: Chart 3.9 of Office for Budget Responsibility (2016).

<sup>63</sup> This is close to (but slightly above) the resulting increase in underlying borrowing that we estimate has actually been seen over this period. Public sector net borrowing is forecast to be – 0.5% of national income in 2019–20, compared with a medium-term forecast of 1.2% of national income in the March 2008 Budget. This 1.7% of national income strengthening in borrowing has occurred during a period in which policy measures totalling an estimated 10.6% of national income have been announced for implementation by 2019–20. This implies an increase in underlying borrowing of 8.9% of national income (10.6% less 1.7%). For potential reasons behind the difference between the 8.9% and 9.9% estimates, see Appendix A.

changes in national income shown on the horizontal axis. A lower level of national income – that is, values to the left of the vertical axis – would be expected to lead to tax revenues (shown by the light green line) being depressed and public spending (shown by the mid green line), and therefore public sector net borrowing (shown by the dark green line), being increased. For example, national income being 5% lower than expected would be expected to lead to tax revenues being 1.0% of national income lower (equivalent to £19 billion in today's terms) and public spending being 2.5% of national income greater (£49 billion). This would push up public sector net borrowing by 3.5% of national income (£68 billion). So if the intention were to leave the size of the state – as measured by tax revenues and public spending as a share of national income – unchanged, then a discretionary tax rise of almost £20 billion coupled with cuts to public spending of almost £50 billion would be required. This would also restore public sector net borrowing to the level originally planned.

The triangles marked on the lines in Figure 4.1 indicate the implied estimated impact on tax revenues, spending and borrowing, as a share of national income, from the 14.1% drop in forecast national income in 2019–20 that has occurred between the March 2008 and the March 2016 Budgets. As discussed above, this implies a 9.9% increase in public sector net borrowing as a share of national income.

Prior to the crisis, in 2007–08, public spending was 40.3% of national income. Had forecasts for the future level of national income not been revised down by 14.1%, then spending at the same share of national income in 2019–20 as in 2007–08 would imply public spending of £1,027 billion in 2019–20. The latest OBR forecasts are for public spending in 2019–20 actually to be £810.4 billion. Of this £216 billion reduction in public spending in 2019–20, £145 billion is simply accounted for by the fact that the economy is smaller than expected. The remaining £72 billion is an additional cut taking spending to below the fraction of national income that it represented just prior to the crisis.

### **Incorporating the direct impact of Brexit on the public finances**

As discussed in Chapter 2, the direct impact of the UK leaving the EU on the public finances would, most likely, be to reduce public spending. This section now turns to consider this direct impact alongside the estimated impact of changes in national income on the public finances. In the absence of any change to national income, the UK leaving the EU and not making any net financial contribution to the EU would have the direct impact of reducing public spending, and therefore public sector net borrowing, by about £8 billion a year (or 0.4% of national income).

A change of £8 billion is equivalent to the change in the public finances that would be caused by a 0.6% change in national income.<sup>64</sup> So if future national

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<sup>64</sup> A fall in national income of 0.6% would be expected to push up public sector net borrowing by 0.4% of national income (since  $0.6 \times 0.7 = 0.4$ , where the 0.7 comes from Table 4.1). Since this is

income were to be more than 0.6% lower as a result of the UK leaving the EU, then the public finances would be weaker even despite the direct £8 billion saving. Most of the credible studies that were surveyed in Chapter 3 suggest that there would be a reduction in national income and that it would most likely be considerably greater than this. On this basis, it is more likely than not that the direct strengthening in the public finances from the UK leaving the EU would be more than cancelled out through the indirect impact on national income.

There are lots of reasons why the exact impact on the public finances of any particular change in growth might deviate from this simple relationship. For example, a reduction in growth that had an unusually big (small) effect on consumption, housing transactions or immigration could have bigger (smaller) consequences for the public finances than this simple relationship suggests. Possible reasons for deviation from the relationship are discussed in more detail in Appendix A. For the purposes of what follows, though, we rely on this historical relationship. Any deviation from it would alter our precise quantifications but not by enough to change the overall story.

## 4.2 Scenarios for the short-term impact on borrowing

This section turns to consider explicitly what some of the estimates surveyed in Chapter 3 of the possible impact of the UK leaving the EU on national income in the short term would mean for the UK's public finances. The estimates are calculated using the relationship between national income and the public finances described in detail in the previous section. Most of the estimates also assume that the direct impact of the UK leaving the EU would be to strengthen the public finances by £8 billion a year (as described in Chapter 2).

The exception to this is the scenarios modelled by the National Institute of Economic and Social Research (NIESR) where the UK joins the EEA on similar terms to Norway. Under this scenario, in the analysis that follows, it is assumed that the UK's net contribution to the EU would be reduced by half, or £4 billion, from £8 billion to £4 billion. As described in Section 2.2, Norway's net financial contribution to the EU appears to be lower than that of the UK, but it is difficult to predict what the UK would contribute were it to join the EEA: on a per-person basis, Norway's contribution is about three-quarters of the UK's, while on a share-of-national-income basis, it is about 40% of the UK's. So a reduction of 50% is, perhaps, not implausible.

The estimated impacts on borrowing in the short run for a number of studies are shown in Table 4.2. This includes all of the main estimates of the impact of the UK leaving the EU on the UK's GDP that have been produced in the last couple of

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equivalent to £8 billion, it would, under this scenario, cancel out the direct impact on the public finances.

years that we are aware of. The vast majority, for reasons explained in the previous chapter, show a negative effect on GDP.<sup>65</sup>

The studies are ranked from the largest decline in national income at the top (6%, produced by Société Générale) to the largest increase in national income at the bottom (1.6%, produced by Economists for Brexit). The second column gives the percentage change in national income. The third column gives the estimated resulting change – usually increase – in public sector net borrowing as a share of national income, while the fourth expresses this in 2016–17 £ billion.<sup>66</sup> The worst-case scenario from the studies included in Table 4.2 is for borrowing to be increased by 3.8% of national income, which is equivalent to £74 billion. At the other end of the table, the best-case scenario is for a much rosier situation: borrowing is reduced by 1.5% of national income, or £30 billion in today's terms.

To help give a better sense of the scale of these estimates, the final column of Table 4.2 presents the change in public sector net borrowing divided by the current number of households in the UK (27.0 million in 2015<sup>67</sup>). This is not to say that should any tax rises and spending cuts be implemented, these would fall equally on all households. It is also the case that should the UK population turn out to be larger (or smaller), then this would lead to the resulting cost or gain per household being smaller (or larger). Despite these caveats, these figures are a reasonable way of giving a feel for how significant these changes in borrowing would be.

The worst-case scenario presented in Table 4.2 leads to borrowing in 2019–20 increasing by the equivalent of £2,750 per current UK household. So tax rises or spending cuts of this magnitude, on average, would need to be delivered if borrowing were to be returned to its current forecast path. At the other end of the spectrum, the rosier scenario would lead to borrowing falling by £1,100 per current UK household. If correct, a combination of tax cuts and spending increases worth this much on average would be possible while leaving borrowing unchanged from that forecast by the OBR in the March 2016 Budget.

HM Treasury's short-term analysis (not contained in Table 4.2) is for a 'shock scenario' where national income is reduced by 3.6% and a 'severe shock' scenario where it is reduced by 6.0%. It estimates that these shocks would be associated with a £24 billion and a £39 billion increase in public sector net borrowing in 2017–18, respectively. These are much smaller increases in public sector net

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<sup>65</sup> Chapter 3 considers a subset of these studies that look substantively at the medium-term impacts.

<sup>66</sup> Note that if the models in the studies assume that a fiscal tightening is implemented to offset any change in public sector net borrowing, then – to the extent to which this harms growth – we will overstate the increase in borrowing purely from the UK leaving the EU. Conversely, if the models do not include this, then we will potentially understate the scale of net tax rises / spending cuts that would restore borrowing to the level currently forecast by the OBR.

<sup>67</sup> Source: Office for National Statistics, <http://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/bulletins/familiesandhouseholds/2015-11-05>.

borrowing than implied by the methodology used to construct Table 4.2. This is because the Treasury's shock involves much higher inflation, which it implicitly assumes leads to spending by Whitehall departments on the delivery and administration of public services being less generous in real terms. In other words, it has built a significant real cut to public spending into its numbers.

**Table 4.2. Estimated short-run impact on public finances from different scenarios for GDP and a reduction in the UK's net EU contribution**

	<b>GDP change (%)</b>	<b>Impact on borrowing (% of national income)</b>	<b>Impact on borrowing (£bn, 2016–17 terms)</b>	<b>Impact on borrowing per household<sup>a</sup> (£, 2016–17 terms)</b>
Société Générale	–6	+3.8	+74	+2,750
PwC/CBI	–4.25	+2.6	+50	+1,850
Nomura	–4	+2.4	+46	+1,700
Citi	–4	+2.4	+46	+1,700
OECD	–3.3	+1.9	+37	+1,350
NIESR (impacts for 2019)				
– WTO pessimistic	–3.5	+2.0	+40	+1,450
– WTO optimistic	–2.8	+1.5	+30	+1,100
– FTA pessimistic	–2.5	+1.3	+26	+950
– FTA optimistic	–2.2	+1.1	+22	+800
– EEA pessimistic	–2.4	+1.5	+29	+1,050
– EEA optimistic	–2.1	+1.3	+25	+900
Deutsche Bank	–3	+1.7	+33	+1,200
Morgan Stanley	–2	+1.0	+19	+700
Credit Suisse	–1.5	+0.6	+12	+450
HSBC	–1.25	+0.5	+9	+350
JP Morgan	–1	+0.3	+6	+200
Mansfield	+0.1	–0.5	–9	–350
Economists for Brexit	+1.6	–1.5	–30	–1,100

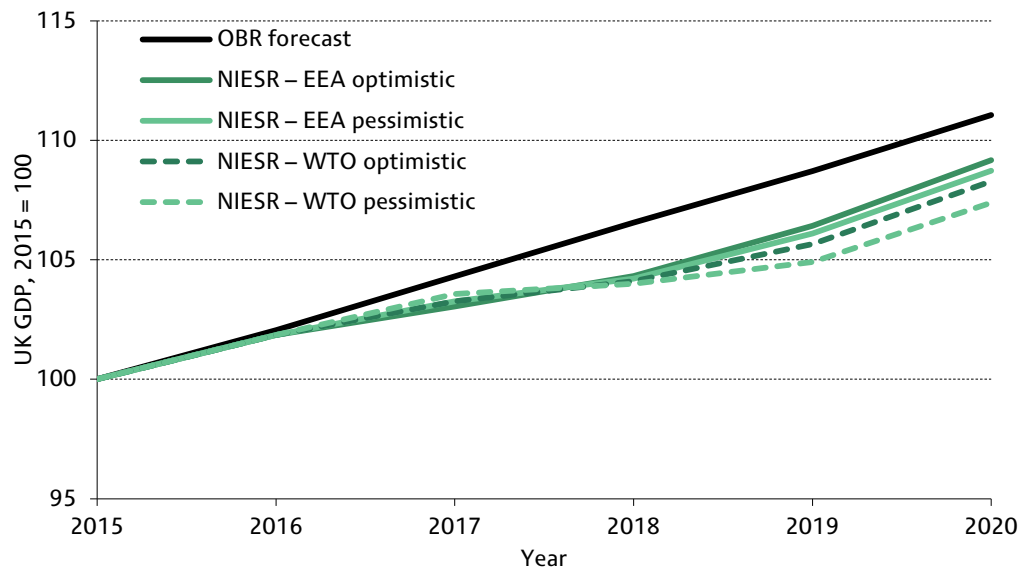
<sup>a</sup> Rounded to the nearest £50.

Note: period covered by the 'short term' varies from study to study: Nomura, HSBC, JP Morgan = 1 year; Morgan Stanley, Credit Suisse = 2 years; Citi, Deutsche Bank = 3 years; Mansfield = 3 to 5 years; OECD, Economists for Brexit = 4 years; Société Générale, PwC/CBI, NIESR = 5 years.

Source: Impact on GDP taken from the survey contained in the JP Morgan research note, Mackie (2016). NIESR estimates by Baker et al. (2016) added. Resulting public finance estimates are authors' calculations.



Figure 4.2. Comparison of the latest OBR forecasts for GDP with how these might be affected by different NIESR scenarios for the impact of the UK leaving the EU



Source: Office for Budget Responsibility (2016); NIESR estimates produced by Ebell and Warren (2016); authors' calculations.

The estimates from NIESR are, of the studies included above, based on the most comprehensive economic modelling exercise. Our judgement is that they provide a credible view of the possible effects of the UK leaving the EU. The estimates also sit towards the middle of the range of all estimates. Furthermore, the most recent edition of the *National Institute Economic Review* includes NIESR's estimates of the impact of the UK leaving the EU for each year through to 2020. This allows a comparison of the path of GDP, public sector net borrowing and public sector net debt under each of the scenarios that NIESR models. Here, this is done by taking the OBR's latest forecast as the baseline and showing the impact of the deviations to GDP as suggested by the NIESR scenarios. For brevity, this is done for the forecasts under the two WTO and EEA scenarios, but not the two FTA scenarios, since these have impacts on GDP that lie in between the other scenarios. Figure 4.2 presents the resulting estimated path for GDP under each scenario. This shows that under the EEA scenarios (both optimistic and pessimistic), all of the short-term hit to GDP growth would be felt by the end of 2018. In contrast, under the pessimistic WTO scenario, growth continues to be noticeably weaker in 2019.

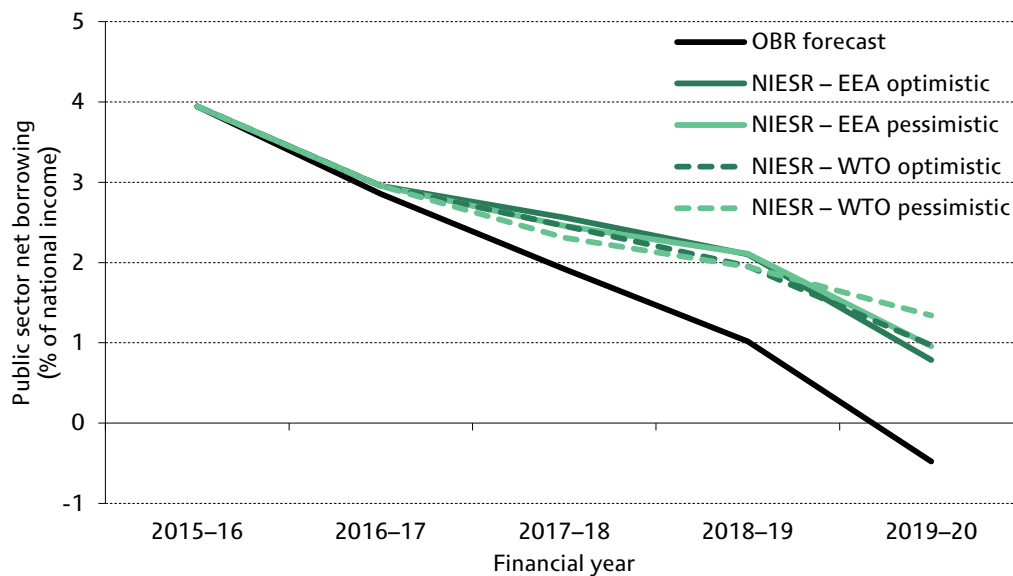
The estimated paths for public sector net borrowing under each of these scenarios for GDP are presented in Figure 4.3.<sup>68</sup> It is assumed that the UK's net financial contribution to the EU continues to the end of 2017–18, but thereafter it

<sup>68</sup> The NIESR model assumes that direct tax rates rise to offset any change in public sector borrowing. This means that, to the extent to which this tax rise harms growth, we will overstate the increase in borrowing and debt purely from the UK leaving the EU. But when considering the size of net tax rises / spending cuts that would be required to restore borrowing to its original path, we are implicitly allowing for it to depress economic activity.



is reduced by one-half under the EEA scenarios and eliminated completely under the WTO scenarios. Under all the scenarios, the deficit as a share of national income is projected to fall each year. Under the two EEA scenarios, it is projected to fall by 1.8% of national income between 2015–16 and 2018–19, while under the two WTO scenarios, it is projected to fall by 2.0% of national income. The slightly greater fall in the deficit under the WTO scenarios is despite weaker growth and is explained by the assumption that the UK's financial contribution to the EU is completely eliminated under this scenario by 2018–19, whereas under the EEA scenarios it is assumed to be running at half of its current level. But under all four scenarios where the UK leaves the EU, the reduction in the deficit is smaller than the 2.9% of national income decline between 2015–16 and 2018–19 that is forecast by the OBR.

Figure 4.3. OBR forecasts for public sector net borrowing and how these might be affected by different NIESR scenarios for GDP



Source: Office for Budget Responsibility (2016); Ebell and Warren (2016); authors' calculations.

In 2019–20 under all four scenarios for the UK leaving the EU, public sector net borrowing would still be positive. This implies that a further set of net tax rises and spending cuts would be required if a budget surplus were to be delivered before the planned date of the next UK general election, in line with the government's current ambition.

The scale of measures required to achieve a budget surplus by 2019–20 varies across the scenarios. But the most optimistic scenario set out in Figure 4.3 is for a deficit of 0.8% of national income in 2019–20, which would be a deficit of £17 billion in that year. This would be £28 billion greater than the £10.4 billion surplus forecast by the OBR for 2019–20, as shown in Table 4.3.

An additional fiscal tightening of 0.8% of national income (£15 billion in today's terms) – on top of what is already planned for this parliament – would be far from easy to deliver. For example, it is roughly the amount that would be saved if the government increased the cuts to day-to-day spending by central government

on the delivery and administration of public services planned for this parliament by 40% (from £12 billion to £17 billion), increased the size of the planned cuts to social security benefits and tax credits by 40% (from £12 billion to £17 billion) and also increased the basic and higher rates of income tax by 1p (which would raise an estimated £5½ billion). Even this would only achieve a forecast budget balance. To restore the 0.5% of national income surplus that the Chancellor is currently aiming for would require a further £10 billion of spending cuts and tax rises to be found. And this is under the most benign scenario shown in Figure 4.3.

**Table 4.3. Tightening required to return public finances to current path**

	<b>NIESR – WTO pessimistic</b>	<b>NIESR – WTO optimistic</b>	<b>NIESR – EEA pessimistic</b>	<b>NIESR – EEA optimistic</b>
Deficit in 2019–20	£28bn	£21bn	£20bn	£17bn
Tightening to restore £10.4bn surplus	£39bn	£31bn	£31bn	£27bn
Additional years of austerity at current pace to restore £10.4bn surplus	2.0 years	1.4 years	1.3 years	1.1 years

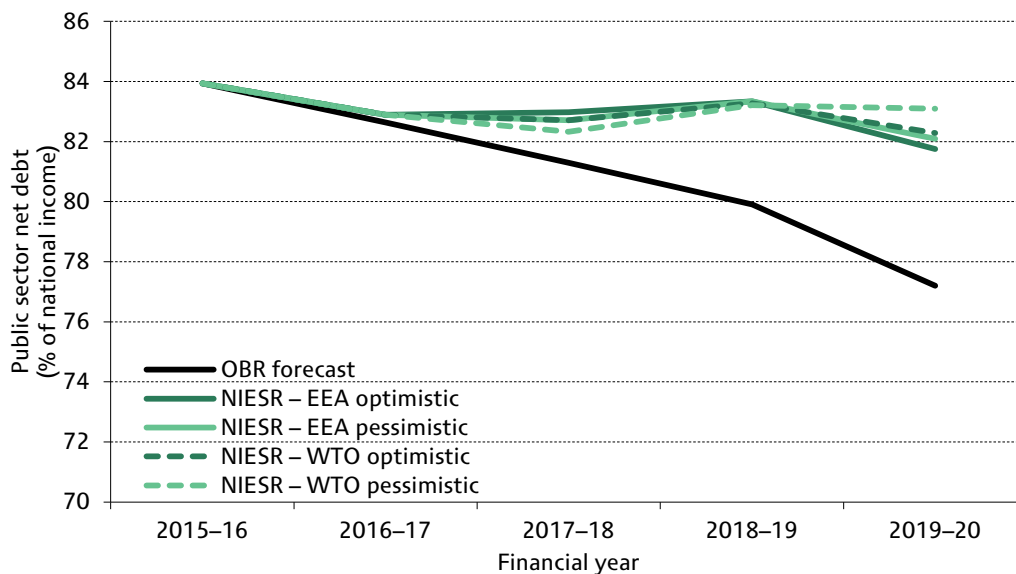
Source: Office for Budget Responsibility (2016); Ebell and Warren (2016); authors' calculations.

The government's fiscal mandate specifies that there should be an overall budget surplus in each year from 2019–20 onwards. But this rule is automatically suspended in periods of weak economic performance. Specifically, should growth over four consecutive quarters appear to fall below 1%, or should the OBR forecast that growth over four quarters will be less than 1%, then the rule is suspended.<sup>69</sup> This suspension would occur under three of the NIESR scenarios set out in Figure 4.3 as they involve calendar-year GDP growth dropping below 1%. While under the other scenario – the EEA optimistic scenario – growth reaches a low of 1.2% in 2017, it is still possible the rule would be suspended, depending on the quarterly pattern of GDP growth.

Even if the fiscal mandate were not suspended, the type of trade-off set out above might well lead the Chancellor to decide to allow budget deficits to persist throughout this parliament and the rule to be broken. If a budget surplus is still deemed desirable, this could then be brought about through an extension of austerity further beyond 2019–20. Such a course of action would not be surprising: both of the government's other fiscal targets set for this parliament (the cap on forecast welfare spending and the requirement that debt should fall as a share of national income every year) have already been breached. And, should a scenario such as that suggested in Figure 4.3 materialise, extending austerity into the next parliament may well be preferable to additional austerity in this parliament. (Another chancellor might, of course, simply decide to live with an ongoing deficit.)

<sup>69</sup> For more details, see Crawford et al. (2016).

Figure 4.4. OBR forecasts for public sector net debt and how these might be affected by different NIESR scenarios for GDP



Source: Office for Budget Responsibility (2016); Ebell and Warren (2016); authors' calculations.

Under the NIESR scenarios, growth in 2020 would actually be stronger if the UK left the EU than if it remained in it, as some of the costs of short-term uncertainty dissipate and some of the assumed longer-term costs from lower trade volumes and lower foreign direct investment (FDI) are not fully in place. This reduces the size of the necessary fiscal action if a surplus of 0.5% of national income is to be restored after 2019–20.

The UK's current fiscal consolidation, comprising tax increases, benefit cuts and cuts to spending on public services, announced since the March 2008 Budget, in response to the financial crisis and associated recession, are estimated to total just over 10% of national income.<sup>70</sup> This is taking place over the current decade, so entails a tightening of roughly 1% of national income per year. As set out in Table 4.3, under the most optimistic NIESR scenario for economic growth presented above, continuing austerity for a little more than one more year would be sufficient to restore a surplus of 0.5% of national income. This would mean the era of austerity coming to an end after 2021–22.<sup>71</sup> Under the most pessimistic scenario, it would have to run for one more year beyond this.

The paths for public sector net debt are compared in Figure 4.4. Under all four scenarios where the UK leaves the EU, public sector net debt as a share of national income is projected to be lower in 2019–20 than it was in 2015–16. However, in all four of these cases, a disproportionate part of this fall in debt would occur between 2015–16 and 2016–17, which is before most of the impact

<sup>70</sup> See Tetlow (2015).

<sup>71</sup> Currently, the fiscal consolidation runs until 2020–21, with a smaller tightening in the final year. Continuing at the current pace would involve additional tightening in 2020–21, with the final tax rises and spending cuts coming into effect in 2021–22.

of slower growth in the economy is projected to have occurred. In addition, the reduction in debt relative to the size of the economy is much lower than it is under the OBR's latest forecast. Between 2015–16 and 2019–20, the OBR forecasts that public sector net debt as a share of national income will fall by 6.7 percentage points. The largest decline shown under the four NIESR Brexit scenarios presented in Figure 4.4 is 2.2% of national income (under the EEA optimistic scenario), with slightly less than half of this decline happening in the current financial year. This would leave public sector net debt above 80% of national income in 2019–20.

### 4.3 Scenarios for the long-run public finance impact

This section turns to look at the longer-term impact of the UK leaving the EU on the public finances. The exercise that is done here is simpler than that in the last section. For this, it is assumed that public spending continues to run at 37.0% of national income, which is the level forecast by the OBR for 2019–20. This is consistent with the sort of methodology used by the OBR in its long-term fiscal forecasts and is consistent with a view that, as the size of the economy changes over time, the size of the state tends to alter in proportion to the size of the economy. Therefore lower – or higher – levels of future national income naturally lead to smaller or greater sums being available to spend publicly (as well as private consumption also being reduced or increased).

As before, the direct impact of the UK leaving the EU is also taken into account: in most scenarios, it is again assumed that this would be to strengthen the public finances by £8 billion a year (as described in Chapter 2). The exception to this is the 'EEA' scenarios, where it is assumed that the UK joins the EEA on what might be considered similar terms to Norway's. As before, it is assumed that this leads to a one-half reduction in the UK's net financial contribution to the EU.

As was the case in the previous section, results are presented for all of the main modelled estimates of the impact of the UK leaving the EU on the UK's GDP that have been produced in the last couple of years that we are aware of. Again the vast majority, for reasons explained in the previous chapter, show a negative effect on GDP.

The estimated long-run impact on the public finances is shown in Table 4.4. The table shows the percentage change (usually a fall) in national income and the change (also usually a fall) in the amount available to spend publicly.

A 2% reduction in national income would, with public spending at 37.0% of national income, reduce public spending by £14 billion (in 2016–17 terms). If the UK's net financial contribution to the EU were completely eliminated, it would offset £8 billion of this, leaving a £6 billion cut to public spending.

Table 4.4. Estimated long-run impact on public finances from different scenarios for GDP and a reduction in the UK's net EU contribution

	GDP change (%)	£bn change in spending (2016–17 terms)
CEP		
– dynamic EEA/FTA <sup>a</sup>	–7.9	–49
– static WTO	–2.6	–11
– static EEA	–1.3	–5
HM Treasury		
– WTO	–7.5	–46
– FTA	–6.2	–37
– EEA	–3.8	–23
NIESR		
– WTO+	–7.8	–48
– WTO	–3.2	–15
– FTA	–2.1	–7
– EEA	–1.8	–9
OECD	–5.1	–29
PwC/CBI		
– WTO	–3.5	–17
– FTA	–1.2	–1
Oxford Economics <sup>a</sup>	–2.0	–7
Open Europe <sup>a</sup>	–0.3	+6
Economists for Brexit	+4.0	+37

<sup>a</sup> CEP dynamic, Oxford Economics and Open Europe estimates are the mid-points of their best- and worst-case scenarios.

Source: Impact on GDP taken from the estimates from models, produced recently, in the survey contained in the JP Morgan research note, Mackie (2016). NIESR estimates produced by Ebell and Warren (2016) added. Resulting public spending impacts are authors' calculations.

The majority of the estimates in Table 4.4 are for a larger reduction in national income than 2%. For example, the three scenarios produced by the Treasury imply reductions in national income of 7.5%, 6.2% and 3.8%. Under these scenarios, the calculations presented in Table 4.4 suggest that the public finances would be weakened by £46 billion, £37 billion and £23 billion, respectively. These estimates are very slightly above the Treasury's own estimates (of £45 billion, £36 billion and £20 billion, respectively<sup>72</sup>). The method employed is the same; the reason for the differences is that the Treasury takes receipts to be

<sup>72</sup> See table 3.F of HM Treasury (2016a).

37.4% of national income (the level forecast by the OBR for 2020–21) and differences in the assumed reduction in financial contributions to the EU.<sup>73</sup>

A final thing to note about the Treasury's public finance estimates relates to how they have been described. In the foreword to the Treasury document (HM Treasury, 2016a), the Chancellor writes that 'Based on the Treasury's estimates, our GDP would be 6.2% lower, families would be £4,300 worse off **and** our tax receipts would face an annual £36 billion black hole' [our emphasis]. The use of the word 'and' here is wrong. This is because the reduction in national income, of 6.2% or £4,300 per family, already encompasses the public finance impact: i.e. it covers not just the reduction in households' after-tax incomes but also the cut to public spending that would be required to leave borrowing unchanged. It is not necessarily inappropriate to describe the deterioration in the government's finances as making households worse off (since the government ought only to be doing public spending that benefits households), but it is not appropriate to suggest that this would be in addition to the £4,300 per family figure.

Using the estimates from NIESR (to be consistent with our short-run section and because they span most of the available estimates), the possible long-run reductions in national income range from 1.8% to 7.8%. The calculations presented in Table 4.3 suggest that this would reduce the amount available to be spent publicly by between £7 billion and £48 billion a year.

Finally, it is worth noting that none of these estimates explicitly accounts for possible effects of leaving the EU on immigration. It seems most likely that immigration would be lower in this situation. Because immigrants, and especially those from the EU, are on average younger, better educated and more likely to be in work than the native population, numerous studies – for example, Dustmann and Frattini (2014) and Portes (2015) – have shown that immigration has a positive effect on the public finances. The Office for Budget Responsibility (2015) suggests that, in the long run, its low net immigration scenario would involve the public finances being more than 1% of national income weaker than in its high immigration scenario.

## 4.4 Conclusion

The direct impact of the UK leaving the EU would be to reduce – and possibly eliminate – the UK's net financial contribution to the EU. Eliminating this would reduce public spending, and therefore public sector net borrowing, by up to £8 billion a year. In the absence of any other effects on the UK then, if borrowing were to be left unchanged, this would allow net tax cuts or spending increases of up to £8 billion to be implemented.

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<sup>73</sup> The Treasury assumes that completely eliminating the UK's net financial contributions to the EU would save £7 billion, whereas the calculations in this report assume that this would save £8 billion. In addition, in the third scenario, the Treasury assumes that the UK's contribution to the EU budget would be eliminated whereas the calculations in Table 4.4 assume that it is halved.

But numerous studies have suggested that the UK economy would be affected by the UK leaving the EU. And in the majority of cases, the estimates suggest that the increase in uncertainty in the short term and the likely reduction in trade and foreign direct investment over the longer term would reduce national income. This would weaken the public finances.

In the near term, reduced economic growth would push up public spending as a share of national income – largely because fixed cash spending plans would represent a larger slice of a smaller national cake. And the progressivity of the UK tax system means that weaker growth would result not only in tax revenues growing less quickly in cash terms but in them representing a smaller share of (the reduced) national income. Therefore weaker growth would increase the size of the deficit relative to national income.

Of the studies considered, the short-run estimates from NIESR are based on the most comprehensive economic modelling exercise. Taking the most optimistic scenario for growth from NIESR's analysis, and using official estimates of how growth affects the public finances, suggests that in 2019–20 there would be a deficit 1.3% of national income or around £25 billion higher than currently planned. That is, there would be a deficit of 0.8% of national income rather than the surplus of 0.5% of national income that the OBR is currently forecasting. In NIESR's most pessimistic scenario, the deficit would be 1.8% of national income or around £40 billion higher than currently forecast.

Even on NIESR's most optimistic scenario, aiming for budget balance would require an additional fiscal tightening of 0.8% of national income, or £15 billion in today's terms. Achieving this – on top of what is already planned for this parliament – would not be easy: for example, even increasing the cuts to day-to-day spending by central government and the planned cuts to social security benefits by 40% would still require a £5 billion net tax rise. And this would still leave the public finances only just in balance, rather than with the 0.5% of national income (£10 billion in today's terms) surplus that the Chancellor is aiming for. Rather than delivering a budget surplus in this parliament, under this scenario it would, perhaps, be more likely to see the fiscal consolidation – and, with it, the date of the expected budget surplus – pushed back. This would require an additional one year of austerity on the most optimistic scenario and an additional two years on the most pessimistic one, and would add to debt. Another chancellor might, of course, simply decide to live with an ongoing deficit and higher debt.

Over the longer term, the scenarios modelled by NIESR suggest reductions in national income ranging from 1.8% to 7.8%. After accounting for reduced spending on financial contributions to the EU, these falls in national income would reduce the amount available to be spent publicly by between £7 billion and £48 billion a year.

## 5. Conclusion

The mechanical effect of leaving the EU would be to strengthen the UK's public finances by around £8 billion a year as a direct result of ending our net contribution to the EU's budget. Future governments might well also decide to spend somewhat less than the current £4 billion or so of EU money that goes to support agriculture and, to a smaller extent, poorer regions such as Cornwall and the west of Wales. In that case, the public finances would be strengthened by somewhat more than £8 billion a year, though obviously at the expense of the farmers and regions whose subsidies would be cut.

This mechanical effect would be substantially smaller if, post Brexit, a future UK government were to decide to join the EEA in order to gain most, though not all, of the benefits conferred by membership of the single market. It is hard to know quite what the cost of that would be, but going by the Norwegian experience it might reduce the budgetary benefit of Brexit by about a half, or possibly more, as we would be required to make a contribution to the EU budget.

It would not, however, take a substantial effect on future national income to offset this immediate £8 billion gain to the public finances. A fall in national income of just 0.6% relative to what it would otherwise have been would be enough. There is a wide range of estimates of both the short- and long-run effects of a Brexit on national income. The vast majority suggest a negative effect substantially in excess of 0.6% of national income.

In the short run, this negative effect is largely driven by an increase in uncertainty leading to a reduction in investment, lower consumer spending, falls in asset values and a hit to the exchange rate. In the longer run, more expensive trade with the EU – much our biggest trade partner – is generally modelled as the largest contributor to reduced national income, though a fall in foreign direct investment (FDI) could also be important. The scale of the long-run hit will depend on what trade arrangements we reach and the extent to which any reduced trade flows feed through into reduced productivity. Some reduction in regulation could have an offsetting effect, though most estimates are for this to be relatively small. In any case, such effects would depend on future political decisions, which are hard to forecast.

Looking at the short term, and in particular out to 2019–20, which is the year in which we are supposed to reach budget surplus, forecasts for the effect of Brexit range from a reduction in GDP of 6% to an estimate from 'Economists for Brexit' of an increase in GDP of 1.6% – though the latter is an outlier in having a positive effect. The estimates of NIESR for a GDP hit of between 2.1% and 3.5% probably provide a good central range for the likely impact on GDP in 2019. Including the direct benefits of reduced budget contributions, these would lead to the public finances being between about £20 billion and £40 billion less healthy than in a scenario in which we did not leave the EU. Of course, the effects could be different from that and NIESR is explicit that most risk is on the downside – i.e. the hit to



GDP is more likely to be bigger than in the pessimistic scenario than it is to be smaller than in the optimistic scenario.

How a government would react to this is uncertain. It is possible – though in our judgement unlikely – that a further £20–40 billion of spending cuts or tax rises would be implemented in years up to 2019–20 in an effort to keep the public finances on track for the currently predicted £10 billion surplus. This would be both difficult to achieve and unlikely to be appropriate in a period of weak economic performance. Even restoring just a budget surplus would, under the most optimistic scenario, be far from easy – for example, this would require an additional fiscal tightening equivalent to increasing the cuts to day-to-day spending by central government on public services planned for this parliament by 40%, and increasing the planned cuts to social security by 40%, alongside a £5 billion net tax rise. Perhaps more likely would be to extend the period of ‘austerity’ into the next parliament and identify tax rises or public spending cuts then. In the more optimistic scenario, roughly an additional year of cuts at the same rate as we have experienced over this decade would get us back to budget balance. In the more pessimistic scenario, an additional two years would be required. Another alternative would be simply to live with higher borrowing and higher debt for a longer period.

This raises the question as to whether these are big changes. If we turned out to have a £20–40 billion hit to the public finances, that would certainly be much smaller than the effect of the 2008 recession, which hit the public finances to the tune of around £175 billion. Indeed, it would be below the downgrades to the forecasts made by the OBR between the Budgets of March 2011 and March 2013 (estimated at £43 billion). We have coped with those. On the other hand, we start from a position of having a greater level of public sector net debt and, having already done several years of spending cuts, less scope to cut public spending with relatively little pain.

In the longer term, the way to think about the public finance effects of a lower growth trajectory is a bit different. Assuming we want to keep public spending at around the same proportion of national income into the future as it is currently planned to be in 2019–20, then one would expect public spending, on neutral assumptions, simply to follow the path of the economy. This, to borrow the language that Mr Osborne used as shadow Chancellor prior to the financial crisis, would be one way of sharing the proceeds of growth between additional public spending and additional private consumption. If the economy, and private earnings and consumption, are bigger then in general we see that public spending is also bigger, and hence the quality of public services is greater. The reverse is true when the economy is smaller. Over the longer term, the scenarios modelled by NIESR suggest reductions in national income ranging from 1.8% to 7.8%. After accounting for reduced spending on financial contributions to the EU, these falls in national income would reduce the amount available to be spent publicly by between £7 billion and £48 billion a year.

## Appendix A. Possible reasons for deviations in the impact of national income on the public finances

The figures in Table 4.1, which were used to produce Figures 4.1, 4.3 and 4.4 and Tables 4.2 and 4.3, are based on estimates of the average impact of fluctuations in UK national income seen in recent history on revenues and spending. The extent to which these estimates are a good guide to how future changes in national income will impact on the fiscal aggregates depends on a number of factors. Some reasons why the relationship in future could be different from that estimated from the past are discussed in Box A.1. These should be borne in mind: it would certainly be unwise to assume that any public finance estimates, in any context, are completely accurate. But it should also be noted that the estimates have not simply been taken naively straight from a single model: multiple techniques have been employed, the outputs from the model have been adjusted in the light of judgements of what the relationship is likely to be, and possible differences in the relationship over time have also been tested for and, in some cases, allowed.<sup>74</sup>

Perhaps the most obvious reason why a change in national income could have a larger or smaller impact on the public finances than the average is that the nature of that change in national income could be atypical. Some parts of GDP – such as wages and consumer spending – are relatively heavily taxed, while others – such as exports and investment – are taxed relatively lightly. This means that a change in national income that is disproportionately due to changes in consumer spending would be expected to have a greater impact on the public finances than one that was disproportionately due to a change in exports.

Therefore one reason why a change in national income resulting from the UK leaving the EU might have a greater or smaller impact on the public finances than the estimates in the text suggest is that Brexit might disproportionately affect components of national income to which the public finances are relatively more or less sensitive. For example, the recent estimates from NIESR suggest that the hit to wages and consumer spending, which are relatively heavily taxed, would be greater than the hit to GDP. Ebell and Warren (2016) attribute the greater hit to wages and consumer spending as being ‘due to a long-term deterioration in the terms of trade, coupled with a shift towards savings’. This might suggest that the impact on tax revenues, and therefore public sector net borrowing, would be greater than the estimates produced in Chapter 4.

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<sup>74</sup> For details, see Helgadottir et al. (2012).

### Box A.1. Why might future changes in national income affect the public finances in a different way from that estimated from the past?

The estimates are based on a specific econometric model estimated using UK data from the early 1970s onwards. It is, of course, possible that the true relationship between changes in national income and the fiscal aggregates over this period is different from what the estimates imply. This is because the relationships are not estimated with 100% accuracy. This means that even if the model used to calculate them is correct, one should not be surprised if the true relationship between national income and the public finances is, at least a little, weaker or stronger than the estimates suggest. In addition, the econometric model used to estimate them could be misspecified, which again could lead to the true relationship differing from the one that has been estimated.

If the relationship between changes in national income and fiscal aggregates that has been observed in the UK in the past has been estimated accurately, that does not necessarily mean that it will be a correct estimate of how future changes in national income affect the public finances. This is for (at least) three reasons:

- Reforms to taxes and benefits, and changes to the way that public spending is planned, could affect their relationship with national income. For example, the expansion – and subsequent contraction – of tax credits available to working households with low incomes, and the shift to multi-year budgeting for public service spending, may have affected the relationship between national income and public spending. On the tax side, the recent reforms to stamp duty on residential and non-residential property transactions should make these revenues less sensitive to changes in property prices, while increases in the progressivity of income tax (for example, through large increases in the personal allowance and the introduction of the 45p additional rate) should make these revenues more sensitive to growth in taxable incomes.
- Changes in the economy – for example, in the structure of the population or in the level and distribution of different tax bases – may also have affected the relationship between changes in national income and fiscal aggregates. For example, the ageing of the population, as the large baby-boom birth cohort born just after the Second World War moved from childhood to working age and then, more recently, to be aged above the state pension age, may have influenced how the public finances are affected by changes in national income.
- Future changes in national income could be different in nature from the changes seen previously. This could be because the shocks hitting the UK economy in future may not be like those seen in the past – for example, the global oil shocks that occurred in 1973 and 1979 will have had a different impact on the UK economy from that of the global financial crisis of the late 2000s, and the recession of the early 1980s was very different in many dimensions from that of the early 1990s. The impact of a given shock to the economy could also be different from in the past – for example, due to changes in the monetary policy regime.

In a similar vein, it is not just changes in national income that affect the public finances. Other factors that matter, but which we do not explicitly take account of in the text, include:

- **The value of property transactions.** While (with the exception of new-build) sales of residential and non-residential properties are not directly in GDP,<sup>75</sup> they are a key determinant of receipts of stamp duty land tax. There is evidence that the impact of asset price movements on the public finances is particularly marked in the UK (Eschenbach and Schnuknecht, 2002). Analysis by the OBR – in chapter 4 of Helgadottir et al. (2012) – suggests that ‘asset prices and transactions may have affected the UK’s past fiscal position by as much as 1.3 per cent of GDP’. A lower volume of property transactions would weaken the public finances. If this were driven by a drop in the number of transactions then it might prove to be temporary, whereas if it were driven by a drop in property prices then it might be likely to have a more enduring impact. The HM Treasury analysis of the short-term impact of the UK leaving the EU suggests that residential property prices could be reduced by 10–18% relative to what they would otherwise have been (HM Treasury, 2016b).
- **Inflation.** Higher inflation, if associated with commensurately higher tax receipts, would leave tax revenues in real terms unchanged. But, at least by default, it would depress the generosity of fixed cash budgets for public service spending in real terms. It could also reduce the likely cost of the ‘triple lock’ on the state pension (which is the most expensive social security benefit).<sup>76</sup> Therefore higher inflation would be expected to strengthen the public finances. NIESR’s estimates of the short-term impact of the UK leaving the EU suggest that inflation in 2017 would be increased by between 2.2 and 3.8 percentage points.
- **The cost of government borrowing.** Increases in gilt rates would push up government spending on debt interest gradually over time: the Office for Budget Responsibility (2016) estimates that a permanent 1 percentage point increase in gilt rates would increase spending by just £1.4 billion in 2017–18 but by £3.8 billion in 2020–21. A 1 percentage point increase in short rates is estimated to push up spending immediately by £4.9 billion a year. Ebell and Warren (2016) estimate that the UK leaving the EU would push up government borrowing costs by 1 percentage point for three quarters, with this increase then fading.

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<sup>75</sup> If two individuals decide to swap their £2 million mansions, there is no direct impact on GDP, but the public finances would be strengthened by the resulting stamp duty revenues. Of course, if the exchange required the use of a surveyor, estate agent and removal firm, then these would be measured in GDP, but even this will depend on the cost of providing these services, which ought not to rise and fall perfectly in line with property prices.

<sup>76</sup> The triple lock states that the state pension will be increased each year by the greatest of the growth in earnings, the growth in prices and 2½%. Higher inflation would make it less likely that the 2½% floor binds.

- **Immigration.** The impact of the UK leaving the EU on immigration from outside the EU is highly uncertain. But it seems more likely than not that immigration from within the EU would be reduced. Recent analysis of the Labour Force Survey by researchers at the London School of Economics (Wadsworth et al., 2016) shows that ‘Immigrants from the EU are younger and more educated than the UK-born – for example, almost twice as many have received some form of higher education. They are also more likely to be in work, especially those entering from Eastern Europe.’ On average, immigrants are found, at least at the moment, to pay more in tax, to receive less in out-of-work benefits (but more in in-work benefits) and to place lower demands on public services than the native population (Dustmann and Frattini, 2014; Portes, 2015).<sup>77</sup> While this could change if they remain in the UK through their retirement, the OBR has estimated that lower immigration would weaken the UK’s long-run public finance position.<sup>78</sup>

The estimated impact of changes in national income on the public finances that were presented in Figures 4.1, 4.3 and 4.4 and Tables 4.2 and 4.3 do not explicitly take account of changes in other factors that affect the public finances. However, to the extent to which these factors – such as the volume of property transactions – move in line with national income in the same way as they have in the past, then they are, implicitly, included. But some changes to national income will be associated with different movements in these factors – not least those relating to the property market. For example, the 1990s recession was associated with a much larger drop in residential house prices than the recession of the late 2000s, despite the latter involving a bigger drop in national income.

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<sup>77</sup> These positive effects could be undone if there were a negative impact of immigration on the employment and earnings of the native population. There is no evidence of a negative impact on the employment of natives, and while there is some evidence of a reduction in the wages of unskilled labour (Nickell and Saleheen, 2015), this is very small.

<sup>78</sup> See chart 5.1 of Office for Budget Responsibility (2015).

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