

# THE ECONOMIC IMPACT ON THE UNITED KINGDOM OF A CUSTOMS UNION DEAL WITH THE EUROPEAN UNION

Arno Hantzsche and Garry Young

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*Note: Figures 10 and 11 and table 6 of this report were corrected after its initial publication.*

# THE ECONOMIC IMPACT ON THE UNITED KINGDOM OF A CUSTOMS UNION DEAL WITH THE EUROPEAN UNION

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## EXECUTIVE SUMMARY

In the wake of Parliament's rejection of the proposed Brexit deal, there have been discussions between the Government and the Labour Party on a customs union as the basis for the future relationship between the United Kingdom and the European Union. This option also gained substantial support in the indicative votes held in the House of Commons in late March and early April. Therefore, even if the Government and the Labour Party cannot reach an agreement, a customs union deal is unlikely to disappear from the agenda any time soon.

There has been very little information available on what would be the economic effects of a customs union. This report fills that gap.

We provide estimates of the economic effects of the UK leaving the EU to form a UK-EU customs union. There are many different forms a customs union could take. We model it along the lines of the backstop arrangements set out in the protocol on Ireland/Northern Ireland of the withdrawal agreement.

While this type of customs union arrangement is seen as being as frictionless a trade relationship as is possible without the UK being in the single market, it would nevertheless involve significant non-tariff barriers that would hinder trade, particularly in services. That would be a material economic burden in view of the importance of services trade to the UK economy.

### Macroeconomic effects

We estimate that leaving the EU to join such a customs union would eventually result in **the UK economy being around 3 per cent smaller** than it would have been had the UK stayed in the EU. This reflects the impact of higher barriers to trade in services on investment and productivity, and an assumption that net inward migration would be lower with the UK outside the single market. We estimate that **GDP per head would be around 2 per cent lower** than it would have been had the UK stayed in the EU, equivalent to around **£800 per person per annum** in today's prices. This is around half the effect we would expect if the UK were to leave the EU without a deal.

### Fiscal effects

A smaller economy would generate less income with which to pay for public services. We estimate that, partly due to a lower population associated with less net inward migration, **tax revenue would be around £26 billion a year lower** ten years after EU exit than it would have been had the UK stayed in the EU. There would be some saving from not being a member of the EU, though we expect that the UK would still need to make some

Summary table: Impact on macroeconomic outcomes ten years after EU exit (Customs union scenario relative to Stay scenario)

	% difference	£ (2016 prices)
GDP	-3.1	-£80 billion
GDP per head	-2.3	-£800
Tax revenue	-2.9	-£26 billion
Effective revenue shortfall	-1.5	-£13 billion

Source: NIESR. The Stay scenario is an estimate of how the economy would develop if the UK were to stay in the EU.

Note: The effective revenue shortfall is smaller than the reduction in tax revenue because it accounts for reallocated EU budget contributions and the effects of a lower population on spending.

financial contribution to EU programmes. In addition, a lower population due to less net inward migration would mean that demand for public services would be lower. Taken together, there would be an **effective revenue shortfall of around £13 billion a year that could not be spent on public services**. To put this in context, this is slightly larger than the 2017–18 budget of the Department of Business, Energy and Industrial Strategy.

### *Regional effects*

It is likely that the main industries to be impacted directly by the UK leaving the EU to form a UK-EU customs union would be the financial and professional services sectors, based mainly around London and other large cities. But other industries and regions would be affected indirectly so that all would end up poorer than they would have been had the UK stayed a member of the EU. Our estimate, based on evidence from other studies scaled to our UK-wide estimates, is that **GDP in each region of the UK would be reduced by a broadly similar amount, but with some variation from 2½ per cent to 4 per cent**.

Although our assessment of how the UK economy will develop in the future is based on well-grounded comprehensive analysis, it is nevertheless subject to significant uncertainty. This is largely because there is no precedent for any country leaving a major trading bloc, such as the EU. It should be stressed that this uncertainty about the impact of leaving the EU and forming a UK-EU customs union is not the same as the uncertainty that typically surrounds forecasts. In particular, forecasts are produced by making judgements about the effects of many possible events, and are known to be subject to wide margins of error. Long-term forecasts are especially uncertain and can be likened to trying to forecast what the income of a school leaver will be in ten years' time, which is likely to be determined by a whole range of unpredictable factors. By contrast, the current exercise aims to compare two different scenarios on a consistent basis, holding constant many of the factors that affect the development of the economy, and varying only the economic relationship between the EU and UK. This is more akin to trying to assess how much higher a school leaver's income would be in ten years' time if they gained a degree compared with if they did not. This calculation is much more precise than trying to forecast their income.

Similarly, we are more confident about the effect of different trading arrangements with the EU than we are about the outlook for the economy. This is because we know that the terms on which the UK will trade with the EU after Brexit will not be as favourable to the UK as they are now. This is largely because higher impediments to services trade would make it less attractive to sell services from the UK. This would discourage investment in the UK and ultimately mean that UK workers were less productive than they would have been if the UK had stayed in the EU.

The findings in this report are consistent with our November 2018 report which was the first analysis of the economic effects of the government's proposed Brexit deal (Hantzsche, Kara and Young, 2018). Our estimates then, of this and other Brexit deals, were broadly in the middle of those subsequently reported by the UK Government (2018) and Levell *et al.* (2018).

The report is organised as follows. In section 1 we explain why being in a customs union but out of the single market inhibits trade. In section 2 we quantify the effects on the economy as a whole using NIESR's global macroeconomic model NiGEM. In section 3 we examine the fiscal implications. In section 4 we report estimates of the regional implications.

## I. Modelling a UK-EU customs union

In this section we describe how we model the economic effects of a UK-EU customs union. As in all analyses of different Brexit arrangements, we quantify the effects of a UK-EU customs union by comparing it with a counterfactual assessment of how the economy would develop from this year onwards if the UK stayed in the EU and all uncertainty about the future relationship between the UK and EU was resolved.

### *The Stay scenario*

In this baseline scenario the UK decides to stay a member of the EU, its single market and customs union. This scenario could come about as the result of decisions made by Parliament and Government to revoke article 50 by the end of October 2019 and/or a referendum. The lifting of uncertainty in this case would mean that the UK economy would be stronger in the near term than in NIESR's May 2019 main forecast based on a 'soft Brexit' outcome (see Box A in Hantzsche and Young, 2019).

### *A UK-EU customs union*

In the alternative UK-EU customs union case, the UK enters a transition period after 31 October 2019 while uncertainty remains elevated for as long as negotiations about the future trading relationship continue. After the end of the transition period, the UK enters a customs union with the EU in 2021.

There are many forms that a customs union could take. At its most basic, a customs union could involve an agreement between the countries involved not to levy tariffs or quotas on each other's goods and to agree a common external tariff on goods imported from other countries. In such a basic arrangement, customs checks would still be needed to confirm the origin of goods, allocate customs and other tax revenue, and ensure adherence to phytosanitary standards (that is, to protect human and animal health) and trade policy measures such as anti-dumping duties. In practice, customs unions tend to reach beyond such a basic arrangement to streamline border checks, if not completely eliminate them (Jerzewska, 2019). But the extra measures need to be agreed between the different parties involved and cannot be decided by one party alone.

While the exact nature of any future UK-EU customs union would need to be negotiated, we assume that it will be broadly in line with the customs agreement already set out in the so-called 'Irish backstop' of the withdrawal agreement whereby a single UK-EU customs territory could be established from the beginning of 2021. The provisions of the backstop indicate what the UK Government and the EU might accept as a future customs relationship. Under this arrangement, there would be no tariffs or quotas for goods traded between the UK and EU, and no need for proof of origin. But to ensure a level playing field, the UK would commit to maintaining similar taxation, environmental protection, labour and social standards, and state aid and competition policy as the EU. In order to avoid the need for regulatory checks in Ireland, Northern Ireland would have to stay in line with single market rules. This is seen by many experts as being as frictionless a customs agreement for goods as it is possible to negotiate without the UK being in the single market. The provisions on regulatory alignment in the backstop go beyond those of the Turkey-EU customs union, suggesting that goods trade would be subject to fewer frictions than in that arrangement.

The UK would, however, exit the European single market. That would mean that UK and EU citizens would no longer be able to move freely to work across borders and, over time, the regulations of the UK and EU would become less closely aligned, impacting on access to each other's markets for both goods and services. As a consequence both goods and, especially, services would face higher non-tariff barriers that would reduce overall UK-EU trade, compared to continued EU membership.

Table 1 sets out our interpretation of how different aspects of the UK-EU relationship would be affected by the establishment of a customs union on the lines of the backstop, where the UK leaves the single market.

A key point to note is that while goods trade across borders might be close to frictionless in the envisaged customs union, it is still likely to be inhibited by restrictions affecting services. This is because many products contain a services element. For example, if UK-based manufacturing businesses were unable to service locomotive rolling stock sold to EU countries, then they would be less likely to be able to find buyers for it.

But the more significant impact of being outside the single market would be on services trade. The service sector accounts for approximately 80 per cent of the UK economy, around 45 per cent of all exports and 40 per cent of all exports to the EU. The share of services trade in total EU trade has grown substantially since 1999, partly

Table I. Changes to UK-EU relationship in a customs union and modelling assumptions

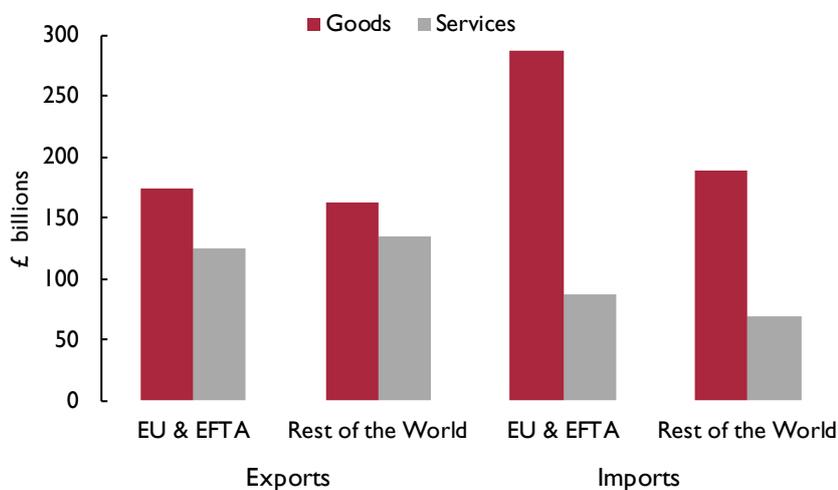
Part of deal	Detail	Economic effect in comparison to other policy arrangements
<i>GOODS TRADE</i>		
Tariffs and quotas	Zero tariffs, fees and quantitative restrictions on EU-UK goods trade.	Comparable to EU membership.
Regulatory alignment	Deep but presumably not full regulatory alignment as UK leaves single market. Minimum standards set out in Annex of WA (environmental, labour, social, state aid).	More impediments to trade than in EU and Norway as a consequence of being outside the single market.
Rule making	Only indirect influence.	More frictions than EU membership but less than Switzerland, Norway.
Own non-EU trade deals	Constrained by the common external tariff.	Less benefit than Norway, Switzerland which are not in EU customs union.
Access to EU's 3rd country trade deals	Rules of origins provisions would provide frictions even if access ensured.	More frictions than EU, less than Norway, Switzerland.
Services dependent goods trade	Goods trade may be hindered by restrictions on services.	More frictions than EU membership, Norway, Switzerland.
<b>Total goods trade</b>	<b>Benefits from customs union and access to EU's 3rd country trade deals likely offset by non-tariff barriers, constraints to rule-making.</b>	<b>On balance frictions similar to bilateral agreements between EU and Switzerland.</b>
<i>SERVICES TRADE</i>		
Regulatory alignment	Limited alignment. For example, lack of passporting for financial services and absence of freedom of movement.	More frictions than Switzerland, Norway, EU due to being outside single market.
Rule making	Limited capacity to influence rules, e.g. to reflect own preferences.	More freedom than Norway, Switzerland.
<b>Total services trade</b>	<b>Regulatory divergence likely offsets benefits from autonomy in rule making.</b>	<b>More frictions than Switzerland, Norway, EU membership.</b>

because of proximity and also because of various EU agreements that have reduced or eliminated barriers to services trade. The UK runs a trade surplus in services with the EU which was worth £28 billion in 2017, helping offset some of the deficit in goods trade (figure 1).

For services, the UK Government and the EU agreed in the political declaration that both parties “should conclude ambitious, comprehensive and balanced arrangements on trade in services and investment” and “aim to deliver a level of liberalisation in trade in services well beyond the Parties’ WTO commitments, and building on recent Union Free Trade Agreements, the Parties should aim at substantial sectoral coverage”.

At present, the extent of service sector liberalisation under the WTO’s General Agreement on Trade in Services (GATS) is low. The number of sectors that the EU is prepared to open to non-EU countries is small and as a

Figure 1. UK export and imports, EU and rest of the world, 2017

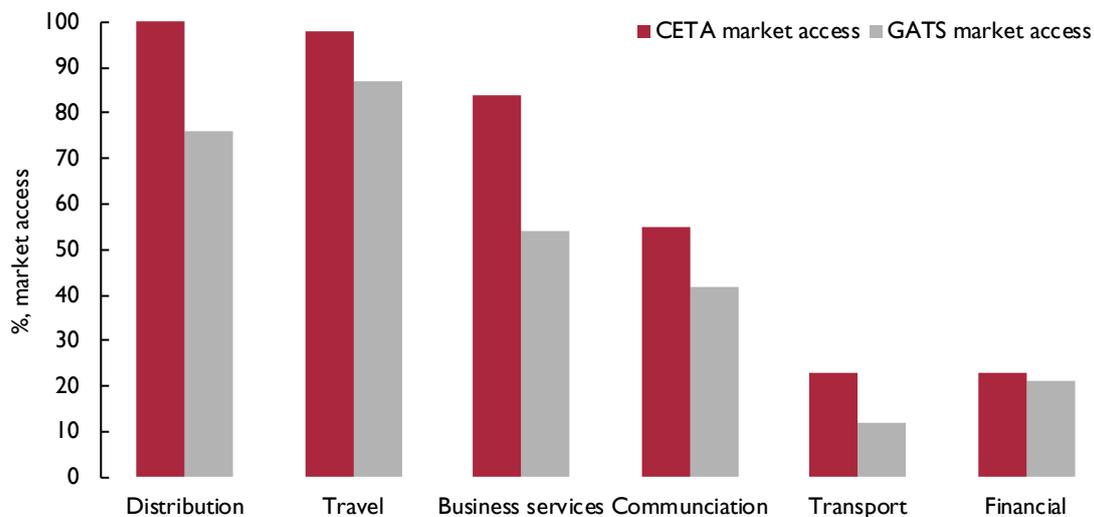


Source: ONS, NIESR calculations.

result of that the arrangements that are likely to be negotiated for services trade are likely to be more restrictive than the trade in goods. This is illustrated in figure 2, derived from Magntorn and Winters (2018), showing how UK exporters’ access to EU markets would be affected if the UK were to move to trading on either GATS terms or a deal like the Comprehensive Economic and Trade Agreement (CETA) between the EU and Canada.

While there would be little effect on exports of travel services, there would be a significant loss of access by providers of financial services, transport and communications if the UK were to trade with the EU on these terms. The sections in the political declaration that cover the services sector are imprecise and therefore open

Figure 2. Market access under CETA and GATS



Source: Magntorn and Winters (2018).

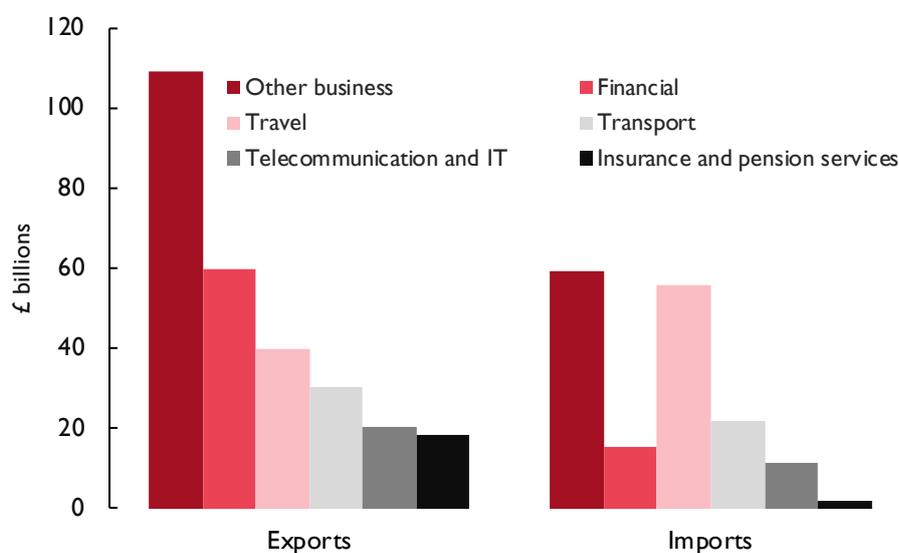
Notes: Full market access represented by score of 100%. CETA stands for Comprehensive Economic and Trade Agreement between the EU and Canada, GATS for the General Agreement on Trade in Services.

to interpretation, but there is no doubt that the scope of any agreement on services trade on that basis is set to fall well short of current arrangements. It is also worth emphasising that the new round of GATS negotiations will not force WTO member countries to open all their services sectors to foreign competition, contrary to some claims. When this point was put to the WTO, the response from them was that:

“There is no obligation on any WTO Member to allow foreign supply of any particular service – nor even to guarantee domestic competition, since it is possible to maintain a monopoly supplier, whether public or private, of any service. Governments are free to choose those services on which they will make commitments guaranteeing access to foreign suppliers. Each Member must have a national schedule of commitments, but there is no rule as to how extensive it should be. Some least-developed Members have made commitments only on tourism, for example, and in general there is great variation in the coverage of schedules, reflecting national policy objectives and levels of economic development. There is agreement among all Governments that in the new round of negotiations the freedom to decide whether to liberalize any given service and the principle of progressive liberalization will be maintained”.<sup>1</sup>

Figure 3 shows the composition of UK service sector trade. The key categories of services exports are financial services, covering mainly retail and investment banking services other than insurance, and ‘other business services’, that covers a range of services including legal, accounting, management consulting and public relations. There are also large contributions from transport, covering sea, air and other transport, and travel, which includes the spending of foreign tourists in the UK.

Figure 3. UK services trade volumes by sector, 2017



Source: ONS, NIESR.

As far as financial services are concerned, the single market enables financial sector firms to carry out activities in other European Economic Area countries by ‘passporting’. Passporting would be withdrawn were the UK to leave the single market and trade on GATS terms. The EU can offer similar access to countries outside the EU under EU equivalence, but the certainty and scope of this regime is restricted because the equivalence arrangements are granted on a case-by-case basis and subject to withdrawal by the EU at short notice. Professional services are covered under the Mutual Recognition of Qualifications Directive and similar specific arrangements cover legal services, telecoms and consumer-protection laws. There is an enormous amount of uncertainty for sectors that rely on professional services because the political declaration seeks “appropriate arrangements on professional qualifications”, without any assurance of the sectors, the overall objective, the regime or the implementation period.

Table 2. Impact of trade agreements on bilateral trade

	Goods trade % reduction in bilateral trade	Services trade % reduction in bilateral trade
Norway	25–38 (B)	40 (M) 19–28 (C)
Switzerland	25–38 (B)	40 (M) 45–54 (C)
FTA	35–44 (E)	61–65 (E)
WTO	53 (B) 58–65 (E)	61–65 (E)

Sources: (B): Baier *et al.*, 2008, (E): Ebell (2016), (M): van der Marel and Shepherd (2013), (C): Ceglowski (2006).

Leaving the European Union will therefore unambiguously result in higher frictions to trade between the UK and the EU. In fact, there is evidence that uncertainty about future trading relationships has already deterred exporters from entering into new trade contracts after the referendum (Crowley *et al.*, 2018).

In order to quantify the impact of different Brexit outcomes, we rely on estimates provided by the empirical literature (summarised in table 2). More specifically, we use measures of the impact on goods and services trade of joining trade arrangements with European countries and calculate the implied change in UK-EU trade from reversing membership, accounting for the share of goods and services trade in total UK-EU trade, which in most recent ONS data have been 68.3 per cent and 31.7 per cent, respectively. We therefore assume symmetry in the effects of joining and leaving the EU. Empirical estimates are based on different periods and the average EU member state. It is possible, given the UK's particularly strong reliance on services, that the overall impact of trade restrictions could be larger on the UK compared with other economies where services are less important. We therefore apply judgement in our application of historical findings.

As set out in table 1, on the basis that the new UK-EU customs relationship is similar to the backstop set up in the protocol on Ireland/Northern Ireland of the withdrawal agreement, we think that, on balance, frictions faced by goods exporters and importers would be similar as for goods trade between the EU and Switzerland. Using the estimates of Baier *et al.* (2008), we assume a reduction in UK-EU bilateral goods trade of 25 per cent.

Services trade is not subject to tariffs and therefore would not benefit from tariff alignments in a customs union. As set out in table 1, we would expect the new trading arrangement to be more restrictive for services trade than the arrangement between the EU and Norway and Switzerland. Using the range of estimates in table 2, we assume that services trade would be lower by 50 per cent compared to EU membership. As a result, total bilateral trade with the EU is lower by around 30 per cent in the long run, compared with EU membership in this scenario.

A cross-check, using detailed estimates of sector-specific market access under CETA and GATS from Magntorn and Winters (2018) weighted by the volume of UK services exports to the EU by sector, suggests that total services access to EU markets would be reduced by between 40 per cent (CETA) to 55 per cent (GATS), broadly confirming our estimates.

Our estimates are also broadly consistent with calculations by Lowe (2018) using a different methodological approach. He examines the different modes by which services are supplied by UK businesses to the EU and compares this with how UK services are provided to non-EU countries under the EU's third country provisions. He asserts that "it is reasonable to expect the composition of UK services exports to the EU to shift in profile to that of the UK's trade with the rest of the world" when the UK leaves the single market. On this basis, he calculates that exports of financial services would be around 60 per cent lower were the composition of UK exports to the EU to match UK exports to the rest of the world. Other categories of services exports would be up to around 20 per cent lower on his calculations.

### *Additional assumptions*

In line with the assumptions we made in our November report, we further assume that as a result of trade frictions foreign direct investment and productivity would be negatively affected. We assume a reduction in inward foreign direct investment of 18 per cent and in labour productivity of 1 per cent in the long run. Exiting the single market and ending freedom of movement is likely to lead to lower levels of EU net migration than in the recent past, while trade frictions between the UK and the EU may also deter migrants from the rest of the world from moving to the UK. Overall, we assume that the UK population grows by 50,000 people less per year compared to the Stay scenario, 75 per cent of whom are of working age.

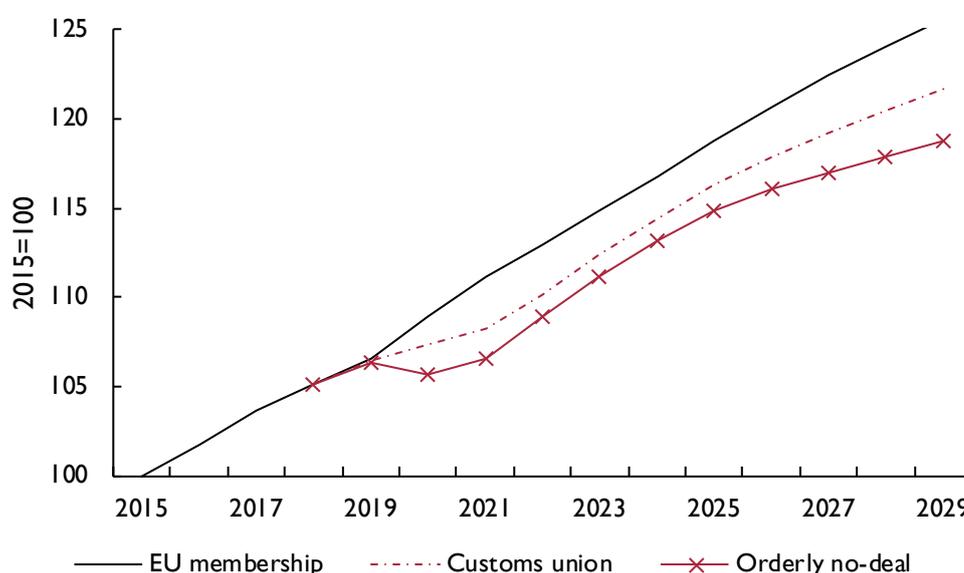
In our customs union scenario, the UK Government complies with the terms of the financial settlement set out in the withdrawal agreement and continues contributing to selected EU programmes. This reduces net fiscal contributions to the EU budget of currently around £10 billion a year by one half once the bulk of the divorce settlement of £37 billion has been paid by 2024. We assume that recovered contributions are fully recycled into domestic government spending.

## 2. The macroeconomic impact

We model the impact of leaving the EU on the UK economy using NiGEM, the National Institute Global Econometric Model, an empirical multi-country economic model. NiGEM's global nature and explicit trade linkages make it particularly well-suited to modelling the impact on the UK economy and other countries of shifts in trade policy. NiGEM is general equilibrium in nature, so that both prices and quantities adjust over time. Moreover, it incorporates endogenous monetary and fiscal policy responses, which are clearly important when dealing with the kinds of adjustments that leaving the EU might bring. It has also been used by the OECD and HM Treasury in their analyses of Brexit.

We estimate that leaving the EU to form a UK-EU customs union would eventually result in UK GDP being about 3 per cent smaller than it would have been had the UK stayed in the EU. This is consistent with the estimate we provided in our analysis of the Government's Brexit deal in November, under a scenario where the UK trades under the provisions of the whole-UK backstop specified in the draft withdrawal agreement (Hantzsche *et al.*, 2018).

Figure 4. The impact of different Brexit scenarios on real GDP

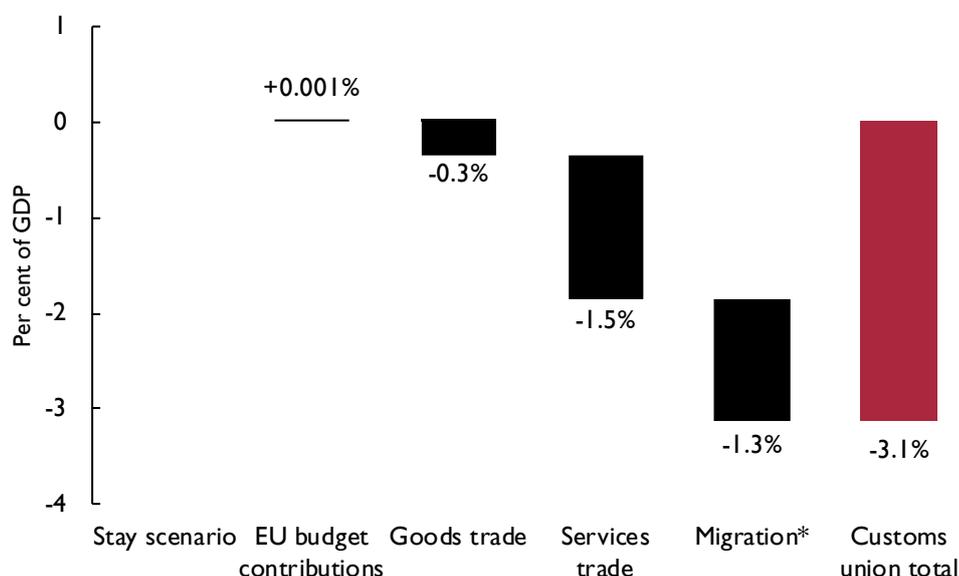


Source: NIESR, NiGEM simulation.

The impact of a customs union on the level of GDP over time is illustrated by figure 4, which also compares the estimated impact to an orderly no-deal Brexit scenario. As explained in detail in Hantzsche and Young (2019), if instead the UK were to exit without a deal at the end of 2019, we would expect GDP eventually to be lower by 5–6 per cent compared to continued membership in the long run. This would not be offset by free trade agreements with third countries. We estimate that were the UK to negotiate free trade agreements with other countries the economic benefit would be at best around 0.3 per cent of GDP.<sup>2</sup>

Differences in impact between the customs union scenario and one where the UK remains in both the single market and customs union arise mainly from regulatory barriers to services trade and restrictions on the free movement of people. Figure 5 breaks down the overall impact into the effect on GDP from non-tariff barriers to goods trade, barriers to services trade, reduced contributions to the EU budget and migration effects due to potential restrictions to the free movement of people (see also Tarrant and Tilford, 2018). It shows that, of the overall long-run impact on GDP of just over 3 per cent, 1½ percentage points are accounted for by higher barriers to services trade under a customs union compared to EU membership, affecting trade directly but also foreign direct investment, productivity and the migration of people employed in services exporting industries; ¼ percentage point is due to non-tariff barriers to goods trade; the remaining 1⅓ per cent reflects our estimate of other migration effects. Reallocating some of the UK's contributions to the EU budget has a negligible effect on GDP.

Figure 5. Contributions to the overall impact on GDP relative to continued membership



Source: NIESR, NiGEM simulation.

Notes: Impact ten years after exit. \*Migration effects not directly related to services trade.

Moving to a customs union trading arrangement is likely to affect living standards in the UK in multiple ways. For instance, checks at the border, the need to obtain licences to sell certain types of goods and services, and bureaucratic burdens are likely to increase the cost of moving exports and imports across countries. As a direct effect of trade costs but also due to a lower exchange rate than otherwise, consumer prices are estimated to be 1½ per cent higher than under continued EU membership (table 3). This, together with the effect of lower productivity, depresses real earnings by 3½ per cent on our estimates. As a result, income that individuals have available for consumption and saving would be more than 4 per cent smaller in real terms, around £800 per year per head. In our analysis this means that consumption would be 3½ per cent lower in the customs union scenario.

The sterling exchange rate would be 8 per cent lower in the long run in response to the greater difficulty in trading with the EU. We estimate that, because firms would face higher frictions in accessing the EU market than otherwise, investment in the UK would be around 7 per cent lower each year compared to UK-EU trade under current arrangements. Over time, this means that the capital stock accumulated by businesses would be some £600 billion smaller than otherwise by 2030. In addition, more trade frictions are unlikely to help the UK resolve its productivity puzzle. We estimate that labour productivity would in the long run be around 2 per cent lower in the customs union scenario compared to full EU membership. Taking all these effects together, we estimate that GDP per capita as a measure of average individual welfare would be 2.3 per cent smaller in the customs union case.

Table 3. Impact on other macroeconomic outcomes (percentage difference from Stay scenario)

Nominal effective exchange rate	-8.0
Consumer prices	1.5
Real wage	-3.4
Real personal disposable income	-4.3
Consumption	-3.4
Investment	-6.7
Productivity	-2.0
GDP per capita	-2.3

Source: NIESR, NiGEM simulation.

Note: Figures show estimated impact ten years after EU exit.

### 3. Fiscal implications

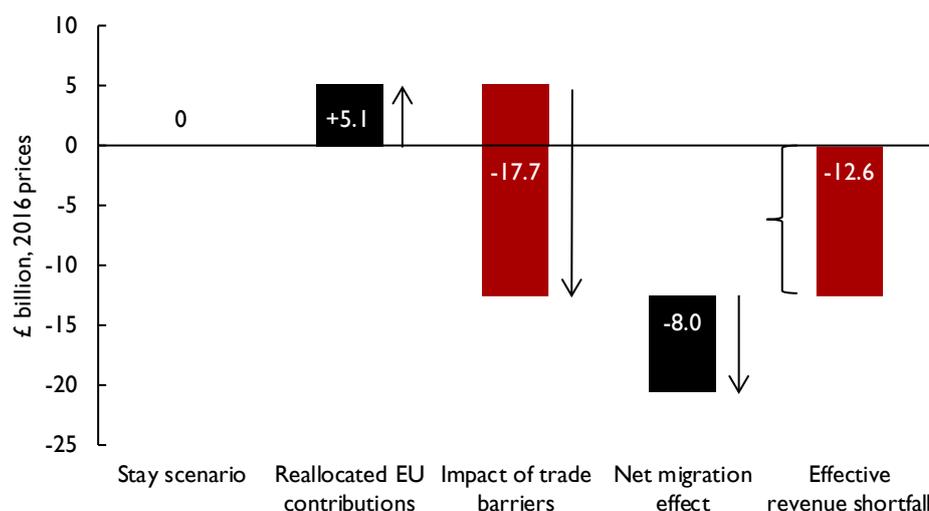
As a result of lower GDP relative to continued EU membership, the Government is estimated to earn around £26 billion a year less in tax revenue in the long run, a 3 per cent revenue shortfall relative to the counterfactual Stay scenario. Only partly offsetting this, we assume that the revenue gain from recovering a share of the UK's current net contributions to the EU budget amounts to around £5 billion a year, or 0.6 per cent of spending compared to the Stay scenario.

Reduced levels of net migration mean the population will be smaller under the customs union scenario. This partly accounts for the reduction in tax revenue, but also means that the demand for certain public services such as health care and education may be lower. Our estimates imply that expenditure needs would be £8 billion per annum lower as a direct result of lower net migration, in line with the impact of lower net migration on revenue. Accounting for reallocated EU transactions and population effects, the long-run effective revenue shortfall created by a customs union deal relative to continued EU membership is estimated to be £13 billion per annum in real terms ten years after Brexit. This corresponds to 1½ per cent of total revenue in the Stay scenario or ¾ per cent of GDP. Figure 6 provides an illustration of how the revenue impact can be broken down.

The Government could meet the effective shortfall of £13 billion per annum by raising tax rates, increasing public borrowing or reducing spending, or a combination of all of these options. Each option is likely to be politically difficult. For example, according to HMRC, an increase in the basic rate of income tax of 1p in the pound currently raises £5.6 billion (HMRC, 2019). This suggests the basic rate would need to rise by around 2½p in the pound to cover the effective revenue shortfall ten years after Brexit. Alternatively, public borrowing could be allowed to rise by ¾ per cent of GDP. For illustrative purposes only and not because we think it would be politically feasible or economically desirable, we assess the implications of the revenue gap being filled entirely through a reduction in total managed expenditure, leaving borrowing and taxation unchanged. In particular, we consider two extreme cases on how to allocate corresponding differences in spending relative to the Stay scenario across spending areas in each year.

**Scenario 1:** In this scenario, the revenue shortfall is met by reducing real spending proportional to the share each spending area ('function') had in total managed expenditure in most recent data (2017–18). The only exception is debt interest payments which is determined by the existing debt stock and the level of long-term interest rates. This approach does not account for the fact that the composition of spending may look different in the future, for instance as a result of an ageing population.

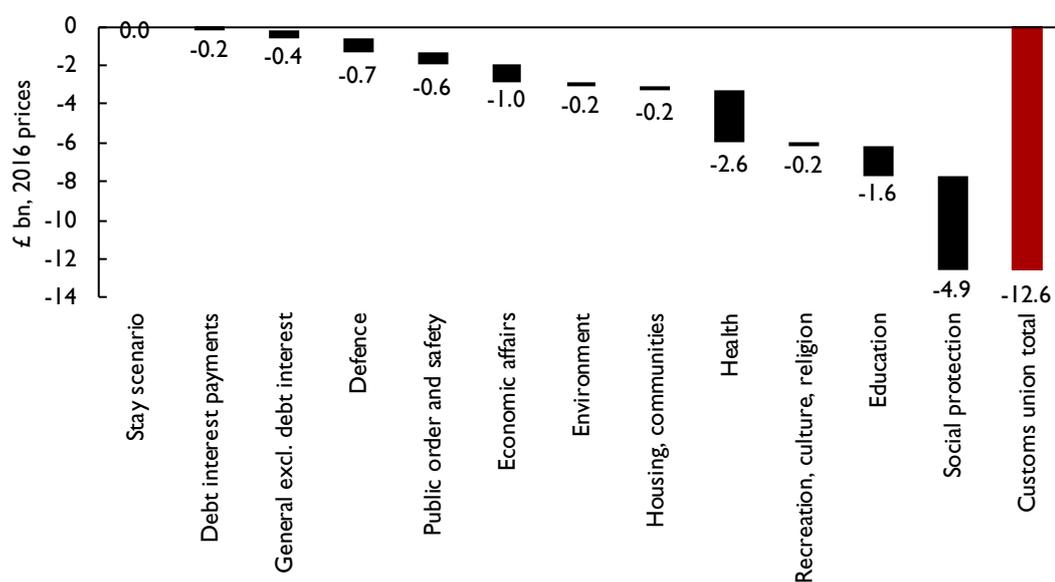
Figure 6. Impact of a UK-EU customs union on annual fiscal revenue relative to Stay



Source: NIESR, NiGEM simulation.

Note: Figures show estimated impact ten years after EU exit.

Figure 7. Implications for annual government spending relative to Stay (Scenario 1)



Source: NIESR, NiGEM simulation.

Note: Figures show estimated impact ten years after EU exit.

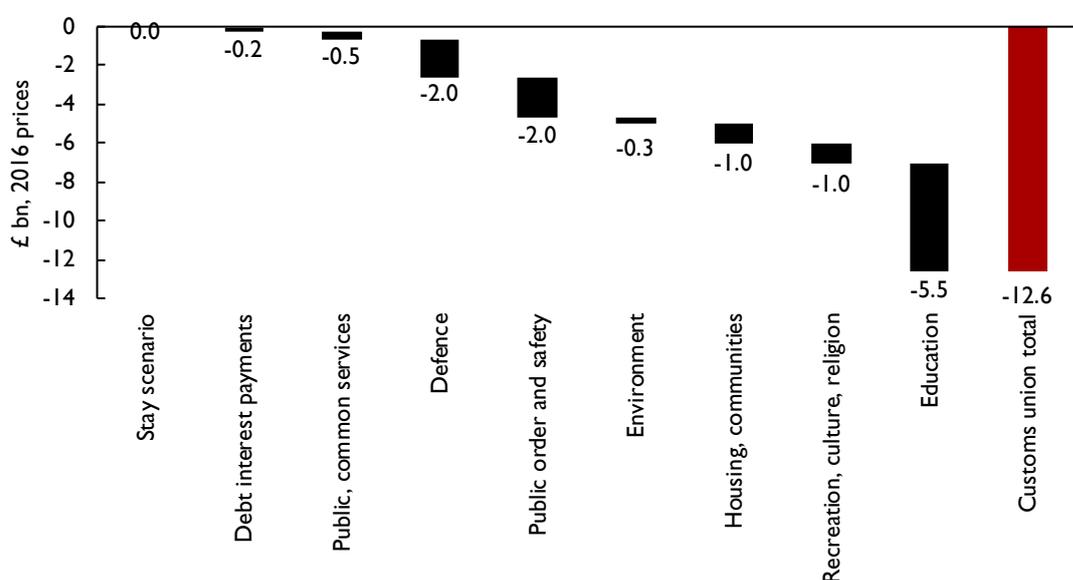
**Scenario 2:** Demographic pressures might mean that some spending areas will remain protected from Brexit-related spending restraints. We use information on changes in real spending between 2010–11 and 2017–18 to form a measure of recent governments' spending priorities. In particular, we allocate spending shortfalls relative to Stay only to those spending areas that saw reductions in spending in real terms during the recent period of austerity, i.e. public and common services, defence, public order and safety, environmental protection, housing and communities, recreation and culture, and non-protected spending on education. Relative spending reductions compared to continued EU membership are apportioned using the relative size of real cuts between 2010–11 and 2017–18.

The first scenario implies that there would be £5 billion less available in real spending on the welfare state (social protection) compared to the scenario in which the UK stayed in the EU (figure 7). Health spending would be between £2–3 billion lower per annum ten years after Brexit. In the second scenario (figure 8), in which areas like social protection and health remain protected, the brunt of the revenue gap would now be borne by non-protected education spending, i.e. mainly higher education, followed by public order and defence.

The effective revenue gap of £13 billion applies ten years after Brexit. The gap immediately after Brexit will be smaller as the revenue gap relative to continued EU membership is estimated to build up over time, as differences across both scenarios regarding the economy's productive capacity widen. Unless a general election takes place earlier than 2022, the next Parliament would run from 2022 to 2027. Our estimates imply that the government in power during that period will have around £9 billion less available, on average, to spend each year, assuming tax rates and borrowing remain unchanged, or around £5 billion if a smaller population is accounted for (table 4). This shortfall increases to an average of around £20 billion (£12 billion accounting for population differences) in the subsequent Parliament.

Lower spending to compensate for the shortfall in revenue is likely to affect different regions of the UK differently. Table 5, derived from the Government's most recent Public Expenditure Statistical Analyses, depicts the share of total spending per head allocated to different spending areas and regions. It shows that overall more than average amounts of public expenditure per inhabitant are spent in Northern Ireland, Scotland, London and Wales. We interpret this information as one possible measure of regional sensitivity to any changes in government spending.

Figure 8. Implications for annual government spending relative to Stay (Scenario 2)



Source: NIESR, NiGEM simulation.

Note: Figures show estimated impact ten years after EU exit.

Table 4. Implications for government spending relative to Stay by legislative session (£ billion, 2016 prices)

	Scenario 1		Scenario 2	
	2022–27	2027–32	2022–27	2027–32
Total revenue shortfall	-9.4	-20.0	-9.4	-20.0
Effective revenue shortfall	-4.9	-12.0	-4.9	-12.0
Debt interest payments	-0.4	-0.3	-0.4	-0.3
General excl. debt interest	-0.2	-0.4	-0.2	-0.4
Defence	-0.3	-0.7	-0.7	-1.9
Public order and safety	-0.2	-0.5	-0.7	-1.9
Economic affairs	-0.3	-0.9		
Environment	-0.1	-0.2	-0.1	-0.3
Housing, communities	-0.1	-0.2	-0.4	-1.0
Health	-1.0	-2.5		
Recreation, culture, religion	-0.1	-0.2	-0.4	-1.0
Education	-0.6	-1.5	-2.0	-5.2
Social protection	-1.8	-4.6		

Source: NIESR, NiGEM simulation.

Note: The effective revenue shortfall is smaller than the reduction in tax revenue because it accounts for reallocated EU budget contributions and the effects of a lower population on spending.

If any Brexit-related revenue shortfall was met by spending restraints in the areas of social protection and health (scenario 1), the table illustrates that this would be likely most to affect people in Northern Ireland, Wales and the North of England. The East and South East of England would feel less of a fiscal impact compared to the rest of the country.

If, by contrast, areas of spending that had remained protected from larger cuts in the past were to be spared in future (scenario 2), we would expect London, Scotland and Northern Ireland to be affected most, where spending per head on education and public order and safety is higher than the average.

Table 5. Identifiable expenditure by function and region per head indexed to UK identifiable expenditure per head

	General public	Defence services	Public order and safety	Economic affairs	Environment protection	
North East	1.0	0.0	5.3	6.1	1.3	
North West	0.9	0.0	4.9	6.3	3.5	
Yorkshire and The Humber	0.8	0.0	4.5	6.2	1.3	
East Midlands	1.0	0.0	4.2	5.1	1.1	
West Midlands	0.9	0.0	4.4	5.8	1.2	
East	1.2	0.0	3.8	6.0	1.5	
London	1.3	0.0	6.6	12.4	1.4	
South East	1.7	0.0	3.6	6.8	1.5	
South West	1.1	0.0	3.7	6.2	1.9	
England	1.2	0.0	4.6	7.1	1.7	
Scotland	2.2	0.0	5.2	12.0	2.7	
Wales	1.8	0.0	4.4	8.1	2.2	
Northern Ireland	2.0	0.0	7.2	9.3	1.5	
UK identifiable expenditure	1.3	0.0	4.7	7.6	1.8	
	Housing and community amenities	Health	Recreation, culture and religion	Education	Social protection	Total expenditure on services
North East	2.0	25.8	1.2	13.9	49.0	<b>105.7</b>
North West	1.2	25.3	1.1	13.9	45.9	<b>102.9</b>
Yorkshire and The Humber	1.5	23.1	1.2	14.0	43.7	<b>96.2</b>
East Midlands	1.4	21.2	1.0	13.6	41.8	<b>90.4</b>
West Midlands	1.5	24.0	0.9	14.0	43.7	<b>96.6</b>
East	1.2	20.5	0.8	13.8	40.1	<b>89.0</b>
London	2.2	29.2	1.6	17.5	39.0	<b>111.3</b>
South East	1.0	21.1	1.0	13.2	38.7	<b>88.6</b>
South West	0.9	21.9	0.9	13.0	43.7	<b>93.3</b>
England	1.4	23.7	1.1	14.3	42.1	<b>97.2</b>
Scotland	3.6	25.5	2.1	16.5	46.5	<b>116.3</b>
Wales	2.5	24.4	1.7	14.7	50.3	<b>110.0</b>
Northern Ireland	4.5	24.5	2.8	15.9	53.0	<b>120.6</b>
UK identifiable expenditure	1.7	23.9	1.3	14.5	43.2	<b>100.0</b>

Source: NIESR, Public Expenditure Statistical Analyses, 2016–17 data.

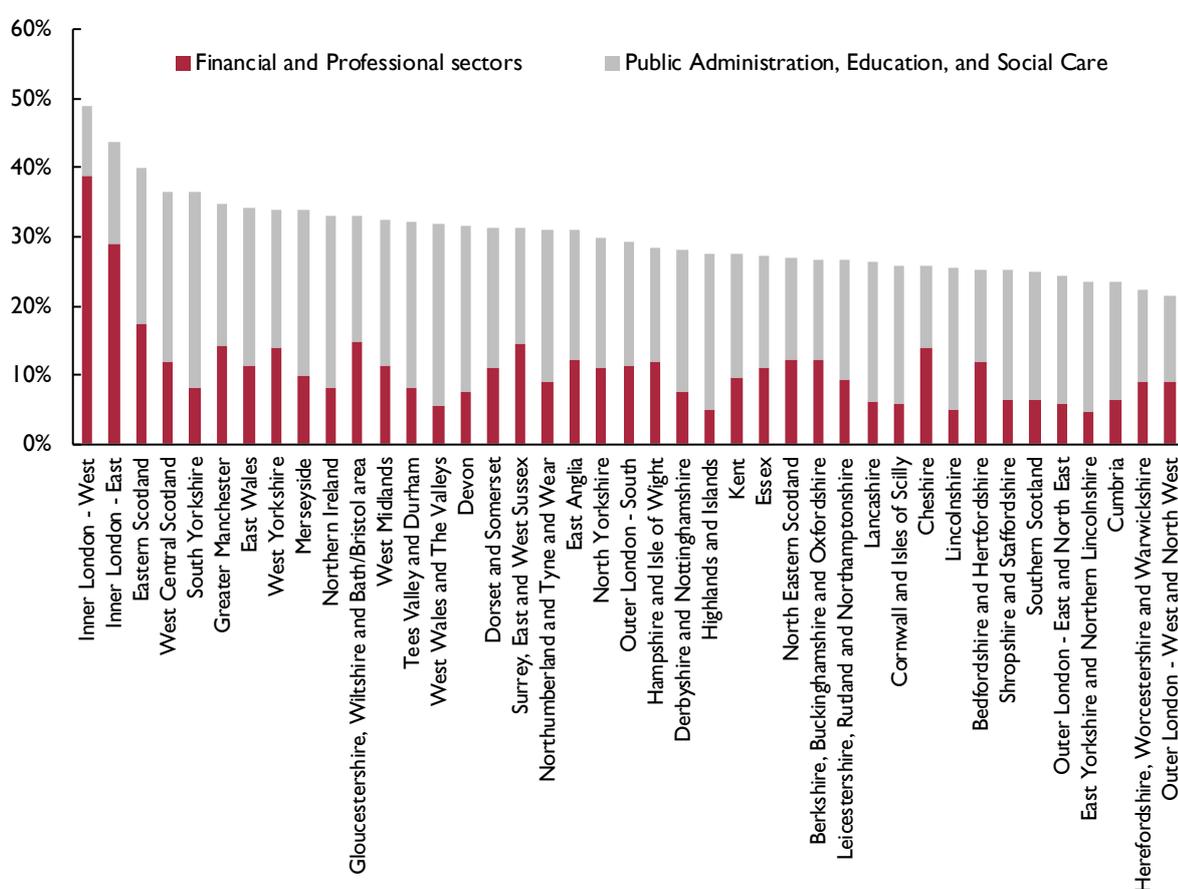
Note: UK identifiable expenditure per head in 2016–17 = £9,159.

#### 4. Industry and regional effects

The industry and regional effects of moving to a UK-EU customs union are likely to depend on a number of factors including the direct and indirect linkages between different industries, the mobility of labour within the United Kingdom, the extent of fiscal transfers between regions, and the flexibility of markets.

To give a simple example, it is likely to be the case that the industries most directly affected by moving to a UK-EU customs union are the financial and business services industries. As the lower bars in figure 9 show, these are most important in and around London. More detailed (NUTS3) data indicate that these industries are also important in cities like Edinburgh and Manchester (areas that voted Remain in the EU referendum) and less important in places like Thurrock and the Welsh valleys (areas that voted leave).

Figure 9. Share of local Gross Value Added represented by financial and professional services sectors and public sector



Source: ONS, NIESR calculations.

But this does not mean that the overall economic impact of leaving the EU will match this regional distribution. First, the output of financial and professional services relies directly on inputs bought in from other sectors and regions, including manufactured goods, wholesale and retail services, electricity and gas, construction. These direct linkages mean that a contraction in the financial and professional services sector will be propagated to all domestic sectors and regions to some extent.

Second, the reduced spending power of those employed in these industries and their owners, including members of pension schemes, will also be dispersed to other regions and sectors, in particular, by commuting workers in London and the South East for example.

Third, as shown in the previous section, lower tax receipts associated with less output in these industries will inevitably be associated with lower public spending that may be concentrated in other parts of the country.

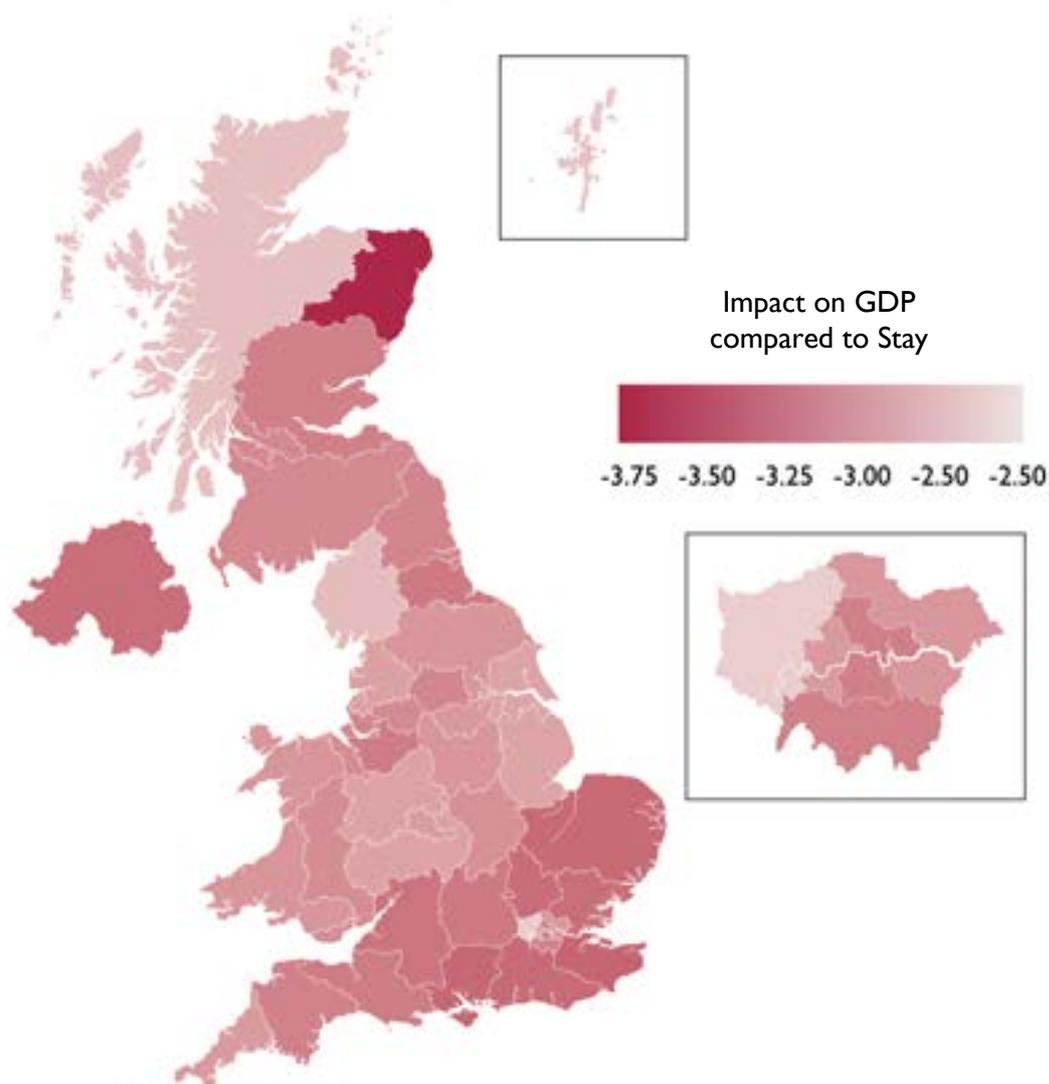
As the upper bars in figure 9 show, the regions where public sector output is most significant include South Yorkshire, West Wales and the Valleys and other areas that might bear the brunt of public spending cut-backs.

Fourth, the flexibility of workers and structures is likely to differ in important ways across regions and industries. For example, it may be the case that the high-skilled service-based London economy is sufficiently flexible that it is relatively easy to switch from producing financial services to other high value added services. Whereas a loss of public sector jobs in other parts of the country may have a more devastating local impact.

Fifth, if labour mobility is high, then shocks to particular sectors and regions can be propagated to other sectors and regions as workers move to where wages are higher and jobs are more plentiful.

All of these factors tend to mean that the regional effects of trade shocks are not as obvious as they appear at first sight. They tend to be more evenly dispersed in their effects once a variety of adjustment mechanisms are taken into account. In order to take account of some of these adjustment mechanisms, we use two different empirical approaches to assess the effects, both based around general equilibrium trade models.

Figure 10. The impact of a customs union Brexit on regions of the UK (per cent of GDP relative to Stay)



Source: NIESR calculations of UK-wide effect, allocated to regions in line with average of Dhingra *et al* (2017) and Mion and Ponattu (2019) estimates.  
Note: Impact ten years after EU exit.

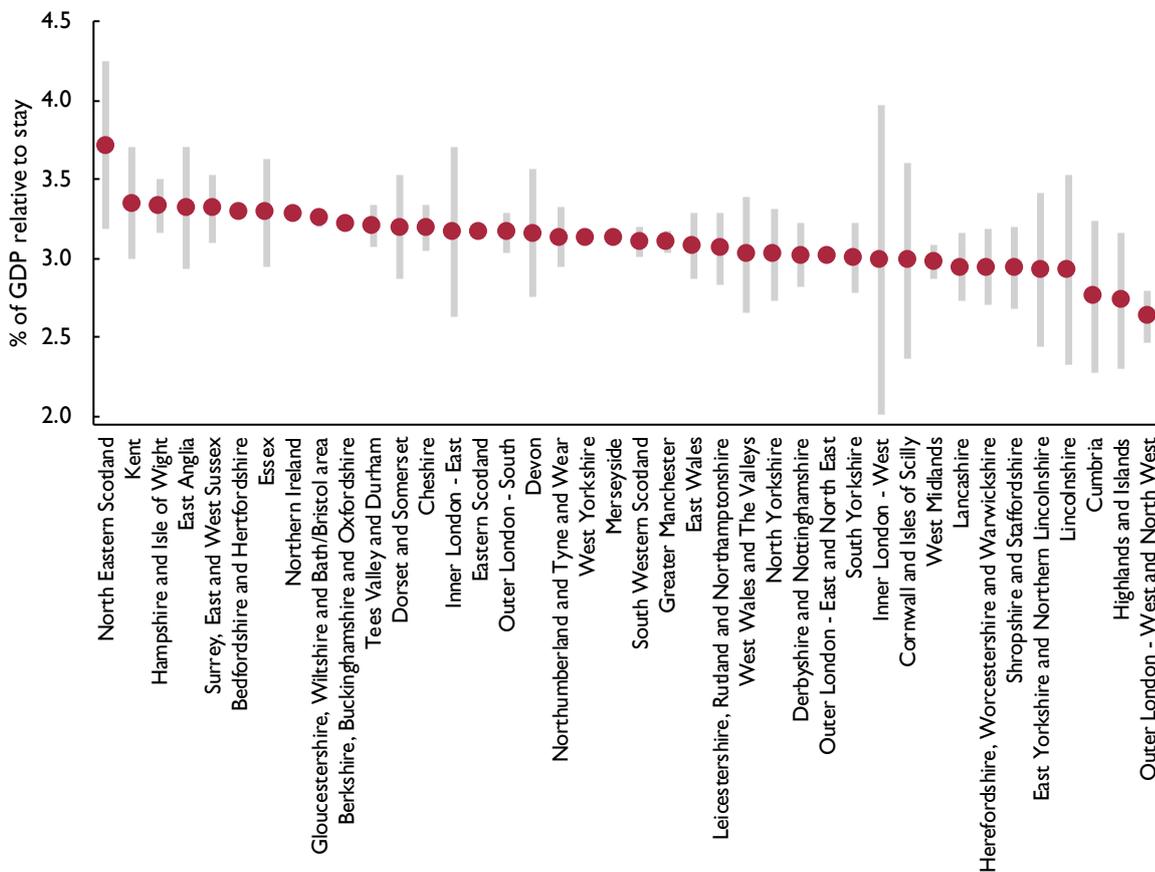
The first approach, due to Dhingra, Machin and Overman (2017), uses a multisector general equilibrium model to simulate the sectoral effects of Brexit that results in higher trade costs due to more tariff and non-tariff barriers. The model estimates the impact of a hard and soft Brexit on bilateral trade volumes for each sector, taking into account inter-sectoral linkages through supply chains and different responses to higher trade costs.

Having estimated the percentage change in sectoral output (GVA), Dhingra *et al.* (2017) use the employment shares of different regions in the UK to estimate the impact of Brexit on local economies. They report that they have more confidence in the area-level results than in the size of the sectoral effects as the employment-share weighting of results means that sector-specific errors ‘wash out’ to some extent.

We use the Dhingra *et al.* estimates as an indicator of how the adverse UK-wide effects of leaving the EU to form a UK-EU customs union might be distributed across the UK.

The second approach, due to Mion and Ponattu (2019), also uses a general equilibrium trade model to assess the effects of Brexit. Unlike the Dhingra *et al.* (2017) approach, the model does not identify the effects of Brexit on different sectors but instead analyses the effects of Brexit on different NUTS2 regions of the European economy directly. They analyse how much higher is inter-regional trade due to EEA and single market membership than would be expected given other characteristics (distance, language, adjacency, past colonial ties) and then model a hard Brexit by assuming that all of the estimated gain due to EEA and single market membership is lost. They model a soft Brexit by assuming that half of the advantage is lost. Geographical distance plays an important role in this approach so that losses are larger in areas such as Kent and Northern Ireland, that are close to the EU.

Figure 11. Regional distribution of GDP loss relative to staying in the EU



Source: NIESR calculations of UK-wide effect based on NiGEM simulation, allocated to regions in line with average of Dhingra *et al.* (2017) and Mion and Ponattu (2019) estimates. Bars indicate differences in the estimated effect that arise from adopting the different empirical approaches. Note: Impact 10 years after EU exit.

Combining the evidence from Dhingra *et al.* (2017) and Mion and Ponattu (2019), we estimate the regional impact of a UK-EU customs union by scaling the aggregate effects of those approaches to match our UK-wide estimate. The results are shown in figures 10 and 11 and are also reported in table 6.<sup>3</sup>

This illustrates that the negative effects on UK regions of leaving the EU and joining a customs union are very similar and vary from a loss of output of 2½ per cent to just under 4 per cent. Figure 11 shows the variation in effects on regions of the UK which arises from applying the different empirical approaches. It highlights that the impact on some regions, like Cornwall or Inner London, is more uncertain than on others.

**Table 6. The impact of a customs union Brexit on regional GDP (relative to Stay scenario)**

	% difference	£ billion, 2016 prices
North Eastern Scotland	-3.7	-1.0
Kent	-3.3	-1.9
Hampshire and Isle of Wight	-3.3	-2.5
East Anglia	-3.3	-2.9
Surrey, East and West Sussex	-3.3	-3.8
Bedfordshire and Hertfordshire	-3.3	-2.3
Essex	-3.3	-1.8
Northern Ireland	-3.3	-1.7
Gloucestershire, Wiltshire and Bath/Bristol area	-3.3	-3.1
Berkshire, Buckinghamshire and Oxfordshire	-3.2	-4.0
Tees Valley and Durham	-3.2	-1.0
Dorset and Somerset	-3.2	-1.3
Cheshire	-3.2	-1.3
Inner London – East	-3.2	-4.5
Eastern Scotland	-3.2	-2.1
Outer London – South	-3.2	-1.3
Devon	-3.2	-1.1
Northumberland and Tyne and Wear	-3.1	-1.3
West Yorkshire	-3.1	-2.3
Merseyside	-3.1	-1.4
South Western Scotland	-3.1	-2.4
Greater Manchester	-3.1	-2.7
East Wales	-3.1	-1.1
Leicestershire, Rutland and Northamptonshire	-3.1	-1.8
West Wales and The Valleys	-3.0	-1.4
North Yorkshire	-3.0	-0.8
Derbyshire and Nottinghamshire	-3.0	-2.0
Outer London – East and North East	-3.0	-1.5
South Yorkshire	-3.0	-1.1
Inner London – West	-3.0	-6.9
Cornwall and Isles of Scilly	-3.0	-0.4
West Midlands	-3.0	-2.6
Lancashire	-2.9	-1.3
Herefordshire, Worcestershire and Warwickshire	-2.9	-1.3
Shropshire and Staffordshire	-2.9	-1.3
East Yorkshire and Northern Lincolnshire	-2.9	-0.8
Lincolnshire	-2.9	-0.6
Cumbria	-2.8	-0.5
Highlands and Islands	-2.7	-0.4
Outer London – West and North West	-2.6	-2.4
Total	-3.1	-76

Source: NIESR calculations of UK-wide effect based on NiGEM simulation, allocated to regions in line with average of Dhingra *et al.* (2017) and Mion and Ponattu (2019) estimates.

Note: Impact ten years after EU exit.

## NOTES

- 1 Quotation taken from *GATS: Fact and Fiction*, World Trade Organisation, [https://www.wto.org/english/tratop\\_e/serv\\_e/gats\\_factfictionfalse\\_e.htm](https://www.wto.org/english/tratop_e/serv_e/gats_factfictionfalse_e.htm).
- 2 For comparison, our report from November 2018 (Hantzsche *et al.*, 2018) also provides long-run estimates for a scenario in which the UK and the EU negotiate a free trade agreement, in which case GDP would be around 4 per cent smaller compared to continued EU membership.
- 3 We estimate the regional impact of a UK-EU customs union as follows. We first calculate an average measure of intensity with which each region would be affected by a customs union based on estimates reported in Dinghra *et al.* (2017) and Mion and Ponattu (2019). We then use the intensity estimate to allocate the impact on regional gross value added such that total effects sum up to our whole-economy estimate of 3.1 per cent of output relative to continued EU membership.

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