HM Government

HM Treasury analysis: the long-term economic impact of EU membership and the alternatives

Cm 9250

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Presented to Parliament by the
Chancellor of the Exchequer
by Command of Her Majesty

April 2016

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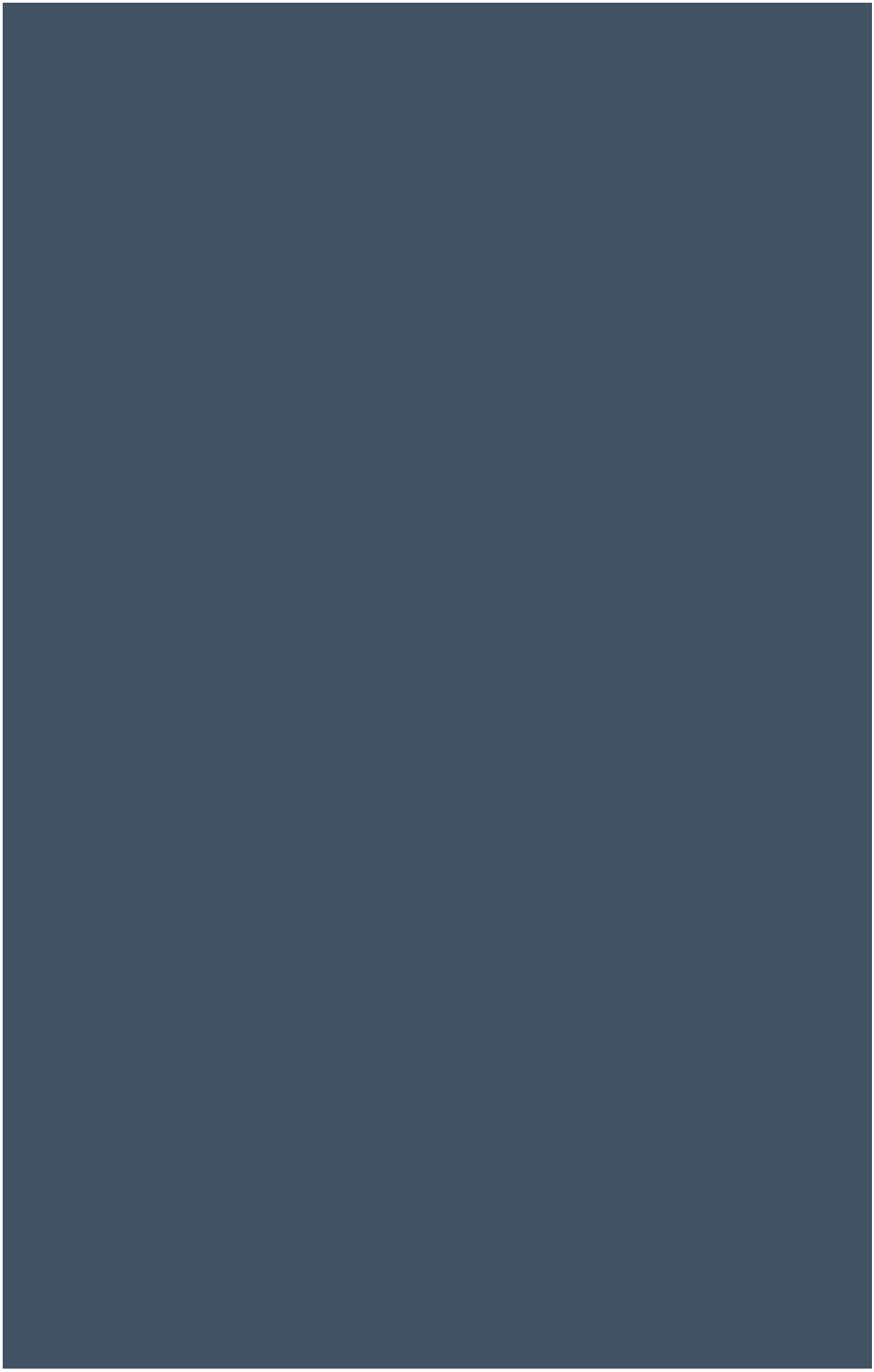

Foreword

On 23 June, the people of Britain will make the most important decision for a generation – whether to remain in the European Union. It is one that will affect them, their families and their children for decades to come.

What's clear is that the British people are asking for the facts before they decide whether to vote Remain or Leave. I promised to set out a serious and sober assessment of the economic facts, to inform this vital decision for our country. That is what this analysis provides.

Of course, there are many factors to weigh – not just the economic ones. Does Britain want to continue to be a country that faces out to the world? Do we want to be promoting our case at the top table of the world's institutions? Is our national security best served by retreating from the world?

But my first duty as Chancellor is to seek to deliver economic security and higher living standards for the people of Britain, and that is the prism through which this document considers the costs and benefits of EU membership.

Using detailed analysis and rigorous economic modelling, this document sets out the Treasury's assessment of the long-term economic impact of staying in the EU compared to the alternatives. The short-term economic impact will be assessed in a future government publication.

It is widely accepted that leaving the EU would mean a new relationship based on one of the following models:

- membership of the European Economic Area, like Norway
- a negotiated bilateral agreement, like those of Switzerland, Turkey or Canada, or
- membership of the World Trade Organization without any specific agreement with the EU

No country has been able to negotiate any other sort of deal, and it would not be in the EU's interest to agree one.

The conclusions of this document are clear: none of the alternatives support trade and provide influence on the world stage in the same way as continued membership of a reformed EU; and all of them come with serious economic costs that would affect businesses, jobs, living standards and our public finances for decades to come. To put it simply, families would be substantially worse off if Britain leaves the EU.

If we take as a central assumption that the UK would seek a negotiated bilateral agreement, like Canada has, the costs to Britain are clear. 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. This is more than a third of the NHS budget and equivalent to 8p on the basic rate of income tax.

This analysis shows a vote to remain is therefore the best way to ensure the continued growth of the UK economy and future prosperity for this and future generations. Britain is stronger, safer and better off in the EU.

I hope that armed with these facts, the people of Britain will feel better informed and able to make this historic choice with confidence.

George Osborne
Chancellor of the Exchequer

April 2016

Executive summary

On 23 June 2016, the British people will make the most important decision for a generation – whether the United Kingdom (UK) should remain a member of the European Union (EU).

This document provides rigorous and objective economic analysis of the long-term impact of remaining a member of the EU compared to the alternatives. The HM Treasury analysis uses a widely adopted gravity modelling approach, which distinguishes the specific effect of EU membership and the alternatives from all the other influences that determine trade and foreign direct investment (FDI). The consequences for productivity and Gross Domestic Product (GDP) are then estimated based on the most relevant external evidence on the impact of trade and HM Treasury modelling of FDI. Through a range of realistic assumptions, many of them cautious, the HM Treasury analysis produces robust estimates, which are within the range of external studies.

Much of the UK's economic success is built on its long history as an open trading nation. Openness to trade and investment will be a key driver of the UK's future economic security, boosting the productivity of the economy, which in turn delivers higher living standards, creates better quality jobs, reduces prices for consumers and makes households better off.

The key economic criteria for judging the UK's membership of the EU against the alternatives are therefore what it would mean for the UK's economic openness and interconnectedness. This needs to be considered alongside the obligations that come with securing that access and the influence the UK has over those obligations.

Annual impact of leaving the EU on the UK after 15 years (difference from being in the EU)

	EEA	Negotiated bilateral agreement	WTO
GDP level (%) – central	–3.8	–6.2	–7.5
GDP level (%)	–3.4 to –4.3	–4.6 to –7.8	–5.4 to –9.5
GDP per capita – central[a]	–£1,100	–£1,800	–£2,100
GDP per capita[a]	–£1,000 to –£1,200	–£1,300 to –£2,200	–£1,500 to –£2,700
GDP per household – central[a]	–£2,600	–£4,300	–£5,200
GDP per household[a]	–£2,400 to –£2,900	–£3,200 to –£5,400	–£3,700 to –£6,600
Net impact on receipts	–£20 billion	–£36 billion	–£45 billion

[a] *Expressed in terms of 2015 GDP in 2015 prices, rounded to the nearest £100.*

The judgement must be based on evidence. This document assesses continued membership of the EU against the alternative models, described in the government's document *Alternatives to membership: possible models for the United Kingdom outside the European Union*. No country has been able to negotiate a better deal and it would not be in the EU's interest to agree one with the UK. The 3 existing alternatives considered are:

- membership of the European Economic Area (EEA), like Norway
- a negotiated bilateral agreement, such as that between the EU and Switzerland, Turkey or Canada
- World Trade Organization (WTO) membership without any form of specific agreement with the EU, like Russia or Brazil

The analysis in this document shows that under all 3 models, the UK's economic openness and interconnectedness would be reduced. Trade and investment flows would be lower. **The UK would be permanently poorer if it left the EU** and adopted any of these models. Productivity and GDP per person would be lower in all these alternative scenarios, as the costs substantially outweigh any potential benefit of leaving the EU. The central estimates – defined as the middle point between both ends of the range – for the annual loss of GDP per household under the 3 alternatives after 15 years are:

- £2,600 in the case of EEA
- £4,300 in the case of a negotiated bilateral agreement
- £5,200 in the WTO

The negative impact on GDP would also result in substantially weaker tax receipts. This would significantly outweigh any potential gain from reduced financial contributions to the EU. The result would be higher government borrowing and debt, large tax rises or major cuts in public spending. After 15 years, even with savings from reduced contributions to the EU, receipts would be **£20 billion a year lower in the central estimate of the EEA, £36 billion a year lower for the negotiated bilateral agreement and £45 billion a year lower for the WTO alternative.** £36 billion is more than a third of the NHS budget and the equivalent of 8p on the basic rate of income tax.

These estimates are based on the EU as it is today, without further reform. The total cost of leaving is likely to be higher. The new settlement for the UK negotiated by the Prime Minister in February 2016 included an ambitious agenda of economic reform in the EU. This will include the next stage of development of the Single Market, with a focus on bringing down the remaining barriers to trade in services, energy and digital, alongside completing major ongoing trade deals. If the economic benefits of reform are realised this could increase UK GDP by up to a further 4% – which equates to £2,800 for every household in the UK. With the UK outside the EU these economic reforms would be less likely to happen. So the cost of exit in terms of the potential loss of GDP would be correspondingly greater.

This document looks at the long-run economic impact of exit. A range of external studies conclude that a vote to leave the EU would also lead to an extended period of uncertainty during the transition period, with negative economic consequences of fewer jobs, lower living standards and higher prices. The International Monetary Fund stated in April 2016 that an UK exit from the EU "could do severe regional and global damage by disrupting established trading relationships" and that "negotiations on postexit arrangements would likely be protracted, resulting in an extended period of heightened uncertainty that could weigh heavily on confidence and investment, all the while increasing financial market volatility". A full assessment of the short-term implications of leaving the EU will be published in a further government document.

The UK's economic membership of the EU

The UK's membership of the EU has delivered significant economic benefits through increasing the openness of the UK economy and supporting trade and investment. This is the result of the access the UK enjoys to the EU Single Market, including the ability of the EU to negotiate access to global markets. This is particularly important to the UK as a dynamic economy in which services and advanced manufacturing, with complex supply chains, play a prominent role. The analysis in this paper shows that these benefits far outweigh the costs that come with EU membership.

Membership of the EU has made it easier to trade both with the EU and the wider world. Trade as a share of national income has risen to over 60% in the past decade, compared to under 30% in the years before the UK joined the EU. **The HM Treasury analysis, which is in line with academic research, shows that EU membership increases trade with EU members by around three quarters.**

EU membership has also made the UK an attractive place to invest and one of the top global destinations for FDI. **Almost three quarters of foreign investors cite access to the European market as a reason for their investment in the UK.**

Trade with the EU has been made easier because of the unique way the Single Market reduces barriers and costs to trade. It removes tariffs and quotas, creates a customs union which reduces cross-border costs, and creates a level playing field, for example, by reducing non-tariff barriers (such as regulations, standards or specifications required to trade). Increasingly in today's global economy, these non-tariff barriers are the most significant impediment to trade, particularly for advanced economies like the UK. Estimates indicate that on average they can add 2 or 3 times as much to the cost of traded goods as tariffs. The Single Market has done more to reduce such barriers than any other trade agreement.

Increased trade with the EU has not come at the expense of trade with the rest of the world. With an economic weight 5 times the size of the UK, the EU has been able to negotiate access to global markets through multilateral trade agreements and, increasingly, bilateral agreements with other countries. Once current bilateral negotiations are completed over 80% of UK trade will be with either the EU or through EU Free Trade Agreements (FTAs). **As a member of the EU, the UK will have trade deals with more countries than the US and Canada put together.**

The depth and breadth of the Single Market is particularly important to the UK given the nature of the economy and its increasing emphasis on high-value activities. The UK has developed into an economy in which services account for almost 80% of GDP. Many services industries and advanced manufacturing rely on complex cross-border supply chains. These sectors are important drivers of growth and productivity. Trade with the EU is important to the country's economic security and prosperity and it is estimated that **3.3 million jobs are linked to exports from the UK to other EU countries.**

EU membership means accepting the regulatory framework associated with it, and in particular the rules that enable UK firms and consumers to access the Single Market. These rules are necessary for its functioning and reduce barriers to trade. Properly designed rules bring important benefits for businesses and reduce costs for consumers. The UK has made improving this regulatory framework, especially for small business, a long-standing priority, including in the UK's recent renegotiation. **Not least because of the UK's influence, the flow of new EU regulation has reduced in recent years.**

Overall, the UK's membership of the EU has not prevented it from maintaining a very competitive economy. Evidence from the Organisation for Economic Co-operation and Development on product market regulation shows that **the UK already has the second**

least restrictive regulatory regime among all advanced economies after the Netherlands, a fellow EU member.

The UK's membership of the EU has also not prevented it from having a highly flexible labour market, with low unemployment, record employment and close to record self-employment. The UK's new settlement with the EU establishes new powers to tackle the abuse of free movement and reduce the attractiveness of the UK's in-work benefits system.

EU membership also requires the UK to make a financial contribution to the EU. **When the UK's rebate and receipts are taken into account, for every £1 of tax paid in the UK a little over 1p goes to the EU.** It has been a continuing priority of the UK to control the cost of the EU budget and increase its value for money, and the most recent EU budget reform deal secured by the Prime Minister reduces the size of the EU budget in real terms, for the first time ever.

The UK has significant influence over EU decision-making and the rules associated with the Single Market. This includes veto rights in the European Council. Throughout its membership, the UK has used its influence to maximise the benefits of the Single Market and to pursue a proactive agenda of economic policy reform. The UK was the driving force behind the original establishment of the Single Market.

The alternatives to EU membership

The economic analysis shows that all the existing alternatives to EU membership would come with a significant economic cost. They would make it more difficult and expensive to trade with Europe and across the world, and lead to a reduction in foreign investment. Alternatives with significant access to the Single Market would require the UK to implement its rules but the UK would no longer have a vote on these rules. They would require the UK to accept the free movement of people and continue to make financial contributions to the EU. No country has been able to negotiate a better deal than these alternatives and it would not be in the EU's interest to agree such a deal for the UK.

All the existing alternatives would increase the costs of trading with Europe, and none of the alternatives would involve the full access to the Single Market that the UK currently benefits from. Membership of the EEA would give the most access but would mean UK exporters facing increased transaction costs as a result of customs checks, and the re-introduction of tariffs for agriculture and fisheries. A negotiated bilateral agreement would give the UK some access to the Single Market but this, in particular, would be limited for the UK's large service sector. WTO membership would amount to a significant closing of the UK's access to global markets and would likely see the introduction of a much broader range of tariff and non-tariff barriers. **The reduced access to the Single Market under all the alternatives would make the UK a less attractive destination for foreign investment.**

All the alternatives would also reduce the UK's access to wider global markets. If the UK left the EU it would no longer have the right to benefit from the EU's FTAs with third countries. While these FTAs fall short of the Single Market in terms of breadth and depth, they are some of the most advanced in the world. Just to maintain what the UK enjoys through the EU, would mean renegotiating new trade arrangements with the EU and over 50 other countries around the world, while commencing trade negotiations with a further 67. There is significant uncertainty about how long this would take and how much access the UK could achieve, as the UK's ability to negotiate beneficial deals as part of a large bloc would no longer exist.

If the UK simply relied on WTO rules it would set its own import tariffs. But if it kept tariffs at zero with EU countries it would have to lower tariffs unilaterally with all other WTO members where it did not have a preferential trade agreement, giving up a key bargaining position in

negotiating new trade arrangements. The alternative would be to raise tariffs with the EU with implications for UK prices and higher costs for consumers.

Only the WTO alternative would free the UK from all the formal obligations that come with access to the Single Market. Under any of the alternatives, the potential gains from additional regulatory flexibility on leaving the EU would likely be significantly constrained in practice, either because of the impact on domestic policy aims or because of the UK's wider international obligations. In any case, any such potential gains would be significantly outweighed by the losses from the additional regulatory barriers to trade from no longer being a member of the Single Market.

No other country has been able to agree significant access to the Single Market without having to accept EU regulations, the free movement of people and financial contributions to the EU. But in accepting these obligations, outside the EU the UK would have to give up its current significant influence over EU decision-making and become a rule-taker rather than a rule-maker. This matters much more to the UK than, for example, Norway or Switzerland as their economic weight means that they would have a much less significant influence even if they were members of the EU. It is inevitable that, over time, rules governing UK trade would develop in a way that favoured the remaining members of the EU and not the UK.

If the UK left the EU, negotiating the new arrangements with both the EU and the rest of the world would be extremely complex and cause a considerable period of economic uncertainty. There would be no incentive, and it would not be in their interest, for the remaining EU countries to provide the UK a better deal than any of the existing alternatives or a better deal than they themselves have. To allow the UK to access the Single Market without agreeing to the rules of the Single Market would put their own businesses and consumers at a disadvantage. While the UK is an important market for EU exports, the UK has its trading relationship with 27 countries at stake, whereas the rest of the EU have only their trading relationship with one country at stake – **less than 8% of EU exports come to the UK while 44% of UK exports go to the EU**. Only 3.1% of the rest of the EU's GDP is dependent on exporting to the UK, compared to 12.6% of the UK's GDP dependent on EU-UK trade.

Economic impact

In the long term, greater openness to trade and investment boosts the productive potential of the economy. Openness increases competition among firms, allows access to finance from abroad, improves the quality of production inputs, and creates incentives to innovate and adopt new technologies. The HM Treasury analysis estimates the impact on trade and FDI and what this means for productivity and GDP under EU membership and the alternatives. Higher productivity means better quality jobs which lead to higher real wages and household incomes. The robust estimates of the long-term economic impact are within the range of external studies.

Leaving the EU to join the EEA would maintain considerable (but not complete) access to the Single Market, but there would still be an increase in trade barriers with the introduction of a customs border with the EU. It would also mean accepting EU regulations, the free movement of people and financial contributions to the EU. It would mean having to accept EU rules without getting any say over them. In the long term, reduced openness hits productivity which feeds through into lower GDP and living standards.

After 15 years, the UK is estimated to be between **3.4% and 4.3% of GDP better off** inside the EU than the EEA. In 2015 terms, the GDP impact of leaving the EU for the EEA would equate to a long-term **loss of £2,600 a year for each household in the UK.**

A negotiated bilateral agreement (such as an FTA) provides less access to the Single Market than the EEA alternative, in particular in relation to services, which are of critical importance to the UK. The bilateral agreements that involve most access have the greatest obligations: no other country has been able to agree significant access to the Single Market without having to accept EU regulations, the free movement of people and financial contributions to the EU.

After 15 years, the UK is estimated to be between **4.6% and 7.8% of GDP better off** inside the EU than with a negotiated bilateral agreement. In 2015 terms, leaving the EU for a negotiated bilateral agreement would imply a long-term **loss of GDP of £4,300 a year for each household in the UK.**

Relying solely on the WTO rules would result in a significant reduction in the openness of the UK economy to the outside world. It would be the alternative with the most negative long-term impact.

After 15 years, the UK is estimated to be between **5.4% and 9.5% of GDP better off** inside the EU than adopting WTO rules. In 2015 terms, leaving the EU and relying on the WTO rules would mean a long-term **loss of GDP of £5,200 a year for each household in the UK.**

In terms of the long-term economic impact, recourse to WTO rules would be the least attractive of the 3 alternatives. It would, nevertheless, be the default relationship should the UK fail to reach an agreement with the EU. In all scenarios that retain access to the Single Market, the UK would have to accept rules that it has no control over, and would have to rely on other member states to implement the EU reform agenda that the UK has been a key champion of. Either of these factors could further increase the economic costs of these alternatives.

The performance of the economy is central to determining the health of the public finances. The analysis therefore considers the implications of these losses in GDP for tax and other public sector receipts. It finds that any potential fiscal gain from reduced financial contributions to the EU would be substantially outweighed by the negative impact on public sector receipts from the deterioration in the broader economic environment under any of the alternatives.

The net impact on receipts would be £20 billion a year in the central case of the EEA, £36 billion a year in the case of the negotiated bilateral agreement, and £45 billion a year in the case of the WTO. This assumes in all three scenarios that the UK would not have to make any financial contribution to the EU. However, as set out above, an alternative that provides significant access to the Single Market would require financial contributions to the EU and so the fiscal impact would be higher.

To put these numbers into context, the impact in the EEA alternative would be greater than what is currently spent on the combined annual budgets of the departments responsible for policing and prisons; while the impact in the WTO alternative would be more than what is currently spent on the entire schools budget for England.

A £36 billion net receipts impact would require significant spending cuts or tax rises. As illustrative examples, it would be equivalent to more than a third of the NHS England budget or to raising the basic rate of income tax by around 8p from 20p to 28p.

In conclusion, the Treasury's analysis shows that **none of the alternatives come close to matching the net economic benefits to the UK of EU membership. Using a negotiated bilateral agreement like Canada as the central assumption for the alternative, the UK economy is 6.2% larger in the EU, British families are £4,300 better off in the EU, and the UK's receipts are £36 billion healthier in the EU. The overall economic benefits of EU membership are significantly higher than in any potential alternative.**

Introduction

Summary

The United Kingdom (UK) is one of the most open economies in the world.

Openness to trade and investment will be a key driver of the UK's future economic security, boosting the productivity of the economy, which in turn delivers higher living standards, creates better quality jobs, reduces prices for consumers and makes households better off.

The key economic criteria for judging the UK's membership of the EU against the alternatives are therefore what it would mean for the UK's economic openness and interconnectedness. This needs to be considered alongside the obligations that come with securing that access and the influence the UK has over those obligations.

One of the most important factors in the decision facing the British people on 23 June 2016 – whether to remain a member of the EU or to leave – will be what it means for the UK's long-term economic security and prosperity. Much of the UK's economic success is built on its long history as an open trading nation.

To inform this decision, this document provides a rigorous and objective economic analysis of the long-term impact of remaining a member of the EU compared to the alternatives. It is the fifth in a series of papers, published by the UK government, designed to inform the public debate on EU membership.[1]

Economic openness

The ultimate objective of economic policy is to increase living standards through the creation of jobs, rising household incomes and low and stable prices for consumers. Bank of England analysis cites substantial evidence that greater economic and financial openness boosts living standards by raising productivity.[2] HM Treasury has also demonstrated the link between openness and living standards.[3]

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1 See: *The best of both worlds: the United Kingdom's special status in a reformed European Union*, HM Government (February 2016); *The process for withdrawing from the European Union*, HM Government (February 2016); *Alternatives to membership: possible models for the United Kingdom outside the European Union*, HM Government (March 2016); and *Rights and obligations of European Union membership*, HM Government (April 2016).

2 *EU membership and the Bank of England*, Bank of England (October 2015).

3 *Fixing the foundations: creating a more prosperous nation*, HM Treasury (July 2015).

The benefits of trade in terms of increasing productivity are well understood.[4] As set out in Box A, greater openness to trade creates a larger market which the most productive firms expand to serve. Openness also increases competition between firms, enhancing the incentives for domestic firms to innovate or adopt new technology.[5] It increases returns on investment, and encourages UK firms to make greater use of new technologies, either by improving the quality of inputs, or through the more effective adoption of technological innovations. Greater openness to trade also increases consumer choice and reduces prices. Lower trade costs give consumers access to cheaper imported goods and competition reduces the price of domestically-produced goods.

At the same time, openness to cross-border investment also has productivity benefits. It allows firms more access to finance and better matching of capital, which ultimately supports economic growth.

Taking advantage of the opportunities presented by economic openness has become increasingly important with the globalisation of the world economy. Global trade has grown on average over 2 percentage points faster than global Gross Domestic Product (GDP) every year over the past 5 decades.[6]

As the global economy continues to recover from recent financial and economic shocks, global trade growth can be expected to pick up again over the coming years.[7] It is likely that firms that compete in international markets will continue to play a leading role in improving productivity and raising incomes.

A substantial proportion of the growth in global trade has been driven by the development of cross-border supply chains – where different stages of production are located in different countries. Many businesses and jobs are now dependent on these complex international relationships.

Box A: The productivity benefits of greater openness

The UK's economic performance – its ability to maintain high levels of employment and to generate higher living standards – depends on productivity growth. An important feature of the EU is the openness between member states, 12 of which have higher productivity per hour worked than the UK.[8] This box describes the major channels through which greater openness to both trade and investment increases productivity in the UK.

Scale and specialisation

Access to a larger market allows the most productive UK firms to expand, taking advantage of economies of scale in production and expanding the range and variety of products that can be produced. There is significant evidence that greater openness to international trade also improves productivity by encouraging firms to focus on the things they do best.[9]

4 *On the principles of political economy and taxation*, Ricardo (1817).

5 The relationship between international competition and productivity is discussed in more detail in Section 1.

6 *International Trade Statistics 2015*, WTO, 2015.

7 *The Global Trade Slowdown; Cyclical or Structural? IMF Working Papers 15/6*, Constantinescu, Mattoo and Ruta (January 2015); *Understanding the weakness in world trade*, ECB Economic Bulletin, Issue 3 (2015).

8 *Level of GDP per capita and hour worked,* OECD, available at http://stats.oecd.org

9 *Gains from Trade When Firms Matter,* Melitz and Trefler (2012); *How do firm-level responses to trade affect industry productivity and the gains from trade?,* Melitz and Redding (2013).

Increased competition

Greater openness increases competition between firms, enhancing their incentives to improve productivity in order to maintain and improve their market share. A review of UK economic performance found that the weakness of competition from the 1930s to the 1970s undermined productivity growth, but that stronger competition since has been key in ending relative economic decline.[10]

Academic studies have also found evidence to suggest that the Single Market has led to a significant increase in the entry of foreign firms into the UK and the greater competition from foreign firms was found to have a significant positive impact on productivity and patenting in domestic firms.[11]

Innovation and adoption

Greater openness to trade also increases incentives for domestic firms to innovate or adopt new technology. This can be due to greater returns on investment, but higher trade can also encourage UK firms to make greater use of new technologies, either by improving the quality of inputs, or through the more effective adoption of technological innovations.

Foreign direct investment (FDI) can provide UK firms with access to the most advanced inputs to production, including new technologies and working practices. This occurs as technological advances are passed from foreign to domestic firms through the supply chain. Domestic firms can also draw on new techniques that they observe in international entrants, or as local workers move between foreign and domestic firms, taking knowledge with them when they move. A body of evidence has demonstrated this technology transfer.[12]

Better matching of capital

Greater openness to international flows of factors of production can improve the allocation of resources, resulting in capital being allocated to better projects.[13] There is also evidence that higher capital flows allow for greater diversification thereby improving productivity by reducing the cost of capital.[14]

10 *British relative economic decline revisited: the role of competition,* Crafts (2012).

11 *The Effects of Entry on Incumbent Innovation and Productivity,* Aghion, Blundell, Griffith, Howitt and Prantl (2009).

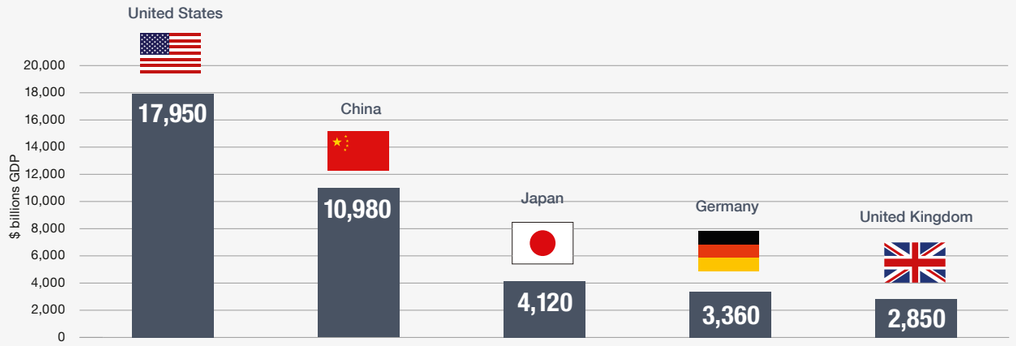
12 A summary of the evidence can be found in *EU membership and the Bank of England,* Bank of England (October 2015).

13 *Financial Openness and Productivity,* Bekaert, Harvery and Lundblad (2011).

14 *The Microeconomic Evidence on Capital Controls: No Free Lunch,* Forbes (2007).

The UK Economy

The UK is the world's fifth largest economy



Source: IMF WEO April 2016, 2015 data

The UK is Europe's leading financial centre

3 out of the **4**
leading surveys in 2015 placed London as the world's number 1 financial centre

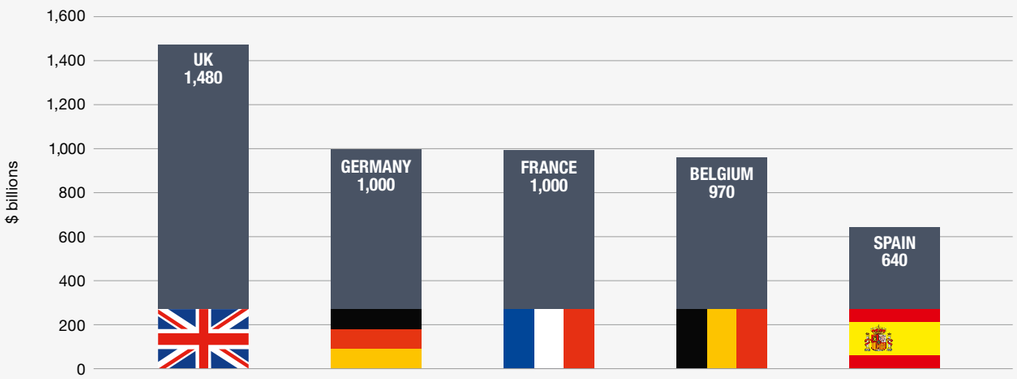
The UK accounts for

78%

of EU Foreign Exchange trading

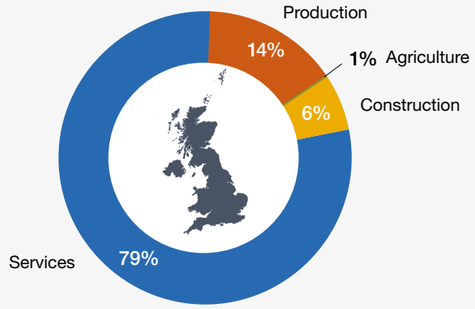
Source: Bank for International Settlements, 2013 data

The UK is the top European destination for inward FDI



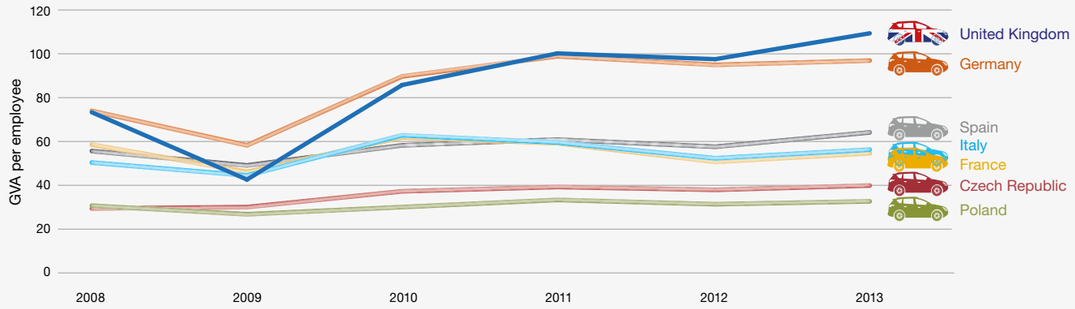
Source: OECD, 2012 data

Services is the largest sector in the UK, but production and construction also make significant contributions



Source: ONS, 2015 data

Productivity of car manufacturing at record levels

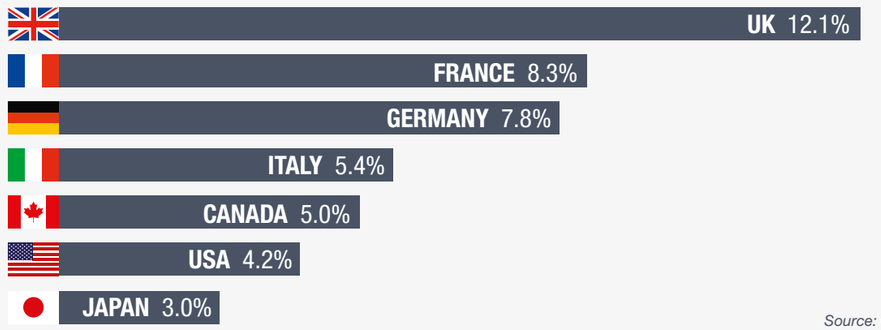


Source: Eurostat, 2013 data

Of the largest EU economies the UK has the biggest service sector as a proportion of output

Source: OECD, 2015 Q4 data

The UK is the leading service exporter in the G7 as a proportion of output



Source: OECD, 2015 data

Openness of the UK economy

The UK has benefitted hugely from its openness to the world and is one of the world's most open economies. This reflects a long history of openness and international trade, stretching back many centuries. Openness has also underpinned the UK's economic revival following 3 decades of relative decline after 1945.

For the UK economy, this has meant that:

- openness to trade, defined as total trade (exports and imports) as a share of UK GDP, has increased significantly over the past 5 decades – rising from 23% of GDP in 1965 to 64% in 2015 (see Chart A)[15]
- the UK is one of the most financially open economies in the world with the total size of the UK's foreign assets as a share of GDP the largest of any major advanced economy, at around 530%[16]

Over this period, the UK has developed into an economy in which both services and advanced manufacturing play prominent roles.

The share of the UK's economy accounted for by services has grown from 67% of national income in the early 1990s to 79% in 2015.[17] Today the sector employs over 25 million people, 80% of total employment.[18] The UK is a world leader in many services sectors: it is host to Europe's largest financial centre[19] and is home to world-leading professional services companies in industries including architecture and engineering. It has the fastest growing creative industry sector in Europe,[20] with particular strengths in TV, film and advertising. The UK is a world leader in the digital economy.

All of these services are highly tradable and their growth has contributed to the increase in openness of the UK economy. A rising share of GDP and exports attributable to the services sector has been observed in every G7 economy, but the trend is particularly prominent in the UK.[21] The share of services in total UK exports has grown by two thirds since 1990, with services accounting for £226 billion in 2015 – 44% of total exports[22] – the largest share of any major advanced economy.

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15 *Three centuries of data – version 2.2*, Bank of England (2015).

16 *Balance of Payments: October to December and annual 2015,* ONS (March 2016).

17 *UK GDP(O) low level aggregates,* ONS (March 2016).

18 *UK Labour Market*, ONS (February 2016).

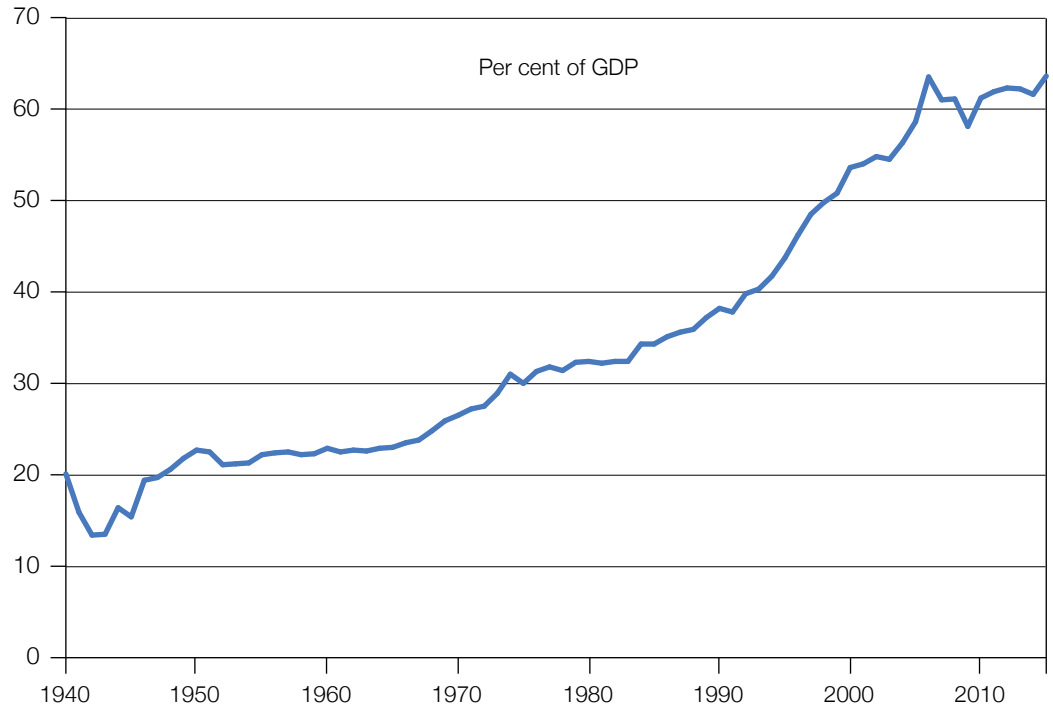
19 *Annual National Accounts,* OECD, available at http://stats.oecd.org/#; *Global Financial Centres Index 2016,* Z/Yen Group (March 2016); *EU membership and the Bank of England*, Bank of England (October 2015).

20 The UK creative industries are growing 3 times faster than those in the EU as a whole. *Creative economy employment in the EU and UK: a comparative analysis*, Nesta (December 2015).

21 *An international perspective on the UK – Gross Domestic Product,* ONS (April 2014); *Quarterly National Accounts,* OECD, available at http://stats.oecd.org/Index.aspx?DataSetCode=QNA

22 *UK Balance of Payments: Oct to Dec and annual 2015*, ONS (March 2016); *UK Balance of Payments – The Pink Book*, ONS (October 2015).

Chart A: Openness – Total UK trade as a share of GDP[23]



Source: Based on ONS data using Bank of England calculations

The services sector is complemented by a manufacturing sector which is innovative and research intensive. It accounts for around 10% of national income and includes world-leading capabilities in pharmaceuticals, clean technologies, aerospace and automotive sectors. Traditional manufacturing sectors remain important, however, accounting for around half of the manufacturing sector's output.[24]

In both services and manufacturing, there is an increasing emphasis on high-value activities in which the UK has a comparative advantage internationally (see Chart 1.A in Section 1) and which benefit most from economic openness.[25] These sectors are important drivers of productivity growth.

In line with all advanced economies, however, UK productivity growth has slowed in the years since the financial crisis, and the UK's productivity continues to show a gap compared with some of the world's leading economies.[26] The OECD has identified raising productivity as a central economic challenge for all advanced economies,[27] and it is an important element of the government's long-term economic plan for the UK.

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23 *Three centuries of data – version 2.2,* Bank of England (2015) and *Quarterly National Accounts Q4 2015,* ONS (March 2016). The trade-to-GDP ratio is the sum of real exports and imports divided by real GDP in 2012 reference prices. It represents the combined weight of total trade in the UK economy and is sometimes used as an indicator of 'trade openness'. Figure 1.C in Section 1 shows more detailed data on goods exports as a share of GDP starting in 1962.

24 *UK GDP(O) low level aggregates,* ONS (March 2016).

25 *Benchmarking UK competitiveness in the global economy*, Department for Business Innovation & Skills (October 2012).

26 *International comparisons of productivity – first estimates 2014*, ONS (September 2015).

27 *Restoring healthy growth: policies for higher and more inclusive productivity*, OECD (February 2016).

Further increasing the UK's economic openness is critical to addressing the productivity challenge. Promoting trade and investment, further integration of international services sector markets and supporting trade agreements beyond the EU are therefore key parts of the UK government's Productivity Plan.[28]

Analytical approach

The approach taken by HM Treasury provides a rigorous and objective economic analysis of remaining a member of the EU compared to the alternatives. The analysis draws on a wide range of evidence, HM Treasury and external analysis, and uses various models appropriate to the key analytical issues which are addressed.

Trade and FDI are influenced by many factors and a key challenge is to identify the particular impact that different trading relationships have using statistical techniques. To do this the HM Treasury analysis uses a widely adopted gravity modelling approach to estimate the impact of EU membership and the alternative relationships. This draws on the extensive economic research that has been carried out to establish the impact of different trade agreements. By looking across countries and back over time, the gravity modelling approach allows the analysis to isolate the influence of the different trade relationships from all the other influences that affect bilateral trade and FDI flows such as distance, historical ties, GDP and population.

Once the effect of each relationship has been identified they can be combined with other data, such as for UK goods and services trade, to estimate the UK specific impacts of moving from one sort of relationship to another, having controlled for all the other influences on bilateral trade and FDI flows. The analysis can then estimate the impact of moving from EU membership to one of the alternatives, which is assumed to happen over a period of 15 years.

The consequences for productivity and GDP are then estimated based on the most relevant external evidence on the impact of trade and HM Treasury modelling of FDI incorporated in a global macroeconomic model. Through a range of realistic assumptions, many of them cautious, the HM Treasury analysis produces robust estimates which are within the range of external studies.

The key economic criterion for judging the UK's membership of the EU against the alternatives is, therefore, what it would mean for the UK's economic openness, access to global markets and its ability to trade with the EU and the rest of the world.

In judging the choices for the UK, the benefits from access to global markets need to be balanced against the costs and obligations that come with securing such access. This includes the implications for UK sovereignty and influence in determining those obligations and over the terms of access to European markets.

This document focuses on the long-run benefits and costs of EU membership rather than on the near-term consequences of a vote to leave the EU.

In the April 2016 *World Economic Outlook*, the International Monetary Fund (IMF) highlighted that a UK exit from the EU "would do severe regional and global damage by disrupting established trading relationships." The IMF also said, "A British exit from the European Union could pose major challenges for both the United Kingdom and the rest of Europe. Negotiations on post-exit arrangements would likely be protracted, resulting in an extended

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28 *Fixing the foundations: Creating a more prosperous nation*, HM Treasury (July 2015).

period of heightened uncertainty that could weigh heavily on confidence and investment, all the while increasing financial market volatility."[29]

In discussing the implications of a vote to leave, the Bank of England's Monetary Policy Committee noted that "Such a vote might result in an extended period of uncertainty about the economic outlook, including about the prospects for export growth. This uncertainty would be likely to push down on demand in the short run."[30]

A subsequent UK government document will examine in detail the short-term economic implications associated with leaving the EU.

Any analysis also has to consider how UK domestic economic policies might change outside the EU. Consistent with the approach to other areas of domestic policy, the HM Treasury modelling analysis does not prejudge future government decisions and assumes no changes to other policy variables. Nevertheless, for the modelling analysis some assumptions need to be made. There are also potential gains for the UK from the next stage of the Single Market with continued EU membership. Although these are not included in the main assessment of the alternatives, a separate assessment of these gains is considered.

There is no precedent for an economy like the UK leaving the EU. Any quantitative analysis is therefore subject to uncertainty. This challenge is addressed in the analysis by presenting ranges for the effects of leaving the EU for each of the main alternatives. These combine a variety of different effects and allow the analysis to test the sensitivity to different assumptions in key areas such as trade and productivity. Overall, the centre of the range provides a robust central estimate.

Structure of the document

In considering the UK's membership of the EU, Section 1 starts by explaining the UK's special status in the EU as a member of the Single Market but not the single currency. The outcome of the UK's new settlement in the EU (see Box B), agreed by the Prime Minister with other EU leaders in February 2016, secured this special status with EU economic governance reforms. It then assesses the economic impact of the access EU membership gives the UK to both the EU and other markets. The impact of the obligations associated with membership is then considered, including the influence the UK has in the EU as a member of its decision-making structures. It concludes by considering the impact of EU economic policy reform.

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29 *World Economic Outlook: Too Slow for Too Long,* IMF (April 2016). Any period of uncertainty could give rise to longer-term effects. For example, firms looking to invest within the EU to serve the EU market will be more likely to choose to invest in other EU countries if they are uncertain about the UK's future market access. Even if the UK subsequently retains some market access, the long-term nature of many investment decisions could result in a persistent loss of investment that might otherwise have occurred within the UK.

30 *Minutes of the Monetary Policy Committee meeting ending on 13 April 2016*, Bank of England (April 2016).

Box B: The UK's new settlement with the EU

At the 18-19 February 2016 European Council, the Prime Minister secured a new settlement for the UK in the EU. This settlement secures all the UK's objectives, set out by the Prime Minister, and gives the UK a special status within the EU, as well as setting the EU as a whole on a path of long-term reform. The agreement covers four key areas:

- **economic governance** – the UK has protected its rights as a country within the Single Market, but outside the euro area, to keep its economy and financial system secure and protect UK businesses from unfair discrimination
- **competitiveness** – the UK has secured a firm commitment to drive the ambitious agenda of economic reform – the result of years of UK pressure, working closely with allies – harder over the coming years to help unleash the full potential of the Single Market and create growth and jobs
- **sovereignty** – the UK has secured agreement that the Treaties will be changed in the future so that the UK is carved out of 'ever closer union' and established a mechanism for decision-making to return from Brussels to the UK and other nation states, where this is most appropriate
- **welfare and free movement** – the UK has secured new powers to tackle the abuse of free movement and reduce the unnatural draw of the UK's benefits system, to meet the UK's aim of reducing immigration, by creating fairer rules, while protecting the UK's open economy

Section 2 considers the alternatives to EU membership. It starts by explaining the alternatives, as set out in *Alternatives to membership: possible models for the United Kingdom outside the European Union*,[31] published by the government in March 2016:

- membership of the European Economic Area (EEA), like Norway
- a negotiated bilateral agreement, such as that between the EU and Switzerland, Turkey or Canada
- World Trade Organization (WTO) membership without any form of specific agreement with the EU, like Russia or Brazil

It assesses these alternatives against the 3 criteria of access to global markets, the accompanying obligations and the implications for influence in determining those obligations.

Section 3 presents HM Treasury's quantitative assessment of the long-term impacts on the UK economy of the alternatives, compared to remaining a member of the EU.

Annexes A and B provide a technical description of the analytical approach used in the assessment set out in Section 3.

[31] *Alternatives to membership: possible models for the United Kingdom outside the European Union*, HM Government (March 2016).

Section 1 – EU membership

Summary

The United Kingdom (UK) has a special status in the European Union (EU). While it is a full member of the Single Market, the UK will not join the single currency. The UK's new settlement protected the UK's rights as a country within the Single Market but outside the euro area.

The UK's membership of the EU has delivered significant economic benefits through increasing the openness of the UK economy and supporting trade and investment. This is the result of the access the UK enjoys to the European Single Market, including the ability of the EU to negotiate access to global markets. This is particularly important to the UK as a dynamic economy in which services and advanced manufacturing, with complex supply chains, play a prominent role.

Membership of the EU has made it easier to trade both with the EU and the wider world. Trade as a share of national income has risen to over 60% in the past decade, compared to under 30% in the years before the UK joined the EU. The HM Treasury analysis, which is in line with academic research, shows that EU membership increases trade with EU members by around three quarters.

EU membership has also made the UK an attractive place to invest and one of the top global destinations for Foreign Directive Investment (FDI). Almost three quarters of foreign investors cite access to the European market as a reason for their investment in the UK.

Trade with the EU has been made easier because of the unique way the Single Market reduces barriers and costs to trade. It removes tariffs and quotas, creates a customs union which reduces cross-border costs, and creates a level playing field, for example, by reducing non-tariff barriers (such as regulations, standards or specifications required to trade). Increasingly in today's global economy these non-tariff barriers are the most significant impediment to trade, particularly for advanced economies like the UK. Estimates indicate that on average they can add 2 or 3 times as much to the cost of traded goods as tariffs. The Single Market has done more to reduce such barriers than any other trade agreement.

Increased trade with the EU has not come at the expense of trade with the rest of the world. With an economic weight 5 times the size of the UK, the EU has been able to negotiate access to global markets through multilateral trade agreements and, increasingly,

bilateral agreements with other countries. Once current bilateral negotiations are completed over 80% of UK trade will be with either the EU or through EU Free Trade Agreements (FTAs). As a member of the EU, the UK will have trade deals with more countries than the United States (US) and Canada put together.

The depth and breadth of the Single Market is particularly important to the UK given the nature of the economy and its increasing emphasis on high-value activities. The UK has developed into an economy in which services account for almost 80% of Gross Domestic Product (GDP). Many services industries and advanced manufacturing rely on complex cross-border supply chains. These sectors are important drivers of growth and productivity. Trade with the EU is important to the country's economic security and prosperity and it is estimated that 3.3 million jobs are linked to exports from the UK to other EU countries.

EU membership means accepting the regulatory framework associated with it, and in particular the rules that enable UK firms and consumers to access the Single Market. These rules are necessary for its functioning and reduce barriers to trade. Properly designed rules bring important benefits for businesses and reduce costs for consumers. The UK has made improving this regulatory framework, especially for small business, a long-standing priority, including in the UK's recent renegotiation. Not least because of the UK's influence, the flow of new EU regulation has reduced in recent years.

Overall, the UK's membership of the EU has not prevented it from maintaining a very competitive economy. Evidence from the OECD on product market regulation shows that the UK already has the second least restrictive regulatory regime among all advanced economies after the Netherlands, a fellow EU member.

The UK's membership of the EU has not prevented it from having a highly flexible labour market, with low unemployment, record employment and close to record self-employment. The UK's new settlement with the EU establishes new powers to tackle the abuse of free movement and reduce the attractiveness of the UK's in-work benefits system.

EU membership also requires the UK to make a financial contribution to the EU. When the UK's rebate and receipts are taken into account, for every £1 of tax paid in the UK a little over 1p goes to the EU. It has been a continuing priority of the UK to control the cost of the EU budget and increase its value for money, and the most recent EU budget reform deal secured by the Prime Minister reduces the size of the EU budget in real terms, for the first time ever.

The UK has significant influence over EU decision-making and the rules associated with the Single Market. This includes veto rights in the European Council. Throughout its membership, the UK has used its influence to maximise the benefits of the Single Market and to pursue a proactive agenda of economic policy reform. The UK was the driving force behind the original establishment of the Single Market.

Part 1: The UK's economic membership of the EU

- The UK has a special status in the EU. It is a full member of the Single Market but will not join the single currency or participate in the Schengen open border arrangement. The UK's new settlement has secured this status with important reforms to economic governance, competitiveness, sovereignty, and welfare and free movement.

1.1 The UK has a special status within the EU, including with respect to economic issues. It is a full member of the Single Market and participates in the EU's economic decision-making arrangements.

Participation in the EU Single Market

1.2 The Single Market gives the UK access to the EU and facilitates access to wider markets, and works by treating the EU's member states as a single economic area. It is founded on the 'four freedoms': the free movement of goods, services, capital and people. These are enshrined in the EU's founding Treaties and the Single Market has developed progressively over the past half a century.

1.3 The Single Market provides **access** to EU markets through 3 broad elements:

- first, it **removes tariffs and quotas** on goods trade within the EU
- second, it **creates a customs union** within the EU. This requires a common external tariff for goods arriving from outside it, and allows for the removal of costly, complex and time-consuming customs controls within the EU
- third, it **creates a level playing field** by reducing non-tariff and other barriers to trade within the EU.[1] This includes aligning regulations, standards and specifications required to trade, removing distortions to competition and guaranteeing non discriminatory access to services markets

1.4 The Single Market provides access to markets beyond the EU through common FTAs with third countries. As a member state and part of the customs union, the UK does not have separate trade deals with each of these other countries, but participates in EU negotiated deals.

1.5 As a member of the EU, and in return for the access the Single Market gives, the UK and other member states accept the **obligations** of membership. EU membership also entails wider economic obligations, in particular contributing to the EU budget.

1.6 As a member of the EU, the UK participates in the EU's governance arrangements, giving it significant **influence** over EU decision-making, which determines the access provided by the Single Market and the rules associated with it.

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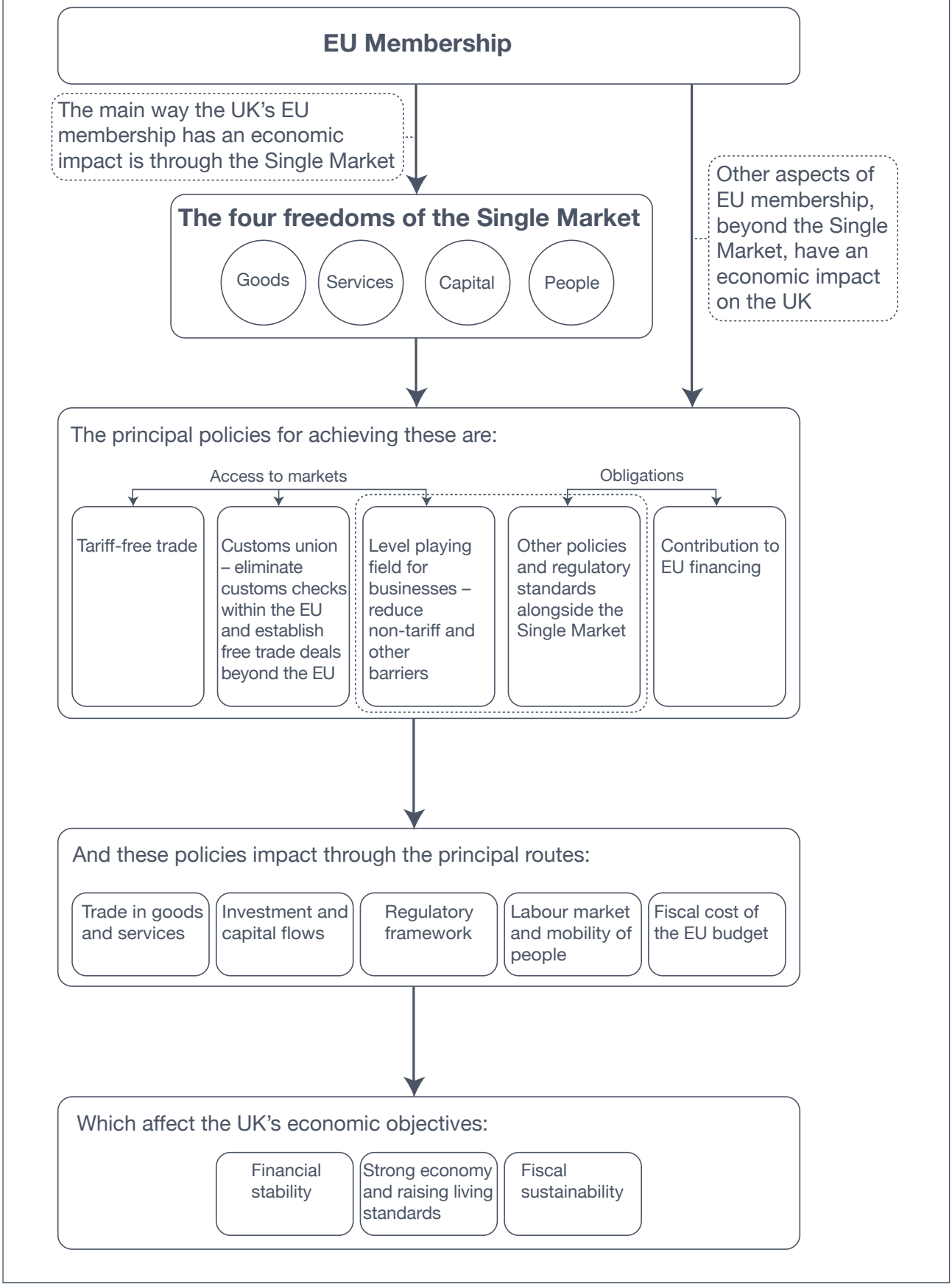
[1] The OECD states that "non-tariff barriers refers to all barriers to trade that are not tariffs. Examples of these include countervailing and anti-dumping duties, "voluntary" export restraints, subsidies which sustain in operation loss making enterprises, technical barriers to trade, and obstacles to the establishment and provision of services". *The OECD Economic Outlook: Sources and Methods. Glossary of statistical terms*, OECD (2014).

1.7 Figure 1.A shows the principal routes through which the EU has an economic impact:

- trade, arising from the free movement of goods and services
- investment and capital flows, arising from the free movement of capital
- the regulatory framework, associated with the above channels and wider EU membership
- labour market and mobility, arising from the free movement of people
- fiscal cost of contributions to the EU and EU payments received

Figure 1.A: How EU membership has an economic impact on the UK



Single currency non-participation and other opt-outs

1.8 While the UK fully participates in the Single Market, it does not participate in the single currency, allowing it to keep control of its currency and retain flexibility in setting macroeconomic policy.

1.9 The UK has secured a permanent opt-out from membership of the euro.[2] All other EU member states, with the exception of Denmark, are obliged to join the euro. Unlike euro area member states, for which a common monetary policy is set by the European Central Bank (ECB), the UK has retained control over its own monetary policy, set by the Bank of England.

1.10 The UK first secured its permanent opt-out from joining the euro as part of the Maastricht Treaty in 1992. There were 2 subsequent assessments by the UK government on whether to adopt the euro, which concluded that the economic conditions for successful adoption were not met.[3] The government has confirmed that it has no intention of adopting the euro as the currency of the UK, and the European Union Act 2011 requires an Act of Parliament and a referendum to take place before the UK could do so. The UK's new settlement, confirms that not all member states have the euro as their currency and that the UK is entitled under the Treaties not to adopt the euro.

1.11 As a non-euro member, the UK is free to set its own macroeconomic policies, and unlike other member states, cannot face sanctions under the EU's fiscal rules. Further, the UK does not participate in the recent developments put in place to strengthen the euro, including the fiscal compact, Banking Union or the euro plus pact.[4]

1.12 Alongside its special status with respect to economic policy, the UK has, in other areas of policy, secured a number of important safeguards: it has chosen not to participate in the Schengen border-free zone, thereby retaining its own border; it has secured an opt-in arrangement on the EU's justice and home affairs matters; and the UK will not be part of further European political integration.[5]

1.13 Figure 1.B maps the various groupings of countries which revolve around EU membership, while highlighting the UK's various economic opt-outs.

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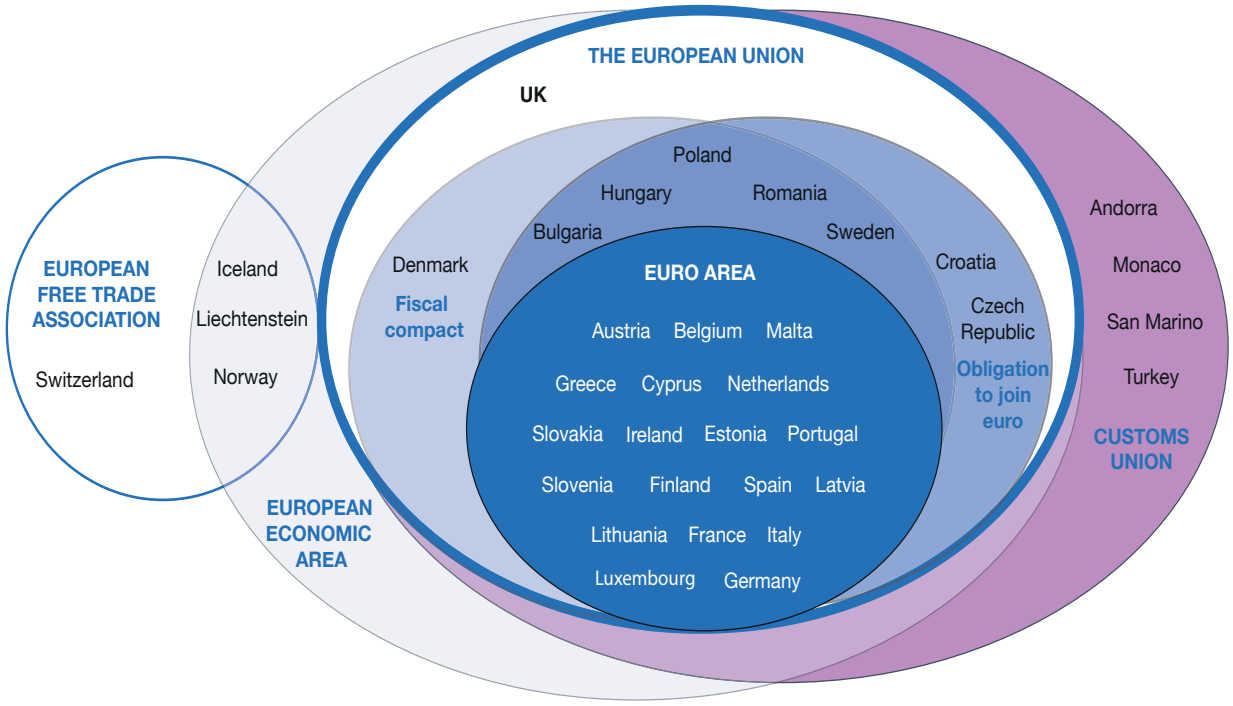
2 See Protocol (No 15) to the Consolidated EU Treaties *On Certain Provisions Relating to the United Kingdom of Great Britain and Northern Ireland*.

3 *UK membership of the single currency: An assessment of the five economic tests*, HM Treasury (October 1997 and June 2003).

4 The euro plus pact is a complementary agenda formed by a core group of the euro area members – as a reflection of their deeper interdependence – with additional reforms focusing on 4 areas: competitiveness, employment, sustainability of public finances and reinforcing financial stability. Banking Union is designed to ensure that banks in the euro area are stronger and better supervised, and is made up of the Single Supervisory Mechanism and the Single Resolution Mechanism, both of which are mandatory for all euro area member states, as well as being open to all other countries in the EU.

5 For more detail see: *The best of both worlds: the United Kingdom's special status in a reformed European Union*, HM Government (February 2016); and *Alternatives to membership: possible models for the United Kingdom outside the European Union*, HM Government (March 2016).

Figure 1.B: EU membership groupings[6]



EU economic governance reform

1.14 The economic component of the government's recently-concluded renegotiation of its EU membership had 2 primary objectives:

- securing the UK's special status with respect to economic issues, through reforms to the EU's economic governance to safeguard the interests of member states like the UK, which are outside the single currency but inside the Single Market
- maximising the economic benefits of the Single Market, by ensuring the EU has an ambitious agenda for economic policy reform

1.15 A stable, successful euro area economy is of vital importance to the UK's economic security. The euro area as a whole is the largest single destination for UK exports, and its financial system is tightly linked to the UK's. A successful euro area is therefore key to delivering the benefits from the openness of the Single Market.

1.16 Following the financial crisis, the euro area made significant and necessary reforms to ensure long-term financial stability, including the adoption of legislation on Banking Union. The Five Presidents' Report of June 2015 on *Completing Europe's Economic and Monetary Union* proposed a number of further measures that would move the euro area towards a closer economic union, financial union and fiscal union.[7] These could be the next steps along what the Chancellor has referred to as the "inexorable logic" of euro area integration.[8]

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6 The UK and Denmark have permanent legal opt-outs from membership of the euro. All other member states have a legal obligation to adopt the euro in the future, and thereby a de facto obligation to join the Banking Union.

7 *The Five Presidents' Report: Completing Europe's Economic and Monetary Union*, European Commission (June 2015).

8 *Speech to the BDI conference*, Chancellor of the Exchequer (3 November 2015).

1.17 As the euro area takes these steps, it is important that the UK is not forced to participate and does not have its interests undermined. In the past, this has not always been clear. The new settlement provides the basis for stable and sustainable economic governance arrangements. It puts in place a set of legally-binding principles, supported by a new safeguard mechanism, that will ensure the UK is not penalised, excluded or discriminated against by EU rules because it is not part of the euro area. The new settlement recognises that not all member states have the euro as their currency and that the UK should not be forced to participate in measures designed for euro area countries. Important protections for the UK in the EU's economic governance are also set out in the new settlement, and mean that:

- UK businesses trading in the Single Market cannot be discriminated against because the UK is outside the euro area
- the integrity of the Single Market – the level playing field for EU businesses – shall be respected as the euro area integrates
- it is recognised that within the Single Market, different requirements may be needed for those inside and outside the single currency[9]
- UK taxpayers will never be required to pay for euro area bail outs
- all discussions on matters that affect all EU member states will involve all EU member states, including the UK, not just the euro area countries

1.18 Finally, there is a binding commitment that the principles will be incorporated into the EU Treaties at the next opportunity.

1.19 This new settlement, therefore, provides a clear way forward for the UK in its relations with the euro area. It is a substantial set of reforms that should promote a more flexible, open and transparent EU. It will facilitate positive reform of the euro area while safeguarding the UK's use of the pound and the UK's role in deciding the rules of the Single Market.

9 In particular, more common rules may be needed for the single currency with regard to financial stability, for example Banking Union, but these same common rules may not be needed for non-euro area member states who are part of the Single Market. The UK will continue to benefit from open participation in the Single Market but responsibility for financial stability remains a matter for the Bank of England and other UK authorities that are accountable to the UK Parliament.

Part 2: Access to global markets

- The Single Market has increased economic openness by providing access to the EU internal market. It has reduced the cost of and made it easier to trade with the rest of the EU by removing tariffs, reducing cross-border transactions costs, and creating a level playing field by reducing non-tariff and other barriers to trade. It facilitates external trade through negotiating trade deals with the rest of the world.
- EU membership has also increased financial openness, supporting investment.
- Increased trade and investment support increased productivity. Higher productivity means better quality jobs and higher real wages.

Trade in goods and services

1.20 The UK is a highly open economy. Trade intensity, a standard measure of trade openness defined as the total volume of goods and services trade relative to GDP, shows UK openness has increased markedly since the decade after the Second World War, rising from around 20% to over 60% in 2015 (Chart A in the Introduction).[10] In 2015, 44% of UK goods and services exports went to the EU, with these exports worth 12.0% of UK GDP.[11]

1.21 Half of the UK's goods exports, and 37% of services exports, go to the EU. The UK ran a trade deficit of £67.8 billion with the EU (3.6% of GDP) in 2015.[12] This was comprised of a deficit in goods of £88.7 billion (4.8% of GDP), but a surplus in services of £20.9 billion (1.1% of GDP).

1.22 As a proportion of GDP the UK exports more services than any other G7 country.[13] In both services and manufacturing, there is an ever-increasing emphasis on high value-added activities in which the UK is relatively specialised, has a comparative advantage and which benefit most from economic openness. Chart 1.A displays revealed comparative advantage – a measure indicating which industry groups the UK specialises in exporting relative to global markets – and demonstrates the UK's strong service exports as well as relative specialisations in pharmaceuticals and aerospace.[14]

10 *Three centuries of data – version 2.2*, Bank of England (2015) and *Quarterly National Accounts: Quarter 4 (Oct to Dec) 2015*, ONS (March 2016). Ratio calculated as the volume of exports plus imports divided by the volume of GDP, 2012 prices.

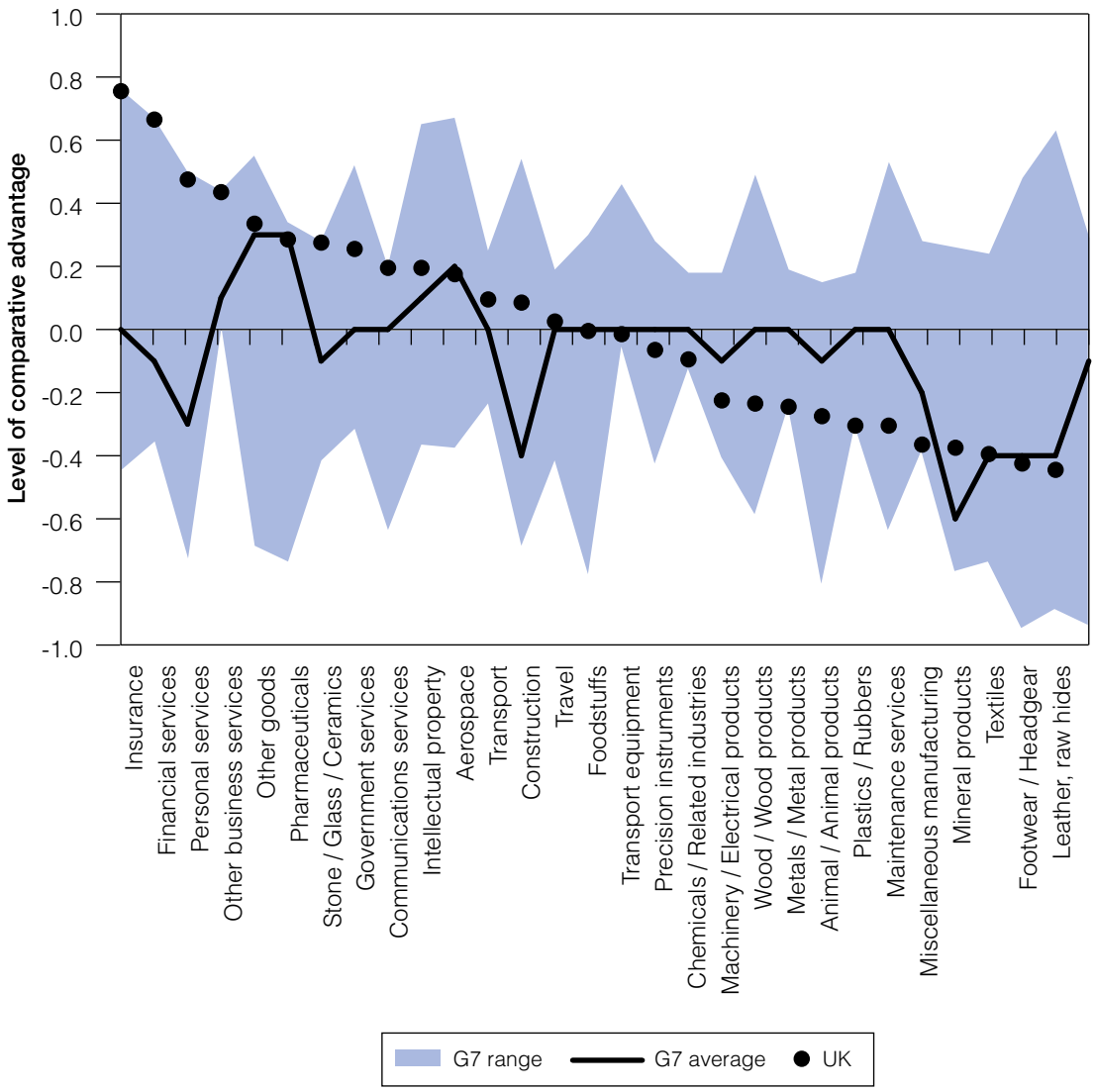
11 *Balance of Payments Oct to Dec 2015 and annual 2015*, ONS (March 2016).

12 Ibid.

13 *National Accounts and Balance of Payments data,* OECD (2014).

14 Revealed comparative advantage (RCA) compares a given sector's share of the UK's exports with its share in global exports – providing an indication of where the UK performs relatively well in international markets. It is sometimes used as a measure of competitiveness. A positive RCA value means that compared to the rest of the world a sector represents a disproportionately large share of the UK's overall exports. A negative RCA value implies that a sector represents a disproportionately small share of the UK's exports.

Chart 1.A: UK revealed comparative advantage relative to G7 countries (2014)



Source: HMT calculations based on previous BIS analysis, International Trade Centre (ITC)[15]

The EU's role in facilitating trade

1.23 The EU Single Market is broader and deeper than any other free trade area in the world. This has reduced trade costs significantly between its members and other countries.

Removing tariffs and quotas

1.24 The first element of the Single Market is that there are no internal tariffs on trade within the EU. The average tariff rate World Trade Organization (WTO) members apply to imports of countries with which there is no preferential agreement is 9%.[16] By removing these tariffs within the EU, UK goods can compete with goods from all other EU countries on the same basis, and UK consumers can buy a wider range of goods from other EU countries at lower prices.

15 Chart 1.A updates previous BIS analysis which can be found in *Benchmarking UK competitiveness in the global economy*, Department for Business Innovation & Skills (2012).

16 *Trade and Tariffs,* WTO (2015).

Creating a customs union

1.25 The second element of the Single Market – customs union – means that there are no customs checks on trade within the EU. Such compliance checks add to an exporter's costs and so create trade barriers. This is true even when tariffs are eliminated, as the administrative costs associated with customs are an important barrier to trade.

1.26 For example, 'rules of origin' specifically require exporters to obtain proof of origin certificates from their national customs authority to certify the domestic content of their exports when trade is underpinned by an FTA. The economic cost of these is significant.[17] Without the customs union, businesses trading within the EU would have to submit customs declarations, pay Value Added Tax on their products as they cross a border, and accept delays while waiting for them to clear inspections. The OECD has estimated that crossing the border, documentation and other delays can increase the transaction costs of trade by up to 24% of the value of traded goods.[18]

1.27 The impact of these administrative costs would be particularly pronounced for time-sensitive industries like fresh food or those participating in complex pan-EU supply chains such as the aerospace and automotive industry (see Boxes 1.C and 1.F). For example, separate evidence from time-sensitive industries in countries acceding to the EU suggests that every 1 hour of customs delay adds 0.8 percentage points to the ad valorem trade-cost rate and leads to 5% less trade.[19]

Creating a level playing field

1.28 The third element of the Single Market creates a level playing field by reducing non-tariff and other barriers to trade within the EU. In contrast to the 'at the border' costs of tariffs, these non-tariff barriers include 'behind border' rules and regulations that restrict and add to the costs of trade. Such barriers include different standards and specifications which make it hard to trade, such as product standards in goods and recognition of qualifications in services. EU competition rules mean that markets are undistorted by anti-competitive practices and work fairly for consumers and society as a whole. Uniquely, the Single Market also provides a guaranteed right to access and deliver services in the same way as any domestic firm in every EU country. Through these actions, the EU has created a level playing field for trade in goods and to some extent services within the EU.

1.29 These non-tariff barriers are increasingly important restrictions on trade globally. Estimates for the size of non-tariff barriers indicate they are at least as important as tariffs, and in advanced economies often on average add 2 or 3 times as much to the cost of traded goods as tariffs on average. Box 1.A discusses the importance of non-tariff barriers in restricting trade, including estimates of their size.

1.30 The Single Market has not eliminated all non-tariff barriers in the EU. However, it has gone further than any other free trade area in reducing such barriers. The EU is unique in its coverage across the economy, its mechanisms for ensuring the rules are respected, and its ability to evolve over time. No other FTA is comparable in these areas.

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17 For example, the Centre for Economic Policy Research (2013) found that applying rules of origin increases trade costs by 4% to 15%. This issue is discussed in more detail in Box 1.A.

18 *Trade Costs: What have we learned? A synthesis report,* Moise and Le Bris, OECD trade policy paper No. 150. (2013).

19 *Need for Speed: Is Faster Trade in the EU Trade-creating?,* Hornok, CEPR Discussion Paper 8451 (2011).

1.31 In addition to trade intensity, a second key measure of openness is trade costs, and there is clear evidence that falling trade costs increase trade. The decline in total trade costs is estimated to account for more than 30% of the expansion in global trade from 1950 to 2000.[20] Specific evidence shows EU membership has substantially reduced trade costs for the UK. One study has estimated trade costs between EU countries have been declining approximately 40% faster than trade costs between other OECD countries.[21] World Bank data suggests that, between 1999 and 2008, the UK's average trade costs with the EU fell by approximately 10 percentage points, to a level less than half of average trade costs with non-EU members.[22]

External trade

1.32 As a customs union, the EU has a common external trade policy. Since becoming a member of the EU, the UK has been represented in trade negotiations, including in multilateral negotiations through the General Agreement on Tariffs and Trade (GATT) and WTO, through the EU. Membership of the EU also facilitates trade through the EU's negotiation of trade deals with the rest of the world. With an economic weight 5 times the size of the UK, the EU is able to negotiate access to global markets through multilateral trade agreements and, increasingly, bilateral agreements with other countries.[23]

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20 *Trade Booms, Trade Busts and Trade Costs*, Jacks, Meissner and Novy (2011).

21 *Price Convergence in the European Union: Within Firms or Composition of Firms?* Méjean, and Schwellnus (2009).

22 HM Treasury calculation based on the World Bank ESCAP data which contains ad valorem equivalent (AVE) of trade costs. The data is based on an inverse gravity model. Trade costs are in AVE terms and include both exogenous factors such as distance, language and borders, and endogenous factors such as tariffs, non-tariff barriers and transport connections. Under this indirect method of estimating trade costs, trade costs are derived based on the difference between observed trade and the trade flows that would have been expected in a 'hypothetical frictionless world'. For more information see: *Trade Cost and Development: A New Data Set,* Arvis, Sheperd, Duval, and Utoktham, The World Bank, (2013) and *Gravity redux: measuring international trade costs with panel data,* Novy (2013).

23 IMF *World Economic Outlook Database* (April 2016).

Box 1.A: The relative importance of non-tariff and other barriers to trade

Part of the backdrop to globalisation has been a reduction in barriers to international flows, especially tariffs and capital controls. Declining tariffs have meant that the relative importance of other barriers has increased. Within the EU, the completion of the customs union in 1968 eliminated costs associated with customs administration.

However, there remain significant impediments to free trade that are unrelated to customs (both tariffs and administration). This includes the costs of different or incompatible regulations, restricted market access or distortions to competition. Many studies have noted the importance of non-tariff barriers in reducing trade. For example, the OECD have said that "the cost of trade protection caused by non-tariff barriers – in terms of trade flows, international resource allocation, and productive efficiency – can be high".[24] The same paper also notes their increasingly important role, as import tariffs have been reduced or eliminated. Although the lack of transparency in non-tariff and other barriers poses possible challenges for measurement, the following estimates are available:

- work focused on non-tariff barriers between the EU and US has suggested they increase trade costs by around 10%, making them nearly 3 times larger than US tariffs[25]
- for the EU the tariff-equivalent cost of non-tariff barriers on EU imports are roughly 2.5 times larger than EU tariff rates[26]
- this pattern is repeated across other advanced economies – for example, estimates for the tariff-equivalent cost of non-tariff barriers in Japan are 11% compared to tariff rates of 4.2% – and across all countries, non-tariff barriers are estimated to add 87% to the restrictiveness imposed by tariffs[27]

Impact of EU membership on EU trade flows

1.33 The UK's openness to trade has increased significantly over the past 5 decades (Chart A in the Introduction).[28] This has been the result of both increased exports and imports, supported by access to the Single Market.

1.34 Over that period, UK exports have grown faster than GDP, rising from 11% of GDP in 1965 to 30% in 2015.[29] This increase has been with EU member states and the rest of the world, and in both goods and services.

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24 *Looking beyond tariffs: the role of non-tariff barriers in world trade*, OECD, page 13 (2005).

25 *Non-tariff measures in EU-US trade and investment – an economic analysis*, ECORYS (2009) and WTO country tariff profiles.

26 *Estimating trade restrictiveness indices*, Kee, Nicita and Olarreaga, The Economic Journal (2009) and WTO country tariff profiles.

27 Ibid.

28 *Quarterly National Accounts*, ONS (March 2016). Ratio calculated as the volume of exports plus imports divided by the volume of GDP, 2012 prices.

29 Ibid.

1.35 In terms of trade with the EU, goods exports to current members have increased from 3% of GDP in 1965 to 9% in 2015.[30] Services exports have grown particularly strongly in recent years. Over the decade to 2014, services exports to the EU have grown more than twice as quickly as goods exports.[31]

1.36 In terms of trade with the rest of the world, over the decade to 2014, there has been strong growth in exports to emerging markets. Exports to China have grown faster than any other major export partner. However, the largest increase in export values has been with the EU reflecting the EU's continuing importance as an export market.[32] These trends in trade are set out in Figure 1.C.

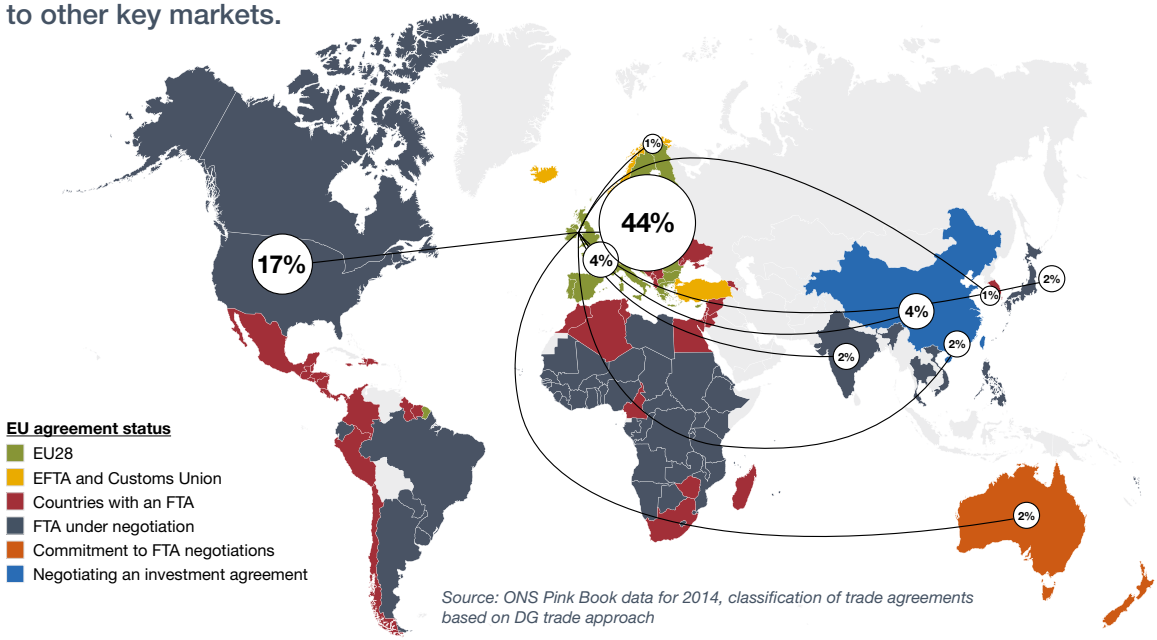
30 *Quarterly National Accounts*, ONS (March 2016). Ratio calculated as the volume of exports divided by the volume of GDP, 2012 prices. The EU/non-EU share for goods is calculated from ONS Publication Tables, UK Trade (March 2016). The EU/non-EU share for services volumes since 1999 is estimated on values data from ONS Balance of Payments (2016). Before 1998, the EU/non-EU share is estimated using Comtrade goods trade data. A full break down of UK exports calculated on this basis is shown in the second panel of Figure 1.C.

31 *United Kingdom Balance of Payments – The Pink Book,* ONS (2015).

32 Ibid.

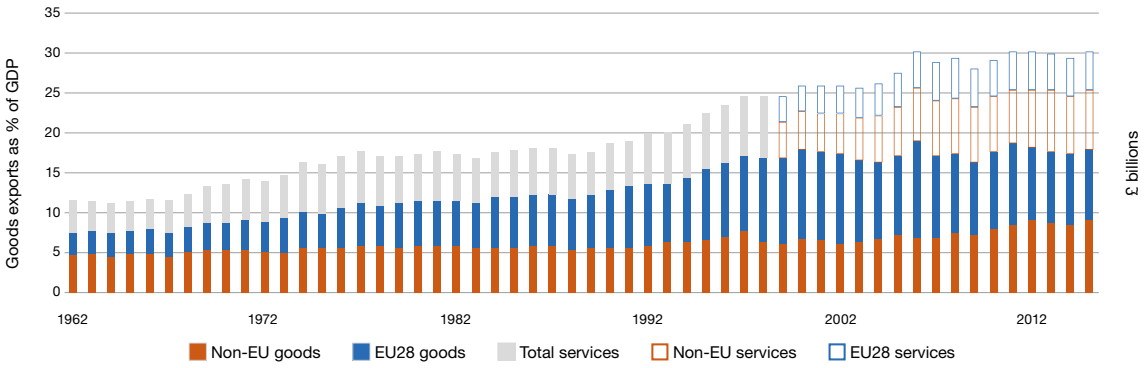
Figure 1.C: The UK's trading relationships

The EU is the UK's most important export partner. It also gives the UK better access to other key markets.



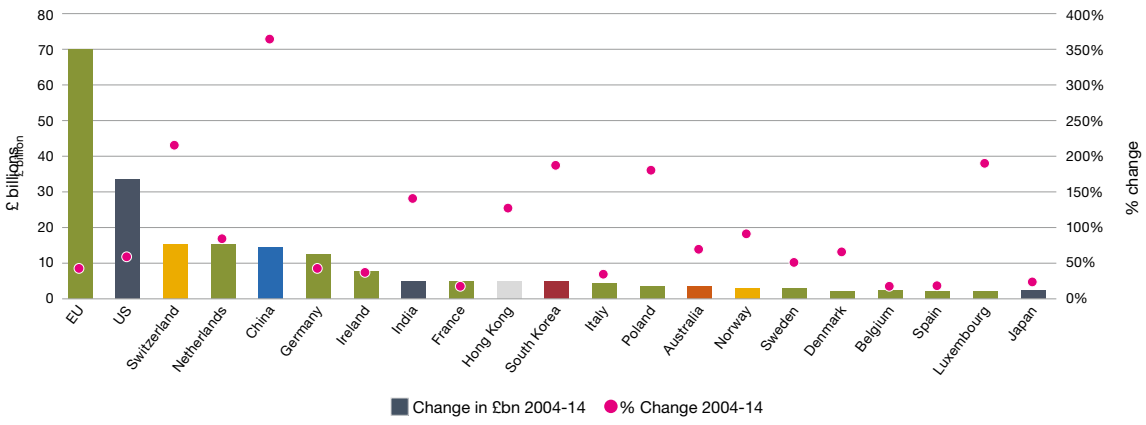
Source: ONS Pink Book data for 2014, classification of trade agreements based on DG trade approach

Exports with both EU and non-EU countries have increased more rapidly than GDP.



Source: HM Treasury calculations, using ONS and Comtrade data.

Exports to the EU have increased by a larger amount than to any other major partner, but exports to China have been the fastest growing.



Source: ONS Pink Book 2015

1.37 As summarised in Part 1 of Annex A, academic research overwhelmingly concludes that EU membership has had a significant positive impact on trade flows between member states. These papers are part of a far larger literature considering the impact of trade costs on flows which consistently finds a reduction in trade costs increases trade flows.[33] A number of recent papers that directly estimate the trade effects of EU membership have found large positive effects. For example:

- Carrere (2006) uses bilateral trade data for 130 countries from 1962 to 1996 to examine the ex-post impact of FTAs on trade flows. Their results suggest EU membership increases intra-EU trade by an average of 104% over the period[34]
- Baier et al (2008) use data for 96 countries from 1960 to 2000 and find that EU membership increases intra-EU trade by over 90%[35]
- Eicher et al (2012) use data from 1970 to 1995 for 196 countries and find that EU membership increases bilateral trade by 51%[36]
- using data for 65 countries from 1990 to 2011, the OECD (2015) finds that being a member of the European Economic Area (EEA) (the EU-28, Norway, Iceland and Liechtenstein) increases trade by approximately 60%, but consider these results a lower bound[37]

1.38 The HM Treasury analysis in this document is consistent with the results in these papers. For the EU membership effect, the HM Treasury estimates show that EU membership increases trade with EU members by between 68% and 85% relative to a baseline position of WTO membership.[38]

1.39 A significant part of the increase in trade flows has been a growth in supply chains. Over 70% of global trade is now in intermediate goods and services, or capital goods; and over the past 15 years, the income created within global supply chains has, on average, doubled.[39] The benefits of the Single Market are particularly strong for high value-added goods exports that rely on cross-border supply chains, such as the pharmaceutical, aerospace and automotive sectors. The impact of the Single Market on each is discussed in more detail in Boxes 1.B. 1.C and 1.F respectively. For these sectors, the customs union is particularly important.[40] A range of external studies conclude that reducing trade barriers within such regional hubs has been crucial to the development of such supply chains.[41]

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33 For example, *Trade theory with numbers: Quantifying the consequences of globalization,* Costinot and Rodriguez-Clare (2013).

34 *Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model,* Carrere, Céline (2006).

35 *Do economic integration agreements actually work? Issues in understanding the causes and consequences of the growth of regionalism*, Baier, Bergstrand, Egger and McLaughlin (2008).

36 *Trade creation and diversion revisited: Accounting for model uncertainty and natural trading partner effects* Eicher, Henn, and Papageorgiou (2012).

37 *Implicit Regulatory Barriers in the EU Single Market: New Empirical Evidence from Gravity Models*, Fournier, Domps, Gorin, Guillet and Morchoisne, OECD (2015).

38 Discussed in more detail in Section 3 and Annex A.

39 *Global Value Chains: Challenges, Opportunities, and Implications for Policy*, OECD, WTO and World Bank (2014) report prepared for submission to the G20 Trade Ministers Meeting Sydney, 2014.

40 These are factors highlighted in OECD, WTO and World Bank (2014).

41 *Networks and structural integration in global value chains,* Santoni and Taglioni in Chapter 4 of *The Age of Global Value Chains: Maps and Policy Issues*, VoxEU (2015).

Box 1.B: Impact of the EU on the UK's pharmaceutical industry

The UK pharmaceutical industry:

- contributes £13.0 billion of UK Gross Value Added (GVA), 0.8% of the UK economy and 7.7% of UK manufacturing GVA[42]
- employs around 93,000 people, many of whom are highly skilled[43]
- 43% of the sector's total exports goes to the EU[44]

The UK is home to operations of all of the top 20 global pharmaceutical companies,[45] as well as many smaller ones, including a flourishing bioscience industry and innovative start-ups. The UK has 80 different companies involved in one or more stage of pharmaceutical manufacturing. These companies operate on 91 different sites and are involved in one or more of the stages in producing 216 products authorised across the EU market.[46] Exports of pharmaceuticals are significant with over half going to the EU, worth £29 million each day.

The Single Market will give life science companies investing in the UK access to new opportunities in a wider market for their products. These benefits for UK-based companies would be put at risk if the UK was to leave the EU. The EU provides a single framework for regulating and improving pharmaceutical products. This ensures a high standard of patient safety, raises productivity through economies of scale and increased competition, and reduces the cost of supplying drugs across the EU. The UK has strong influence over the EU's regulatory framework for pharmaceuticals, which would be lost under any of the alternative relationships discussed in Section 2.

1.40 Moreover, trade associated with global supply chains has a higher productivity impact than 'traditional' trade, as demonstrated by recent academic work which shows that successful integration with regional supplier networks is correlated with higher domestic value added and higher exports.[47] EU-specific research has found that increased integration through value chains has allowed European economies to focus on their areas of comparative advantage.[48]

42 ONS GDP(O) low level aggregates (March 2016).

43 *Strength & Opportunity report*, HM Government, page 4 (2014). Total for the pharmaceutical and medical biotechnology sectors.

44 *Trade in Goods – SITC Dataset*, ONS (February 2016).

45 *Strength & Opportunity report*, HM Government, page 48 (2014).

46 Data from the European Medicines Agency, database provided by the MHRA.

47 *Networks and structural integration in global value chains*, Santoni and Taglioni in Chapter 4 in of *The Age of Global Value Chains: Maps and Policy Issues*, VoxEU, (2015).

48 *Global Value Chains: A Case for Europe to Cheer Up,* Di Mauro Plamper and Stehrer (2013).

Box 1.C: Impact of the EU on the UK's aerospace industry

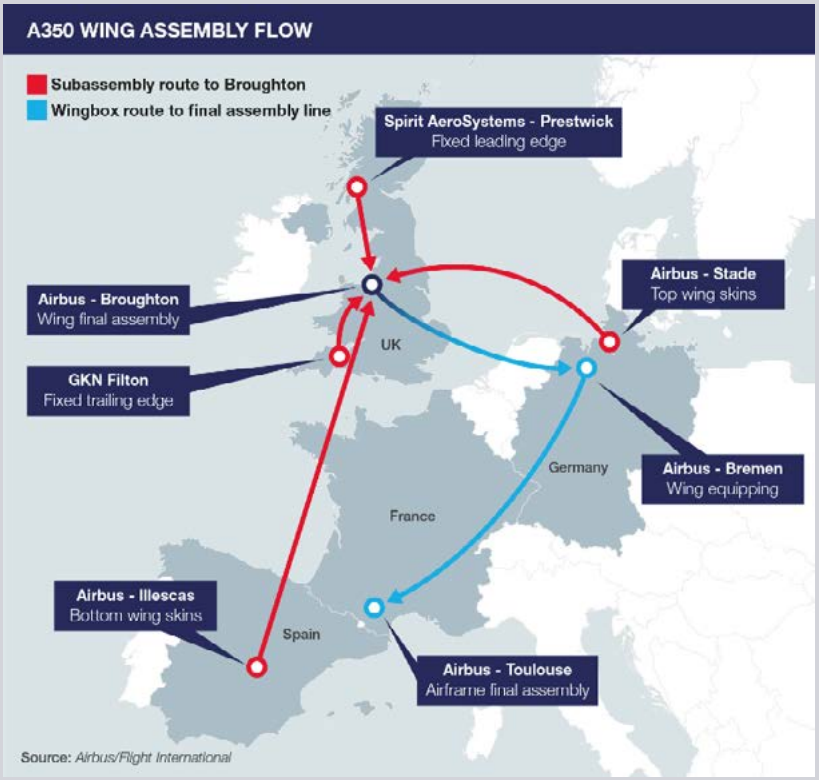
The UK aerospace industry:

- contributes £8.7 billion of UK GVA,[49] with turnover of nearly £30 billion[50]
- employs 110,000 people
- 47% of the sector's total exports goes to the EU

The UK has the largest aerospace industry in Europe, and the second largest in the world, after the US. ADS, the UK trade association for the aerospace, defence and security industries, reported that there were almost 3,000 companies operating in the aerospace sector or in the wider supply chain.[51]

Aerospace is an example of an industry which relies on European supply chains. Many companies which do not directly export themselves produce intermediate inputs for exporters. In addition, many UK firms rely upon imports from the EU to produce their final product.

For example, the wings for the Airbus A350 XWB are produced in the UK. The wings are made from many parts, drawing from expertise and excellence across the UK and EU. Although the wings are assembled in North Wales, they were designed in cooperation with specialist teams in Germany, Spain, France and Filton, near Bristol. Each of the components of the wing rely on capability from across the EU, and the supply chain used to construct those components spans EU member states including the UK. The final aircraft is assembled in Toulouse, with its UK-made wings exported there from Broughton via Bremen, in Germany, where they are equipped with flaps and other high lift devices.



49 *National Accounts*, ONS (2014).

50 *Annual Business Survey*, ONS (2014). SIC codes 30.3 and 33.16.

51 *Aerospace Industry Outlook,* ADS (2014).

If the UK was to leave the EU, the aerospace industry would be worse off because of a reduction in access to the Single Market. Full access to the Single Market, particularly the customs union, reduces the administrative cost of transporting goods across borders, cutting costs for businesses, like those in the aerospace sector, that rely on international supply chains. Any of the existing alternative relationships outside of the EU discussed in Section 2 would require firms to comply with customs rules.[52] Exporters from Norway, Switzerland and Canada (once its FTA is in force) need to comply with rules of origin to benefit from preferential access to the EU. These may require a firm to provide detailed documentation to prove that a sufficient proportion of its product's value originated domestically or from partners covered by relevant trade agreements. These were recognised in a recent statement from Airbus which noted that its business model is "entirely based on the ability to move products, people and ideas around Europe without any restriction".[53]

1.41 The benefits of increased trade with other EU members, and the development of European supply chains, are particularly large for the UK given the structure of the economy. An increasing share of UK exports is comprised of services, and this is reflected in exports to the EU. Overall, services now comprise over 40% of total UK exports, a greater share of total UK trade than in comparable countries such as Germany, France or the US.[54] The level of exports by sector varies significantly within services, as some service industries are inherently hard to trade across borders.

1.42 Services are also an important, and growing, component of value chains. Firms increasingly use logistics, communications services, and business services to facilitate the efficient functioning of their supply chains. When UK manufacturers sell goods overseas they often also sell services, such as training and maintenance. This means goods and services exports often go hand in hand. Reflecting this, almost one third of the value of manufactured exports represents service value added.[55]

1.43 Whereas the early development of the Single Market particularly benefitted goods trade, more recent developments have increasingly benefitted services. The reduction of non-tariff barriers by being part of the Single Market is particularly important for services and has opened new markets to UK-based service firms and reduced the cost of trading. The EU 'Services Directive' has already helped to make some progress in removing barriers to entry in key service sectors, such as in professional services (see Box 1.L), and is estimated to have already added 0.8% to EU GDP.[56]

1.44 In service sectors where the Single Market is most developed, the UK has particular advantages, such as financial services (see Box 1.D).

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52 For example, under the EU-Canada FTA this includes rules of origin requirements as in, where aircraft parts must have at least 50% of value added in the exporting country to qualify for preferential treatment.

53 *Britain's place in Europe and Airbus position on it,* Airbus (April 2016).

54 OECD stats database International Trade and Balance of Payments statistics (2015).

55 *Global value chains (GVCs): United Kingdom,* OECD (2003).

56 *The economic impact of the Services Directive: A first assessment following implementation,* Monteaguado, Rutkowski, and Lorenzani, European Commission's European Economy Economic Papers 456 (June 2012).

Box 1.D: Impact of the EU on the UK's financial services industry

The UK financial services sector:

- contributes slightly more than 7% of UK GDP,[57] with around half of this coming from firms outside London
- employs more than 1 million people, of which two thirds are based outside London[58]
- exports around 33% of its financial, insurance and pensions services exports to the EU; within this, non-insurance financial services export most intensively to the EU and account for the larger share of jobs in the broad sector[59]

The financial services industry is crucial to the success of the UK economy. EU financial integration have helped UK financial firms grow both in size and in the breadth of services they offer. Financial services exports have increased from 1.6% of GDP in 1991 to 3.5% of GDP in 2015.[60]

UK-based firms play a particularly important role in some international sectors – for example, in 2013 the UK accounted for nearly four fifths of total EU foreign exchange trading.[61]

The financial services sector is an example of a Europe-wide industry with significant importance for many regions of the UK in terms of employment, although of course not all these jobs depend directly on access to the Single Market. While London – with around 399,000 jobs in financial services – is a key global financial centre, much of the sector's economic activity is based outside the capital: almost 85,000 people in Scotland and 98,000 people in the North West have jobs in financial services.[62] For example, 40% of JP Morgan's staff are based outside London, it employs 4,000 people in Bournemouth alone, making it the largest employer in Dorset; Deutsche Bank has around 1,500 staff in Birmingham; and Bank of America Merrill Lynch employs around 2,000 staff in Chester.

If the UK left the EU, its financial services industry would suffer from reduced access to the Single Market. Successive EU initiatives through the 1990s supported the creation of a level playing field for financial services, and in particular the development of 'passporting rights'.[63] These rights allow firms with operations established in the UK to trade across the entire Single Market with lower costs and complexity. Financial firms are able to establish a European headquarters in one member state, such as the UK, and then offer services across the whole of the EU without requiring further authorisations. No FTAs have equivalent provisions on market access for financial services. As a result, many financial services firms from non-EEA countries, notably including the US and Switzerland, access the Single Market via subsidiaries located in an EU country, and in particular the UK. This

57 *GDP(O) low level aggregates*, ONS (March 2016).

58 *Workforce jobs by region and industry, Q4 2015*, ONS (March 2016).

59 *United Kingdom Balance of Payments – The Pink Book*, ONS (2015) and *Labour Market Statistics*, ONS (March 2016).

60 *Quarterly National Accounts and Balance of Payments*, ONS (March 2016).

61 Based on data from the Bank of International Settlements' Triennial Central Bank Survey of foreign exchange and derivatives market activity in 2013.

62 *Workforce jobs by region and industry, Q4 2015*, ONS (March 2016).

63 The EU's financial services 'passport' or 'passporting regime' are shorthand terms for the collection of measures in EU secondary law, which specify how the EU fundamental freedoms operate in the context of financial services. Once authorised in one member state the passport allows a firm to provide its authorised services across the EU without further authorisations in other member states.

is possible because of the fundamental principle that all member states share a common regulatory 'rule book' for the financial sector. The subsidiaries of these non-EU firms need to comply with both EU rules and local requirements, including on the amount of capital they must hold.

Access to the EU Single Market has therefore been a significant factor in the UK becoming a major global financial centre, and host to Europe's largest financial centre, as international firms see the UK as a gateway to accessing European markets.[64]

The direct impact of EU membership varies across the sector. Firms in wholesale banking, capital markets and investment management, along with the many other firms who trade across European borders or through branches in other member states, have been particular beneficiaries. The passport enables financial firms in these markets to benefit from economies of scale as they trade across borders. For example, it has allowed for 'UCITS' collective investment schemes to be run from one country and marketed across the EEA which means they can operate on a larger scale. A significant amount of UCITS fund management is currently done in London and Edinburgh. London, like all financial centres, is reliant on 'agglomeration' effects, given the importance of strong networks and skilled labour to the financial services industry. As a result, while the direct benefits of Single Market access fall unevenly across the sector, EU membership has played a role in strengthening the overall financial sector.

In recent years, the UK has continued to play an important role ensuring that international agreements, focussed on addressing the issues exposed by the global financial crisis, are implemented robustly at the EU level. The reforms the UK has secured will ensure that the UK has the flexibility it needs to manage risks in its uniquely large and international financial sector.

Impact of EU membership on UK trade with the rest of the world

1.45 These trends in trade within the EU have come against a background of increasing global openness, reflecting the increasing size of non-EU countries' trade flows. Increased trade within the EU as a result of the Single Market has not come at the expense of trade with the rest of the world. The importance of the trade diversion effect from free trade areas has been assessed by several external studies, which find that the size of the effect is very small, and negligible in comparison to the trade creation effect.[65] In fact, membership of the Single Market gives the EU an important role in facilitating access to non-EU markets through its responsibility for negotiating external trade deals on behalf of all its members with non-EU countries. Indeed, a common external trade policy is an inherent and inseparable part of a customs union.

1.46 Over the past 70 years, the global trading system has developed, first through the GATT system, and since it became the WTO in 1995. The EU, influenced by the UK, has been a driving force in trade liberalisation through successive GATT/WTO initiatives. The European

64 Responses to HMG's 2014 Balance of Competences Review consultation on Financial Services and the Free Movement of Capital considered the existence of the EU Single Market and UK access to it as "critical" to the consolidation of the UK's position as a leading international financial centre.

65 Bagwell, Bown and Staiger (2014) review the literature on this subject and conclude that while trade diversion is a possibility it does not appear to be a consistent feature across regional trade agreements. A full literature review is provided in Annex A.

Economic Community – a precursor to the EU – was identified as a driving force behind GATT and global trade liberalisation as early as the Kennedy Round of negotiations (1963 to 1967).[66]

1.47 Since the UK has been a member of the EU, it has remained a member of the WTO and has been broadly supportive of global trade. However, following successes in the Tokyo and Uruguay Rounds, progress has slowed on the current Doha Round. Partly as a result, there has been an increasing global trend towards more regional FTAs: the WTO report 284 such agreements as currently in force.[67] The EU has been at the forefront of this trend, and now has trade agreements with more than 50 other countries accounting for 12% of UK total exports in 2014 (around £60 billion) as set out in Table 1.A.[68] In comparison, the US has agreements with 20 partners and Canada with 15.[69] While falling short of the Single Market itself, the most recent trade deals negotiated by the EU have been some of the most advanced FTAs in the world. There is evidence that agreeing deals as part of a larger trading bloc strengthens the negotiating position of the UK. The UK influences the EU's trade priorities, helping to ensure trade policy reflects the UK's priorities.

1.48 EU FTAs currently under negotiation will be particularly significant for the UK. For example, the US is the UK's largest individual trade partner outside the EU (accounting for 17% of UK exports).[70] Once agreed, the EU-US FTA is expected to boost UK exports by £18 billion and UK GDP by up to £10 billion.[71,72] The same analysis suggests that UK output of motor vehicles, chemicals, processed food, finance and insurance would particularly benefit. The EU is also currently negotiating trade deals with other countries across the world, including Japan (see Part 4 for more detail). Completing all deals currently under negotiation would mean that more than 80% of the UK's current exports will be with either the EU or to markets with which the EU has external trade deals.[73]

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66 *The making of a world trading power: the European Economic Community (EEC) in the GATT Kennedy Round negotiations (1963-1967)*, Coppolaro (2013).

67 WTO FTAs in agreement database.

68 HMT calculation based on *United Kingdom Balance of Payments – The Pink Book*, ONS (2015) and HMRC goods data for 2014.

69 Refers to FTAs in force as defined by the WTO.

70 *United Kingdom Balance of Payments – The Pink Book*, ONS (2015).

71 *Estimating the Economic Impact on the UK of a Transatlantic Trade and Investment Partnership Agreement between the European Union and the United States*, Centre for Economic Policy Research (March 2013).

72 The FTA between the EU and US, known as TTIP, has been under negotiation since July 2013.

73 There are prospective EU trade deals with a number of the world's largest economies, including: USA, Japan, Canada, Brazil, India, Argentina; as well as a number of other countries: Angola, Armenia, Benin, Botswana, Burkina Faso, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Cook Islands, Democratic Republic of the Congo, Republic of the Congo, Djibouti, Ecuador, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Haiti, Kenya, Kiribati, Lesotho, Liberia, Libya, Malawi, Malaysia, Mali, Marshall Islands, Mauritania, Micronesia, Mozambique, Namibia, Nauru, Niger, Niue, Nigeria, Palau, Paraguay, Philippines, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Singapore, Solomon Islands, Sudan, Swaziland, Tanzania, Togo, Tonga, Tuvalu, Uganda, Uruguay, Vanuatu, Vietnam, Zambia.

Table 1.A: UK trade flows, 2014

	Total exports			Total imports		
	£ billion	% of total	Cumulative %	£ billion	% total	Cumulative %
EU	229	44%	44%	291	53%	53%
EFTA and Customs Union	35	7%	51%	33	6%	59%
Existing FTAs	26	5%	56%	23	4%	63%
FTAs under negotiation	133	26%	82%	107	20%	83%
Rest of World	93	18%	100%	96	17%	100%

Source: HMT calculation based on ONS Pink Book and HMRC goods data for 2014.

1.49 Through these trade agreements, the UK currently has preferential access to markets covering around a third of the world economy. If the EU were to conclude all trade deals under negotiation, the UK would have preferential access to around three quarters of the world economy.[74]

1.50 The UK benefits from these FTAs: a range of external studies have shown they have a positive impact on trade flows and prices.[75] For example, one estimate suggests joining trade agreements reduced the consumer price index in the EU by at least 0.18%, saving EU consumers around €20 billion a year.[76] The impact has been visible in UK exports to South Korea and Chile, 2 of the most recently agreed EU FTAs.[77] Since respective EU FTAs with these countries came into effect, UK exports to Chile have risen from £0.2 billion to £1.25 billion, and UK exports to South Korea have increased from £3.6 billion to £7.4 billion.[78] UK exports to South Korea have grown faster in the last 5 years than exports to any other advanced economy.[79] In the 4 years since the EU-South Korea FTA came into force, UK exports of cars grew 185% and exports of measuring instruments grew by 157%.[80]

1.51 Finally, as part of the EU's role in setting external trade policy, the European Commission is also responsible for defending EU countries in trade disputes. This includes trade defence, whereby the EU leads on taking action against low-priced or unexpectedly high volumes of imported products which cause damage to domestic industries.[81] There have been a number of cases where the EU has supported British business interests, including ensuring British exports to Argentina are treated fairly[82] and in disputes related to tax practices that discriminated against Scotch whisky.[83]

74 IMF *World Economic Outlook Database* (April 2016).

75 For example, *Gravity Equations: Workhorse, Toolkit and Cookbook,* Head and Mayer (2013) on trade flows.

76 *The Impact of Trade Agreements on Consumer Welfare*, Breinlich, Dhingra, and Berlingieri, CEPR Discussion Series (2016).

77 The EU-South Korea FTA came into force in 2011. The EU-Chile FTA came into force in 2003.

78 *United Kingdom Balance of Payments – The Pink Book*, ONS (2015).

79 Ibid.

80 United Nations Comtrade Database.

81 Trade defence action takes 3 forms: anti-dumping duties when an exporter is 'dumping' its products on a market by selling exports at lower prices than those in their home market or their costs; anti-subsidy measures when an exporter is benefitting from certain trade-distorting subsidies; and safeguard action in response to unforeseen surges in imports that cause, or threaten to cause, injury to domestic producers.

82 Dispute DS438: Argentina — Measures Affecting the Importation of Goods.

83 For example, Dispute DS396: Philippines — Taxes on Distilled Spirits, which resulted in changes to excise taxes in the Philippines.

1.52 There are 2 advantages to the UK associated with the EU representing it in trade disputes. First, WTO rulings allow a country to impose counter-tariffs if another ignores the rules by dumping goods or imposing unfair tariffs. The EU has an economic weight 5 times that of the UK, and so the EU's counter tariffs have greater impact, giving the UK more bargaining power than when acting alone. Second, the UK gains from expertise in the Commission, built through representing 28 countries. The available evidence suggests the EU won proportionally more cases at the WTO than other complainants, such as the US.[84]

Box 1.E: Recent developments in the steel industry and role of the EU

The steel industry is an important sector, employer and supplier to other key UK industries. The EU is very important to UK steel. It is the UK's most significant export market, with over half of UK steel exports going to the EU.[85] UK steel is currently being used in projects across the EU, including in the aerospace, automotive and rail sectors.

The worldwide steel industry has been facing extremely difficult global economic conditions. The price of some steel products almost halved in 2014, and estimates suggest there continues to be a global overproduction of around 35%.

Alongside substantial domestic support – exempting energy-intensive industries from renewables policy costs, introducing procurement guidelines so social and economic factors can be taken into account, working with industry to understand its long-term future, and providing support packages for those affected – the UK has used its membership of the EU to press for action against unfair competition. As well as agreeing state aid to compensate for energy costs and flexibility over EU emissions regulations, the UK is using the EU's combined influence to tackle unfair international trading practices affecting UK steel producers. As a combined block of 28 member states the EU also has real power and influence to tackle unfair international trading practices. The European Commission is taking action to tackle unfair trade in a number of ways:

- the Commission now has a record 37 measures against steel products
- further EU investigations into steel dumping are currently taking place, including on hot rolled flat products
- for wire rod, organic coated steel and stainless steel flats, duties were followed by a decline of over 90% in Chinese imports

Given the pressure on steel industries across the EU, if the UK were outside the EU, the pressure for tariffs and restrictions from the EU would be a very real risk.

1.53 The evidence is conclusive that EU membership has had a significant positive impact on trade flows between member states. Trade with the EU has been made easier because the Single Market not only eliminates tariffs but also reduces cross-border transaction costs, and non-tariff and other barriers to trade (such as regulations, standards or specifications required to trade). Importantly, increased trade within the EU has not come at the expense of trade with the rest of the world.

84 *The EU's Use of the World Trade Organization's Dispute Resolution Process*, Young (2004).

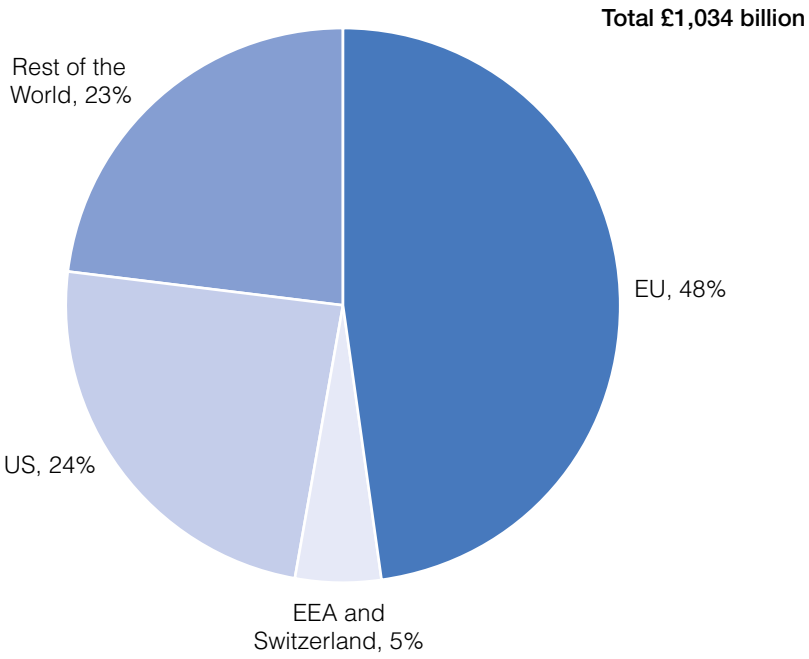
85 United Nations Comtrade Database (2014), 53% of UK exports of iron and steel (SITC code 67) were to the EU.

Investment and capital flows

1.54 The impact of EU membership on investment in the UK is closely linked to trade. Access to the Single Market affects the incentives of businesses to invest in the UK, both for domestic firms and foreign firms. This matters because investment in the economy is a key determinant of economic output and productivity growth.

1.55 In addition, EU membership guarantees the free movement of capital between member states and third countries, except under exceptional circumstances. International investment is large, with other EU countries major overseas investors in the UK. The total stock of inward FDI to EU countries, which includes FDI from other EU countries, was $8.8 trillion in 2013, of which $1.6 trillion (18%) was invested in the UK. This made the UK the largest recipient of FDI in the EU, ahead of Germany and France (with inward FDI stocks of approximately $1 trillion each).[86] EU member states are a significant source of FDI into the UK. In 2014, almost half of the total stock of inward FDI in the UK was held by EU investors (Chart 1.B).[87] Furthermore, over the past 10 years, the EU-held stock of FDI in the UK has doubled.[88]

Chart 1.B: Stock of inward UK FDI by source country (2014)



Source: Office for National Statistics

1.56 The UK's EU membership affects the investment decisions of firms. In turn, those decisions affect the productivity of the UK, ultimately affecting real wages and living standards. Being part of a larger market increases the return on investment and innovation by domestic firms.[89] There is evidence that foreign investment – particularly in the form of FDI – has some additional productivity benefits linked to technological adoption, increased competition and better matching of capital. Evidence suggests that FDI can increase local

86 *BMD3*, OECD (2013).

87 *FDI involving UK companies*, ONS (2014).

88 Ibid.

89 *Market size in innovation: Theory and evidence from the pharmaceutical industry,* Acemoglu and Linn (2004).

productivity by influencing the composition of the economy and through positive knowledge spillover to domestically-owned firms.[90]

1.57 Episodes where trade barriers with major trading partners have been reduced have been shown to trigger increased investment among firms.[91] Following the reduction in trade barriers between Canada and the US, firms responded by both exporting and investing more, to take advantage of new opportunities abroad. Studies show that increased foreign competition has also been shown to have increased investment and innovation in European firms, including in the UK.[92] This suggests greater integration with the global economy increases investment in the UK.[93]

1.58 There are a range of factors that determine firms' decisions to invest in a foreign country. A commonly used analytical framework separates FDI into 'horizontal' and 'vertical' flows. 'Horizontal FDI' is a way for firms to access foreign markets through investment from one country to another in order to supply goods or services. In this type of investment the business activity in home and host markets is roughly the same, as there is no division of the supply chain. Horizontal FDI is driven by the market size and per capita income of the host economy; the rate of growth of the host market; access to regional and global markets; and country-specific consumer preferences.

1.59 Closely linked to horizontal FDI is 'export platform FDI', which is when a firm engages in FDI not just to access the host country's market, but to serve as a production base to export to the wider regional market. This type of FDI is highly influenced by the level of access to the regional market.

1.60 'Vertical FDI' is motivated by firms' desire to increase their productivity. It is investment tied to the building of productive capacity in another country. By splitting up supply chains and locating different stages of production in different countries, firms are able to gain access to specific factors of production (such as resources, technical knowledge, and material knowhow) that may have previously been unavailable, or only available at an excessive cost, in the domestic market. Vertical FDI is driven by, among other things, the relative cost of capital and labour; transport and communication costs; trade policy in the host market; and membership of any regional trade agreements that could be conducive to the establishment of regional corporate networks.

1.61 As discussed above, it is likely that the reduction in trade barriers between EU countries has made the integration of value chains easier. In turn, this has increased the incentive to invest in other countries to build those supply chains (through vertical FDI). This can also trigger wider investment. These supply chains rely on the education and skills of the domestic workforce and of its entrepreneurs, as well as national infrastructure such as roads, ports and telecommunications systems.[94]

1.62 The spread of value chains across national borders has 3 aspects: the intertwining of trade in intermediate goods; the movement of capital and ideas; and the demand for services.

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90 *Multinational Firms in the World Economy*, Navaretti, and Venables (2004).

91 *Improved access to foreign markets raises plant-level productivity…for some plants,* Lileeva and Trefler (2010).

92 *Trade induced technical change? The impact of Chinese imports on innovation, IT and productivity*, Bloom, Draca and van Reenen NBER working paper (2011).

93 *EU membership and the Bank of England,* Bank of England (2015).

94 *Global Value Chains: Challenges, Opportunities, and Implications for Policy*, OECD, WTO & World Bank (2014).

This development has been labelled the 'trade-investment-services' nexus.[95] It requires all 3 aspects to facilitate cross-border supply chains.

1.63 To illustrate the importance of the interdependencies for the UK economy, if a foreign firm invests in a new factory in the UK to produce one element of a product, that investment represents FDI into the UK. The import of components and exports of an intermediate good requires trade in goods. The provision of services – ranging from architecture to advertising – is necessary to facilitate that activity.

Box 1.F: Impact of the EU on the UK's automotive industry

The UK automotive industry:

- contributes over £11.6 billion of UK GVA, 0.7% of the UK economy[96]
- directly supports 147,000 jobs, and 300,000 more in the wider automotive manufacturing supply chain[97]
- exports £15.0 billion to the EU, 43% of the sector's total exports[98]

The UK automotive industry is the fourth largest in Europe, making 1.6 million vehicles a year and accounting for 1.9% of global vehicle production.[99,100] It is also exceptionally open: nearly 4 out of every 5 vehicles made in the UK go to overseas markets.

The sector benefits substantially from EU membership through access to the Single Market and other FTAs agreed by the EU. The supply chains for the sector frequently extend across the Single Market, facilitated by the reduced trade costs the UK's full access to the Single Market provides. Access to the Single Market is also one of the key reasons why the industry is a major beneficiary of FDI.

The enhanced competition provided by the EU, coupled with increased investment and research funding, combine to drive productivity to a record level, above the level in key EU competitors (see page 17).

If the UK was to leave the EU, the automotive industry would be worse off because of a reduction in access to the Single Market. Any existing alternative relationship would result in less comprehensive access to the Single Market and so lead to increased trade costs, making UK-made cars more expensive, increasing the cost of supply chains that span national borders. As discussed in Section 2, Canada will continue to face tariffs on automotive exports to the EU for a further 7 years once its FTA comes into force.

1.64 The reduction in trade barriers between the UK and other EU member states has increased the attractiveness of the UK for both EU and non-EU firms seeking a base for export platform FDI. Surveys of FDI attractiveness regularly show that the UK's perceived position remains strong.

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95 *21st Century Regionalism: Filling the gap between 21st century trade and 20th century trade rules*, Baldwin, WTO Staff Working Paper (2011).

96 *National Accounts*, ONS (2014).

97 Department for Business Innovation & Skills estimate based on *Workforce Jobs*, ONS (2014).

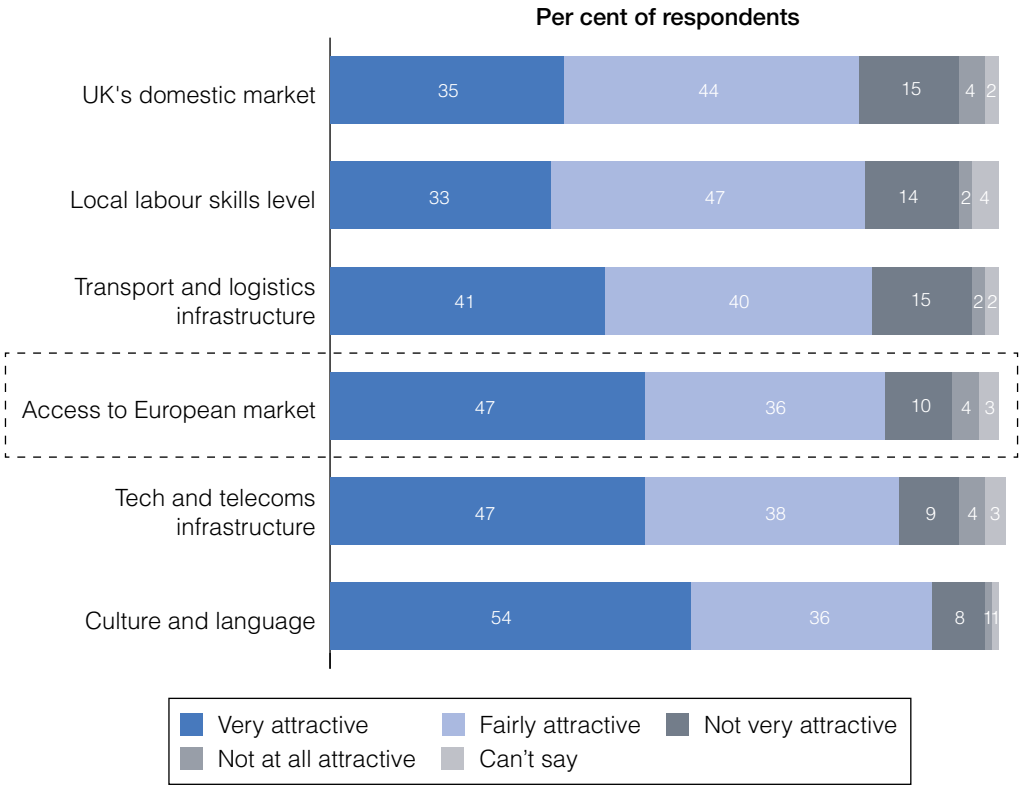
98 Data 2014: Trade in Goods (ONS/HMRC).

99 Society of Motor Manufacturers and Traders.

100 International Organisation of Motor Vehicle Manufacturers (OICA) production statistics for 2015.

1.65 According to the Ernst and Young 2015 UK attractiveness survey, the UK was ranked the fourth most attractive FDI destination in the world, behind China, the US and India.[101] Almost 1 in 10 investors identified the UK as their first choice in a ranking of global attractiveness. The same survey showed that 72% of foreign investors cited "access to European market" as important to the UK's attractiveness as a destination for investment, alongside other factors like the quality of life in the UK, the level of education among the workforce, and technology infrastructure (Chart 1.C).

Chart 1.C: Survey of foreign investors into the UK



Source: Ernst and Young 2015 UK attractiveness survey

1.66 The combination of access to the EU and more UK-specific strengths, like its flexible labour market and the domestic regulatory environment, has made the UK uniquely well-placed to take advantage of the integration of the Single Market (Chart 1.D). As a result, the change in one of these factors – like access to the Single Market – has the potential to drive quite large changes in FDI flows. For example, since their accession to the EU in 2004, the stock of FDI in Poland and Czech Republic more than doubled, while across the Central and Eastern European countries that joined the EU in 2004 the stock of FDI has doubled on average.[102]

1.67 The UK FDI stock has been growing much faster than those of other major EU countries. Between 2009 and 2013, the inward stock of FDI in the UK increased by 45%, much faster than in Germany (9.3%) and France (5.9%).[103]

101 *UK attractiveness survey,* Ernst and Young (2015).

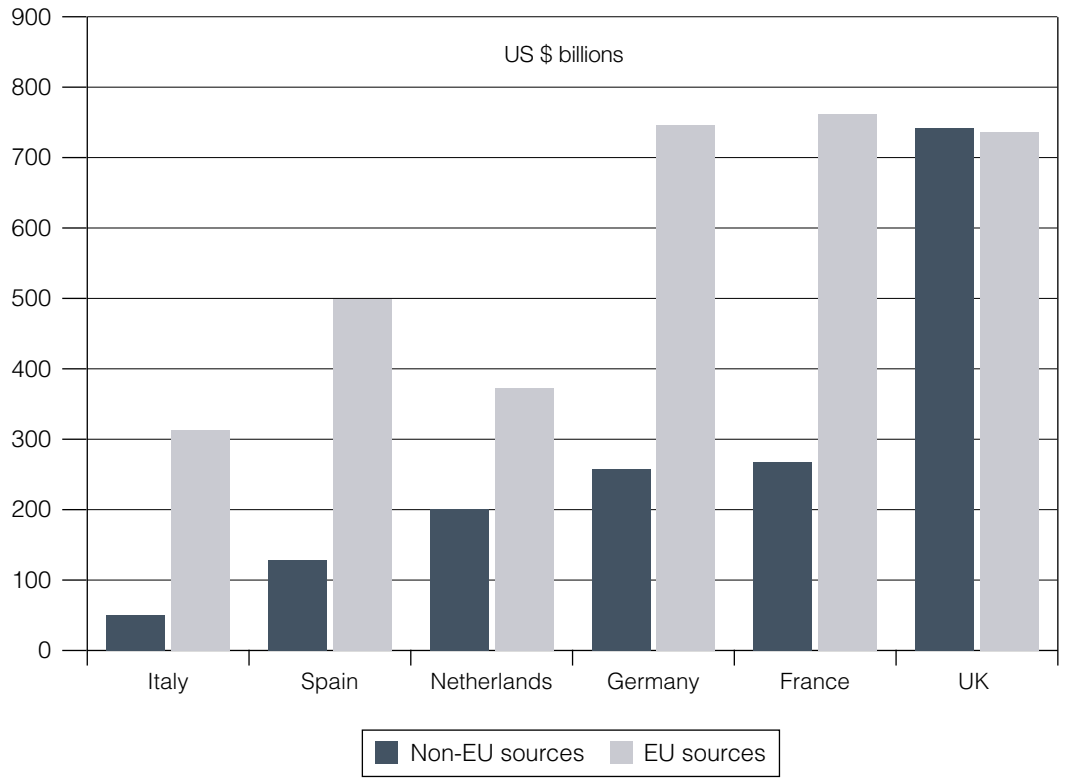
102 *BMD3*, OECD (2013).

103 Ibid.

1.68 While greater financial openness has delivered benefits from increased investment, it also means that developments in the rest of the world, along with investor perceptions of prospects for the UK economy, have become more important influences on UK macroeconomic outcomes. Events such as the financial crisis of 2008 and 2009 illustrate that external developments can have a profound impact on UK economic outcomes.

1.69 The UK's current account deficit means it is also a net borrower from the rest of the world. In turn, this implies the UK is exposed to changes in the perceived riskiness of lending to the UK. This exposure has been noted by the Governor of the Bank of England, who has said "the possibility of a risk premium being attached to UK assets because of certain developments exists, and that plays into the riskiness of the situation".[104] In other words, if concerns about lending to the UK increase, investors will require a return – or premium – for bearing that risk, making it more expensive for the UK to fund its current account deficit.

Chart 1.D: Inward FDI stock in top 6 EU destinations (2012)



Source: United Nations Conference on Trade and Development

[104] Mark Carney, Governor of the Bank of England, Evidence to the Treasury Select Committee on the Financial Stability Report (26 January 2016).

1.70 As summarised in Annex A, external studies have assessed the impact of EU membership on FDI flows. This is part of a wider literature that empirically assesses the drivers of FDI.[105] For example, studies that directly assess the EU's impact on FDI flows include:

- Daude et al (2003) find evidence that FDI within a Regional Integration Agreement – such as FTAs or expanded EU membership – increases by around 27%[106]
- Clausing and Dorobantu (2005) and Beven and Estrin (2004) both find evidence that key announcements around EU accession had a positive impact on FDI in applicant countries[107,108]
- Fournier (2015) finds reducing regulatory differences by 20% increases FDI flows by 15%, and that there is some evidence that belonging to the EU Single Market can have an additional positive effect on FDI[109]
- A recent study by the London School of Economics (LSE) Centre for Economic Performance (CEP) finds that, controlling for many other factors, FDI to the UK would be about 22% lower following the UK leaving the EU[110]

1.71 The HM Treasury analysis in this document is consistent with the results in these papers.[111]

1.72 Since the total stock of FDI into the UK is higher than for other EU countries, it is likely that the UK has benefitted by more than the average estimates in these studies. Overall, the evidence is clear that EU membership has also made the UK an attractive place to invest and one of the top destinations for FDI globally.

Impact of the EU on UK openness and living standards

1.73 There is an important relationship between openness, trade and investment in increasing productivity growth. Higher productivity in turn leads to economic prosperity and rising living standards (see Chart 1.E). The government's long-term economic plan continues the reforms needed so the UK economy is fit for the future.

105 For example, *Determinants of foreign direct investment,* Blonigen and Piger (2014).

106 *Regional Integration and the Location of FDI*, Daude, Levy-Yeyati and Stein (2003).

107 *Re-entering Europe: Does European Union candidacy boost foreign direct investment?*, Clausing and Dorobantu (2005).

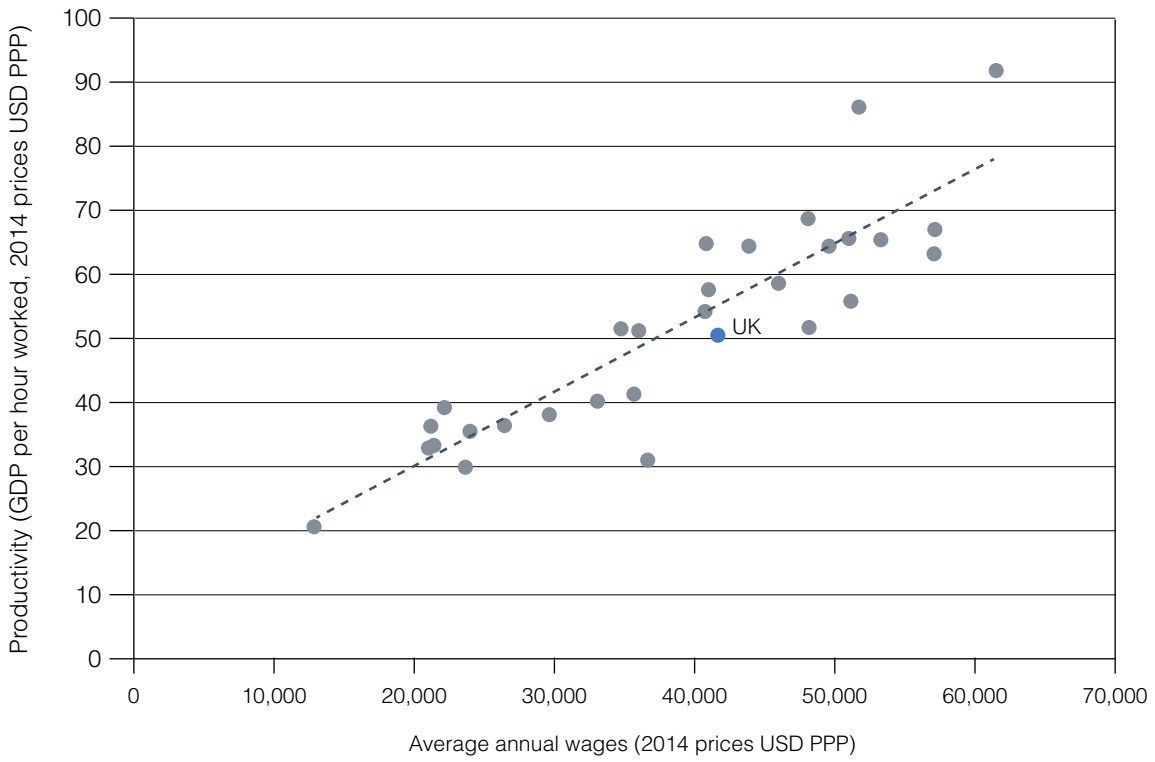
108 *The determinants of foreign direct investment into European transition economies*, Bevan and Estrin (2004).

109 *The negative effect of regulatory divergence on foreign direct investment,* Fournier, OECD Working Paper No. 1268 (2015).

110 *The impact of Brexit on foreign investment in the UK,* Dhingra et al (2016).

111 Bank of England (2015).

Chart 1.E: Productivity and Wages for OECD countries (2014)



Source: Organisation for Economic Co-operation and Development

1.74 The Bank of England analysis of EU membership concluded that "to the extent it increases economic and financial openness, EU membership reinforces the dynamism of the UK economy".[112] Box 1.G summarises the Bank's analysis. The evidence of the impact of the Single Market on trade and investment set out in this section shows that the EU has played an important part in increasing the openness of the UK economy.[113]

Box 1.G: EU membership and the Bank of England

In October 2015, the Bank of England published analysis focusing on how membership of the EU affects its ability to meet its statutory objectives related to price and financial stability.

The paper finds that the UK has become a much more open economy over the past 40 years, noting that "the evidence very strongly suggests that the increase in trade openness of the UK associated with EU membership has been greater than the global economic trend".

It goes on to argue that increased openness has increased economic "dynamism" in the UK. The increase in dynamism is thought to come from 3 channels: an increase in innovation and the adoption of technology; the growth of successful firms relative to less successful firms, through increased scale and specialisation; and the better matching of inputs across countries.

112 *EU membership and the Bank of England,* Bank of England (2015).

113 *The growth effects of EU membership for the UK: a review of the evidence,* Crafts (2016).

1.75 The evidence is clear that trade with the EU and FDI into the UK has grown faster than it would have done if the UK had not been a member. This increase in openness has allowed the UK to increase productivity and raise living standards. As set out in Annex A, a range of external studies demonstrates a direct impact from increased openness on productivity, although estimates differ on the magnitude of the effect.[114] For example:

- Frankel and Rose (2000) estimate that a 1 percentage point increase in the trade to GDP ratio increases GDP per capita by 0.17% to 0.33%[115]
- Helpman et al (2004) identify a 15% labour productivity advantage for multinational firms (i.e. foreign owned) over domestic firms,[116] while Griffith et al (2004) suggest the advantage is even higher for services firms, at 25%[117]
- Feyrer (2009) uses the relative cost of transporting goods via air following changes in transportation technology as a proxy for trade costs, estimating that a 1% increase in the growth rate of exports is associated with a 0.5% to 0.75% increase in the growth rate of GDP per capita[118]
- Feyrer (2011) uses a natural experiment, estimating the impact of a shock to world trade (the closure of the Suez Canal) and estimate that a 1% increase in trade volumes increases GDP per capita by between 0.15 and 0.25[119]

1.76 The HM Treasury analysis in this document reflects the results in these papers.[120]

1.77 Access to the Single Market is the core of the UK's EU membership. EU membership has reduced the costs of trading with the EU and has significantly increased trade between the UK and the rest of the EU. EU membership has also promoted trade with the rest of the world. There is strong evidence that UK trade and investment has been higher as a result of this access to the Single Market. This has increased productivity in the UK. Higher productivity means better quality jobs, and higher real wages and household incomes.

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114 For example, a review by Cline (2004) concludes: "the uniformly positive estimates suggest that the relevant terms of the debate by now should be about the size of the positive influence of openness on growth, and probably also about how trade policy is related to observed openness, rather than about whether increased levels of trade relative to GDP have a positive effect on productivity and growth".

115 *Estimating the effect of currency unions on trade and output*, Frankel and Rose (2000).

116 *Export Versus FDI with Heterogeneous Firms*, Helpman, & Melitz, and Yeaple (2004).

117 *Foreign Ownership and Productivity: New Evidence from the Service Sector and the R&D Lab*, Griffith, Redding, and Simpson (2004).

118 *Trade and Income: Exploiting time series in geography*, Feyrer (2009).

119 *Distance, Trade, and Income – The 1967 to 1975 Closing of the Suez Canal as a Natural Experiment*, Feyrer (2011).

120 Discussed in more detail in Section 3 and Annex A.

Part 3: Obligations and influence

- EU membership involves economic obligations, including accepting the regulatory framework necessary to the functioning of the Single Market. The UK has made improving the regulatory framework a consistent priority. The overall costs of specific EU regulations are outweighed by the benefits from reduced regulatory barriers associated with the Single Market. It is worth noting that the country with the least restrictive regulatory regime of any advanced economy, the Netherlands, is also a member of the EU – demonstrating the two are not incompatible.
- EU membership also entails contributing to the EU budget. Again the UK has made controlling the cost of the budget a consistent priority. For every £1 paid in tax, a little over 1p goes to the EU.

Regulatory framework

1.78 A common regulatory framework is necessary in order to reduce non-tariff barriers to trade within the EU and ensure businesses do not face multiple sets of standards and rules in order to access markets.

1.79 The Single Market's regulatory framework achieves its reductions in trade barriers either through 'mutual recognition' – where EU countries recognise a regulation or a standard from another EU member as equivalent to their own, or 'harmonisation' – where common regulation is agreed across the EU.[121] For both approaches, the EU applies the 'subsidiarity' and 'proportionality' principles.[122]

1.80 The EU General Product Safety Directive is an example of mutual recognition, whereby once a product meets the requirements in one member state, it can be supplied across the Single Market.[123] The EU Approval of Motor Vehicles Directive is an example of harmonisation.[124] This regulation requires the manufacturers of all new cars sold in the EU to comply with standard testing procedures. As a result, consumers across the EU can have confidence in the safety standards of vehicles produced anywhere in the EU and exporters benefit from reduced administrative costs from not needing to comply with different sets of regulations in each country.

1.81 The removal of non-tariff barriers to trade through the Single Market regulatory regime is complemented by wider policy, such as binding commitments on competition policy and guaranteed market access. For example, within the EU's competition policy, the state aid framework prevents distortions to the level playing field that might arise through government subsidies, ensuring UK firms can compete on a fair basis with firms from other member states. Box 1.H sets out the impact of the state aid framework.

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121 For a discussion on mutual recognition and harmonisation see: *Review of the Balance of Competences between the United Kingdom and the European Union: The Single Market*, HM Government (July 2013).

122 There are 2 key principles that guide EU regulation: first 'subsidiarity', which means that the EU may legislate only where the objective of the action cannot be sufficiently achieved at the member state level; and second, 'proportionality', which means that it is no more than necessary to attain the agreed objectives. Both these principles are set out in the EU Treaties (primary EU law). EU Regulations, Directives and other EU legal acts (secondary EU law) provide the mechanism through which specific policies are implemented.

123 Directive 2001/95/EC.

124 Directive 2007/46/EC.

Box 1.H: State aid framework

State aid is any advantage granted by public authorities through state resources on a selective basis to any organisations that could potentially distort competition and affect trade.

The EU's rules on state aid are a subset of the competition rules. A unified set of competition rules ensures that markets function properly – for example, to prevent mergers that may harm competition – which are enforced evenly and independently across the EU. These rules apply whenever a competition issue meets the criteria for consideration by the Commission. The rules apply to EU and non-EU firms in the same way.

The state aid rules aim to prevent market distortions as a result of government support. They can apply to a range of polices, for example, grants, loans, tax breaks or financial assistance. They support a level playing field between competing businesses. Since 2000, the Commission has ordered the recovery of illegal state aid in over 200 cases across all member states – of which 4 were UK measures – compared to 9 in Belgium, 20 in France, 50 in Germany, 41 in Italy, 9 in the Netherlands, and 27 in Spain.[125]

1.82 An effective common regulatory framework to remove trade barriers in the EU should mean businesses face fewer burdens. As discussed above, the removal of administrative costs associated with trade – like rules of origin – can have a substantial impact on trade flows. Properly designed, common rules mean that a firm in one member state is able to provide goods and services to consumers in another. This means a firm operating across the EU faces 1 set of rules rather than 28 different sets. For example, before the EU opened up markets in audiovisual and media services at the beginning of the 1990s, commercial broadcasters had to comply with a different set of broadcasting regulations in every EU country. Today, there are a set of common rules in the EU, covering areas like advertising and sponsorship. Once a broadcaster is licensed in one member state, it can operate in all. The UK alone broadcasts 650 channels into other EU member states.[126]

1.83 Such common rules can bring consumers real benefits where the balance of benefits and costs are positive through lower prices and greater choice. A number of examples are discussed in Box 1.I.

1.84 But sometimes common rules can place burdens on business and consumers. This is particularly where there is an inappropriate application of the 'subsidiarity' and 'proportionality' principles.

125 *Review of the Balance of Competences between the United Kingdom and the European Union: Competition and Consumer Policy Report*, HM Government (2014).

126 Ofcom internal analysis (2013).

Box 1.I: Industries where EU regulation has reduced burdens

Transport Services

The UK transport services industry:

- contributes £77 billion of UK GVA, 4.7% of total UK value added[127]
- employs 1.1 million people
- 44% of the sector's total exports goes to the EU

Transport services are a significant part of the economy and comprise the provision of transport, storage and distribution services, across air, maritime, road and rail modes, for individuals and freight. An efficient, sustainable, cost-effective transport sector is also vital for the functioning of the UK economy (and indeed the Single Market).

UK membership of the EU has helped shape the development of the sector, moving it towards a more open market while at the same time enabling the UK to benefit from pan-European economies of scale in areas such as the 'Single European Skies' initiative on air traffic control. This approach has reduced costs for existing providers who have benefitted from harmonisation of regulations and the removal of restrictive practices and, through deregulation, allowed new business models to come into the sector.

Specifically, the EU's aviation markets have been gradually liberalised through measures across air carrier licensing, market access and fares to create a Single Market.[128] This has allowed new entrants to operate in the EU, particularly low-cost airlines.[129] The number of intra-EU routes has more than doubled since 1993; while the number of European routes covered by more than 2 airlines has increased from 93 in 1992 to 482 in 2011.[130] Fares at the lower end of the market fell by 41% between 1992 and 2000.[131] The result has been lower fares and more rate choices for British travellers.

Telecommunications

The UK telecommunications industry:

- contributes over £28 billion of UK GVA, almost 2% of total UK value added[132]
- employs 218,000 people
- 46% of the sector's total exports goes to the EU

The EU's regulatory framework for electronic communications has played an important role in breaking down barriers in the telecommunications industry and providing a better deal for consumers. Regulation introduced in 2007 has enabled roaming charges on calls, SMS and data to be reduced, delivering savings of 75% to consumers, compared to 2007 prices.[133]

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127 *GDP(O) Low Level Aggregates*, ONS (March 2016).

128 See ec.europa.eu/transport/modes/air/index_en.htm for further information.

129 For example, in the *Review of the Balance of Competences between the United Kingdom and the European Union, Transport,* HM Government (February 2014), EasyJet noted that it is directly "a product of the EU's deregulation of Europe's aviation market".

130 *20 years of the single market,* EU Commission (2012).

131 *The Single Market: Yesterday and Tomorrow,* Canoy, Liddle, Smith, European Commission.

132 *GDP(O) Low Level Aggregates*, ONS (March 2016).

133 http://europa.eu/rapid/press-release_MEMO-12-316_en.htm

Agreement has been reached for roaming charges to be abolished by June 2017, saving UK customers up to 38p per minute on calls.[134]

Cosmetics

The UK cosmetics manufacturing industry:

- has an approximate GVA of £1 billion[135]
- employs 18,000 people[136]
- 62% of the sector's total exports goes to the EU[137]

The EU 'Cosmetics Regulation' prohibits dangerous substances and harmonises requirements for common safety assessments and labelling.[138] The regulation ensures the highest level of consumer safety while promoting the competitiveness of the cosmetics sector through a common set of rules which reduce burdens on manufacturers.

Assessing the economic impact of EU regulation on the UK

1.85 The UK has a very competitive regulatory framework, and international benchmarks place the UK's regulatory environment among the best performing advanced economies.

1.86 Evidence from the OECD on product market regulation shows that the UK has the least restrictive regulatory regime in the G7 and is second only to the Netherlands across the OECD (see Chart 1.F). An examination of the OECD's underlying indicators shows that the UK has low levels of regulation across most measures. The UK is ranked sixth in the world by the World Bank's Doing Business Index, above the US, and has been second in the EU for the past 5 years.[139]

1.87 Similarly, every year the World Economic Forum (WEF) surveys business people about their views on the competitiveness of different economies in a global competitiveness index. The UK is ranked tenth out of 140 countries, above the OECD and global averages across nearly all criteria.[140] This is shown in Chart 1.G. In the WEF's latest survey the key differentiating factor between the US (ranked third overall) and the UK (ranked tenth) was the US's greater market size, rather than the efficiency of goods and labour markets, in which regulation plays a bigger role.

134 The £0.38 estimate is calculated from the cap for outgoing voice calls in the period July 2009 to June 2010. The maximum price allowed was €0.43. This is converted into sterling by the average exchange rate between the 2 currencies as published in the Journal of the European Union in April, May and June 2009, with an average exchange rate of 0.88312. From 15 June 2017 there will be no extra roaming fees and calls made in EU countries will be the same as the domestic price. https://ec.europa.eu/digital-single-market/en/roaming-tariffs

135 *Annual Business Survey*, ONS (2014). SIC 20.42. ONS Low Level Aggregates do not provide this level of detail

136 *Annual Business Survey*, ONS (2014). SIC 20.42. The latest CPTA (cosmetics manufacturers) Report says that in the UK the professional beauty industry employs nearly 250,000 people in more than 55,000 different businesses. http://www.ctpa.org.uk/annualreport/2014/files/assets/common/downloads/CTPA%20Annual%20Report%202014.pdf

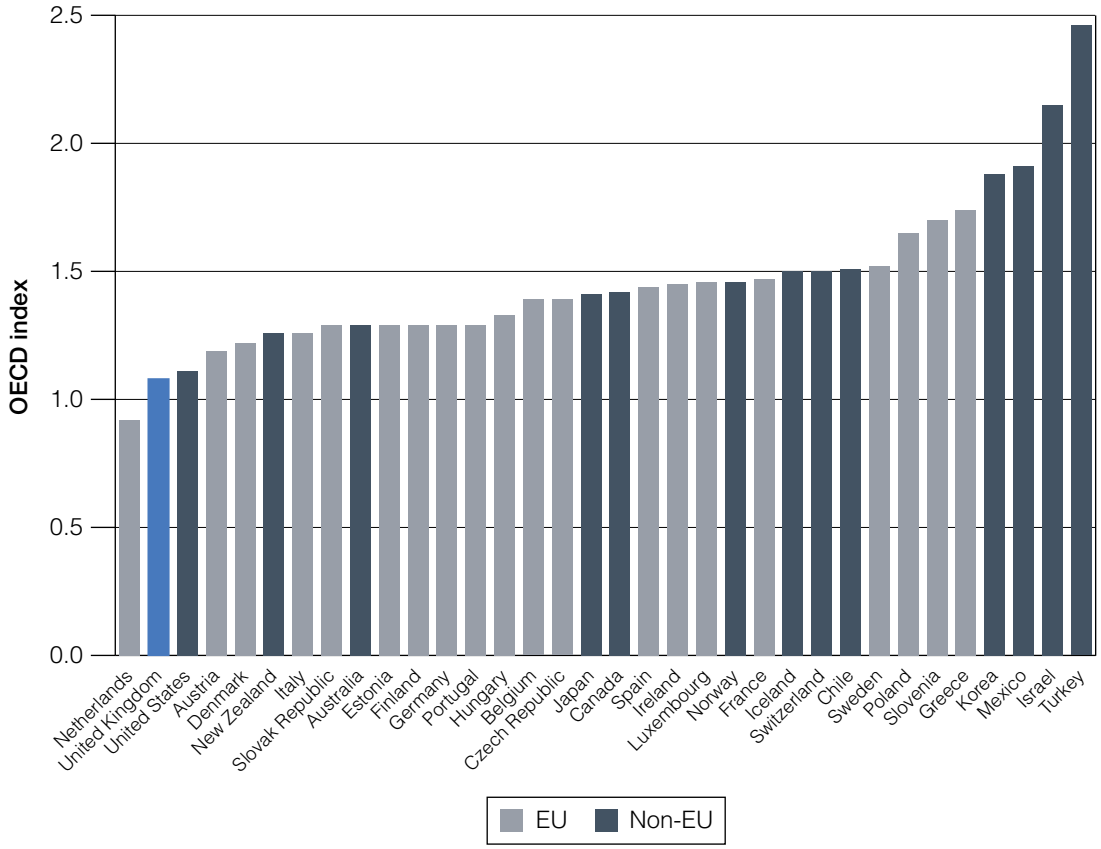
137 HMRC Overseas Trade Statistics SITC 553 and 554.

138 Regulation 1223/2009.

139 *Doing business ranking*, World Bank, 2012 to 2016.

140 *The Global Competitiveness Report 2015-16*, World Economic Forum (2015).

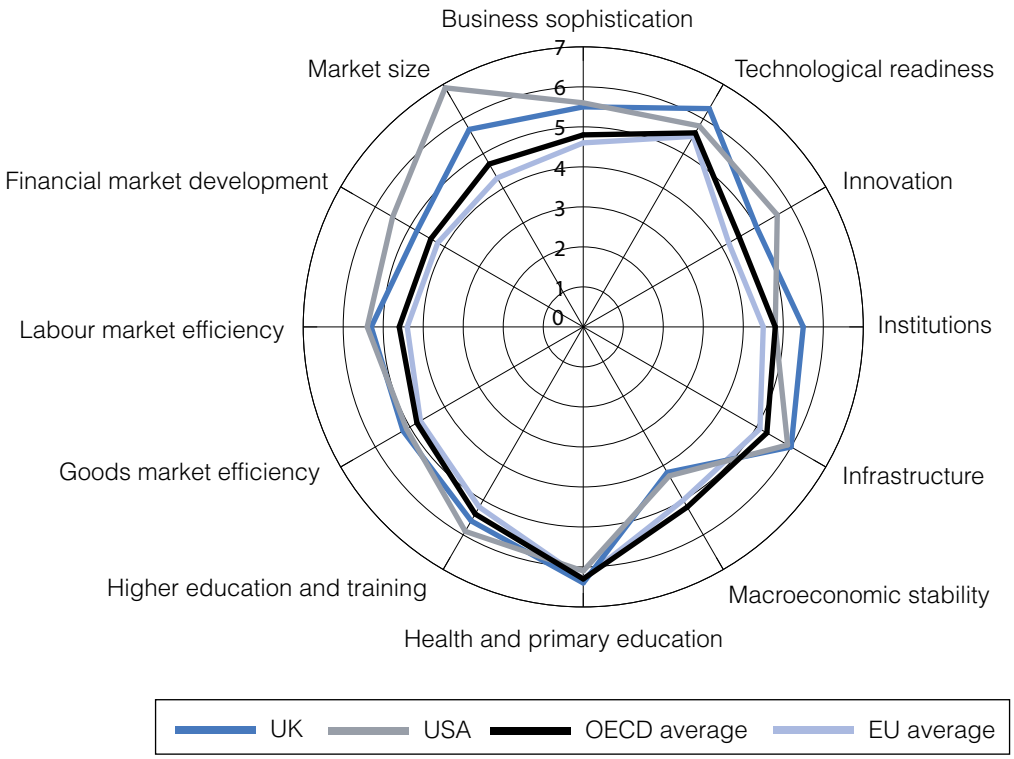
Chart 1.F: OECD Product Market Regulation Index (2013)[141]



Source: Organisation for Economic Co-operation and Development

[141] The OECD's measure of product market regulation (PMR) assesses the degree to which (regulatory) policies promote or inhibit competition in product markets. The scale is from 0-6 (least to most restrictive). Data for US is for 2008 (2013 unavailable).

Chart 1.G: World Economic Forum Competitiveness Index (2015-16)



Source: World Economic Forum

1.88 The evidence shows that the EU is reducing over-regulation across its members. An average of the OECD's product market regulation index for EU counties has fallen from 2.1 in 1998 to 1.3 in 2013.[142] Even so it remains a key aim of the UK government to ensure all regulations are proportionate and fit for purpose.

1.89 The UK government has made minimising the impact of regulation – whether EU or UK – a consistent priority, particularly for small and medium-sized enterprises (SMEs). This was reflected in the government's renegotiation strategy ahead of the agreement of the UK's new settlement with the EU. This is covered in more detail in Part 4 of this Section.

1.90 Any assessment of the impact of EU regulation on the UK needs to take into account any costs associated with regulations alongside the benefits of increased market access. It is also important to assess what would happen in the absence of this regulation, for example what other existing regulation may apply, or if alternative new regulation would be needed.

1.91 The Governor of the Bank of England has highlighted that "producing such an assessment would not be straightforward since it requires a comparison to the counterfactual regulatory framework if the UK were outside of the EU".[143]

142 The averages are calculated using data from the OECD product market regulation index for countries that were EU members in 1998 and are simple averages. The 1998 average excludes Luxembourg due to a lack of data.

143 Letter from Mark Carney (Governor, Bank of England) to Andrew Tyrie (Chair, Treasury Select Committee), 7 March 2016.

1.92 Notwithstanding this, a number of studies have attempted to quantify the impact of EU regulation on the UK.[144] These studies tackle the challenges in this area in different ways, and, as a result, there are a large range of estimates. Many external studies focus primarily on the costs of EU regulation, without full attention to the benefits.

1.93 The LSE's Centre for Economic Performance has noted: "It is unclear whether there are substantial regulatory benefits from Brexit. The UK already has one of the OECD's least regulated product and labour markets. 'Big ticket' savings are supposedly from abolition of the Renewable Energy Strategy and the Working Time Directive (WTD)[145] – both of which receive considerable domestic political support in the UK".[146]

1.94 In practice any potential gains in specific areas from additional regulatory flexibility on leaving the EU are likely to be significantly constrained for 4 reasons.

1.95 First, the interaction between EU regulation and domestic priorities. As set out above, overall the Single Market regulatory framework is necessary to its functioning and the benefits the UK gets from it, with many specific regulations delivering important benefits to businesses and consumers. The UK has been successful in shaping the framework to this effect. However, given regulation reflects a compromise between member states, there are inevitably areas where the UK might take a different approach if it had complete flexibility. This includes areas of social policy, such as some aspects of the WTD. In such instances, the UK has used its influence to maximise domestic flexibility, including securing an opt-out from critical elements of the WTD. Equally, there are areas where the UK has gone beyond the minimum set by EU standards, for example, on parental and paid leave. Overall, given that the UK already has the second least restrictive regulatory regime among all advanced economies, the scope for further significant deregulation without impacting on domestic priorities, including the rights and interests of consumers, employees or the environment must therefore be limited.

1.96 Second, the interaction between EU regulation and international standards which the UK would still need to adhere to in the event of leaving the EU. International agreements are particularly relevant in terms of environmental and some aspects of financial regulation. For example, the National Emission Ceilings Directive[147] implements the United Nations Economic Commission for Europe's Gothenburg Protocol, to which the UK is a signatory in its own right. Therefore, the UK would still be bound by the protocol if it were no longer part of the EU. In financial regulation, the EU Capital Requirements Directive IV[148] package implements the international Basel III reforms agreed in the wake of the financial crisis. While the enhanced capital and liquidity requirements increase costs for large banks, the UK is part of an international agreement on which they are based, regardless of EU membership. In setting global regulatory standards, being part of the EU maximises the UK's influence in negotiations, meaning that agreements are more likely to work well for UK businesses.

1.97 Third, as discussed in Section 2, should the UK wish to have some continuing access to the EU market on leaving the EU, it would in any case be required to accept the regulatory framework relevant to that access, but have no influence over it.

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144 Studies have been produced by Open Europe (2015); PwC, Report for the CBI (2016); Oxford Economics (2016); British Chambers of Commerce (2010); Minford et al, in association with the Institute of Economic Affairs (2005 and 2016).

145 Directive 2003/88/EC.

146 *The consequences of Brexit for UK trade and living standards*, Dhingra, Ottaviano, Sampson and Van Reenen, Centre for Economic Performance, LSE (2016).

147 Directive 2001/81/EC.

148 Directive 2013/36/EU and Regulation (EU) No 575/2013.

1.98 Finally, any assessment of potential gains from specific areas arising from increased flexibility on leaving the EU would need to be balanced with an assessment of the impact associated with reduced access for exporters and importers into and from the EU.

1.99 Overall, if the UK left the EU, any gains from increased flexibility in specific areas would be significantly outweighed by the losses from increased regulatory barriers to trade from losing access to the Single Market.

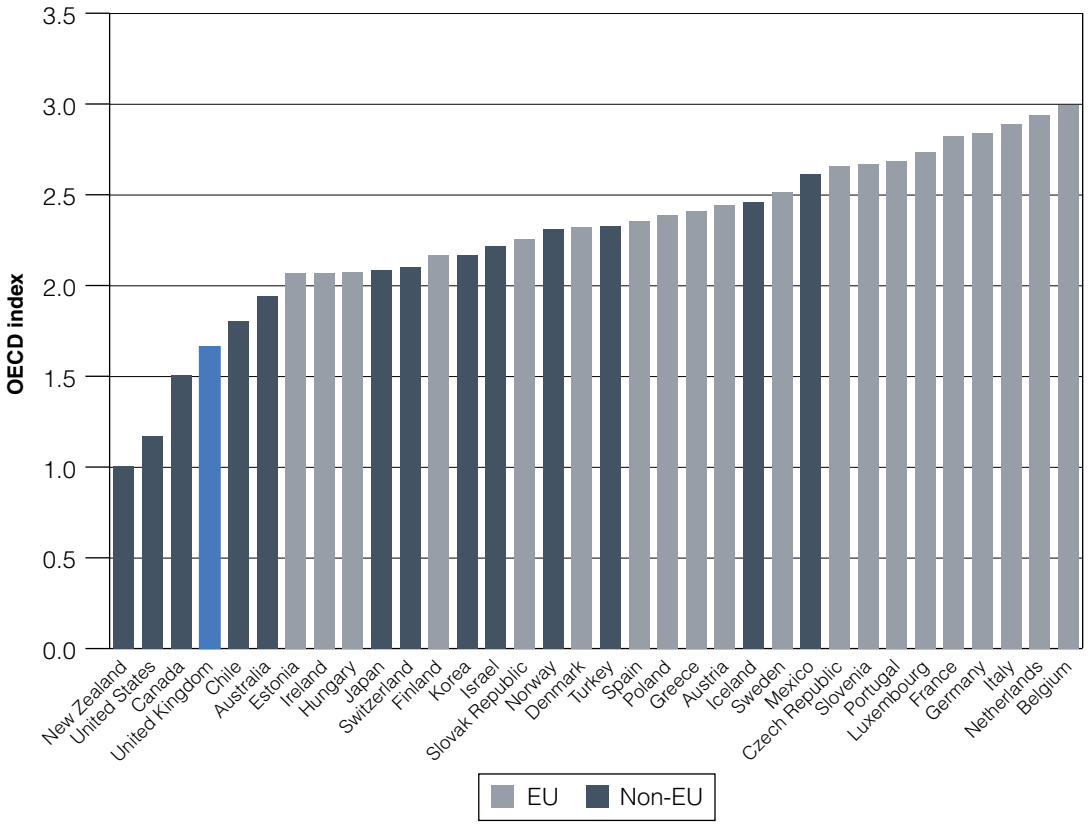
Labour market and mobility

1.100 EU member states have considerable freedom in setting domestic labour market regulation.

1.101 The UK's principled position is that social policy should primarily be a national responsibility, and it has used its influence as an EU member to reduce the impact of EU labour market regulation on the UK. The UK has consistently argued for a strong application of the subsidiarity principle, which allows individual member states to set their own regulations, with respect to EU labour market policy.

1.102 The UK has one of the most competitive employment legislation regimes in the OECD. The development of an internationally competitive regulatory environment in the UK is consistent with EU membership. In contrast, some other EU member states have much more restrictive employment protection legislation (Chart 1.H). This variation is largely due to differences in domestic labour market institutions.

Chart 1.H: OECD Employment Legislation Index (2013)[149]



Source: The OECD's indicators for employment protection legislation used here assesses the strictness of employment protection for permanent workers against individual and collective dismissals. The scale is from 0 to 6 (least to most restrictive).

1.103 The UK's flexible labour market has helped lessen the fall in the employment rate during the Great Recession (see Chart 1.I). The UK's employment rate reached a record high in 2015 Q3, much higher than the average across OECD countries and the EU.[150]

1.104 This outperformance – both compared to previous recessions and other advanced economies – has occurred in the context of EU membership.

1.105 The UK has a particularly strong record for job creation in SMEs which account for 60% of all private sector employment.[151] Furthermore, the nature of work has also changed significantly. Since 2010, 86% of the increase in employment has been from high or medium

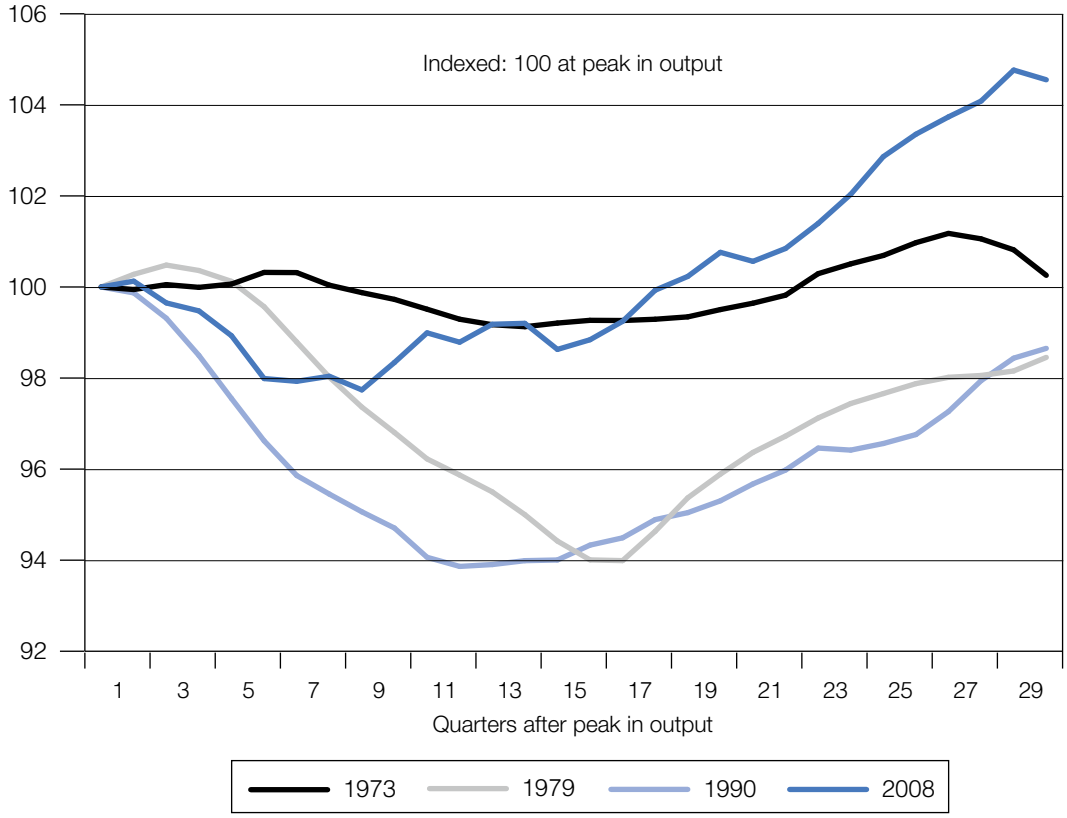
149 The OECD's indicators for employment protection legislation used here assess the strictness of employment protection for permanent workers against individual and collective dismissals. Subsequent to this release a minor update to the methodology was made and has been used to produce the results in Box 1.J.

150 The UK employment rate was 72.7% in 2015 Q3, compared with an average OECD employment rate of 66.3% and an EU employment rate of 65.7%. Sources: ONS: Labour Market Statistics (March 2016) and OECD stats database.

151 *Business Population Estimates for the UK and Regions*, Department for Business, Innovation & Skills (2015).

skilled occupations, particularly in the service sector.[152] Over time, this should support a rebalancing of the overall skill mix of the workforce towards higher skilled jobs, leading to an increase in overall labour productivity. Leaving the EU could affect the progress the UK is making to rebalance the workforce in favour of higher quality jobs, potentially undermining the competitiveness and productivity of the UK's workforce in the long run. Some regions and sectors could be more heavily affected by this than others.

Chart 1.I: Employment level through recessions and recoveries



Source: ONS and HM Treasury

1.106 As an open economy, a significant proportion of this employment in the UK is in sectors that export to other parts of the world, including the EU. Box 1.J sets out that an estimated 3.3 million UK jobs are related to exports to the EU.

[152] UK Labour Market: March 2016, Table EMP08, ONS, where high and medium skilled occupations are defined as Managers, directors & senior officials; Professional occupations; Associate professional & technical; Administrative & secretarial; Skilled trades and Caring, leisure & other services. Calculated as a proportion of all those in employment who have stated their occupation.

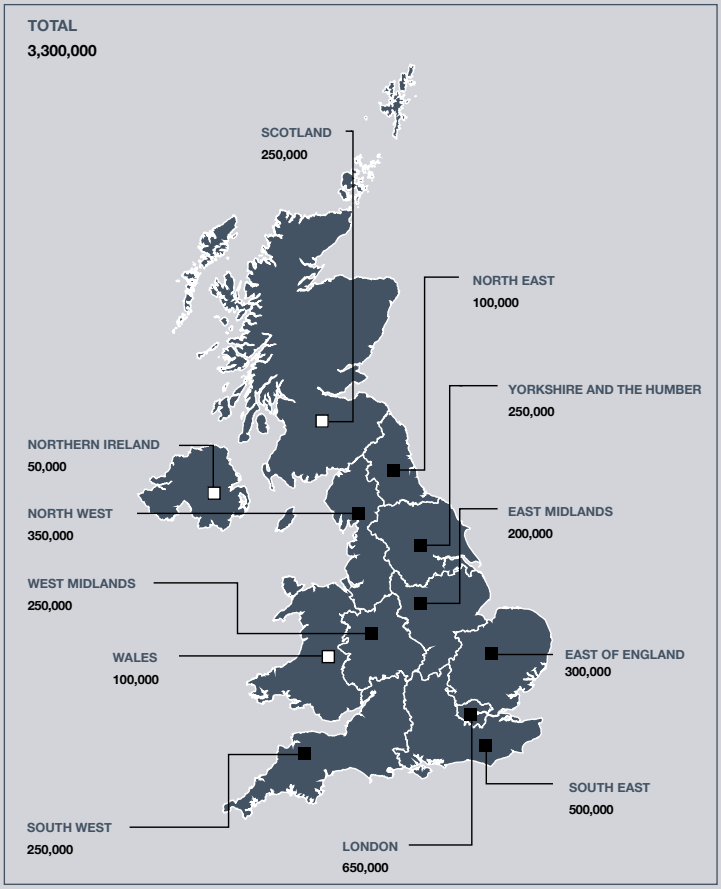
Box 1.J: Estimating the number of UK jobs related to exports to the EU[153]

Analysis by HM Treasury estimates that around 3.3 million jobs, out of a total of 33.8 million across the United Kingdom, are linked to exports from the UK to other EU countries. The analysis also estimates how many jobs in each region are linked to exports to the EU, and how many jobs are linked to exports from each sector of the economy.

The UK estimate is calculated as the sum of direct jobs – ones that are directly involved in exporting – and indirect jobs – those relating to the indirect demand generated in the wider economy as a result of export activities.

Sector	Number of jobs related to EU exports from sector (rounded to nearest 50,000)
Manufacturing	1,050,000
Other production	150,000
Services	2,050,000
Total[154]	3,300,000

The regional breakdown reflects the industrial variation between regions. The results are rounded to the nearest 50,000.



153 Source: *Number of regional jobs linked to EU exports*, HM Treasury (2016). Subsequent to this release a minor improvement to the methodology was made and the results are adopted in Box 1.J.

154 Numbers may not sum due to rounding.

1.107 Alongside the free movement of goods, services and capital, the free movement of people is part of the Single Market. The free movement of workers across the EU allows UK nationals to live and work in the EU. Free movement of people is particularly complementary to the Single Market in services – a significant proportion of services trade requires people to cross a national border to undertake the transaction, often only temporarily.

1.108 There are approximately 1.2 million individuals born in the UK living in EU countries.[155] There are also around 3 million people born in another member state living in the UK, 500,000 of whom are Irish.

1.109 According to the OECD and the Migration Advisory Committee (MAC),[156] higher levels of net migration will, all else being equal, increase the growth rate of the potential labour supply and therefore the rate of growth of overall GDP.[157] GDP per capita is affected by the extent to which the average EU migrant has a higher or lower income and employment rate than the average resident.

1.110 In terms of the impact of migration on productivity, the Bank of England suggests that "EU workers may have filled skill gaps or specialised in different tasks".[158] They cite research by Rolfe et al (2013) which found that employers in the pharmaceuticals, IT, banking and universities sectors recruited from outside the UK in order to fill skills gaps that exist in the resident population, to recruit high skilled individuals who are in short supply globally and to complement the skills of non-migrants.[159] While productivity gains can accrue to the migrant, the resident population may gain via any effects of skilled immigration on productivity. This may arise through specialisation of tasks, job creation in complementary tasks, and wider dynamic effects on the labour market.[160]

1.111 While in aggregate EU migration is likely to make a positive contribution to the UK's public finances, and so to the funding of public services, some migrants contribute more to the public finances than others.[161] When unskilled immigration is too high, its scale and speed puts pressure on public services and benefits, infrastructure and community cohesion. In particular, the UK's largely non-contributory working age welfare system is intended to support people who move off out-of-work benefits and into work. Because of the distinctive features of the UK welfare system and the current EU rules, an EU national who has not previously contributed in the UK was able to take a low-paid job here and immediately claim benefits at the same rate as a UK national.

1.112 At the February European Council, as part of the government's renegotiation, heads of state or government agreed in the International Law Decision that member states' welfare systems "are diversely structured and this may in itself attract workers to certain member

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155 *International migrant stock by destination and origin*, United Nations Global Migration Database, (2015).

156 The Migration Advisory Committee (MAC) is an independent body that advises the government on migration issues. It is responsible for providing transparent, independent and evidence-based advice to the government on migration issues.

157 *Migration Policy Debates: Is migration good for the economy?*OECD (2014) and *Analysis of the Impacts of Migration,* Migration Advisory Committee (MAC) (2012).

158 *EU membership and the Bank of England*, Bank of England (2015).

159 *Migration and productivity: employers' practices, public attitudes and statistical evidence*, Rolfe, Rienzo, Lalani, and Portes (2013).

160 *Migrants in Low Skilled Work*, MAC (2014).

161 Ibid.

states".[162] As set out in a recent government document, EEA migrants are a significant recipient of in-work benefits and this is putting pressure on the benefits system.[163] It establishes new powers to tackle the abuse of free movement and reduce the unnatural draw of the in-work benefits system. The UK's new settlement will enable the UK to have a new emergency brake to limit full access to in-work benefits by newly arrived EU workers for up to 4 years when they enter the labour market. This will be in force for 7 years. This will enable the UK to exert greater control over migration from the EU and take account of the 'pull factor' on income arising from the UK's benefits system.

Financial contributions to the EU

1.113 The other significant economic obligation associated with EU membership is contributions to the EU budget. The EU budget is worth around €140 billion per annum, or around 1% of the EU's GDP. It has a range of objectives, including fostering economic convergence between member states, supporting the EU's agricultural sector and meeting the EU's humanitarian aid commitments.

1.114 The overall framework for the budget, including the annual expenditure ceilings, is currently set every 7 years. The current framework was agreed in 2013 and runs from 2014 to 2020. The precise level of expenditure in any given year is agreed annually.

1.115 The UK is a net contributor to the budget. As set out in Table 1.B, the UK's net contribution has averaged around £7.1 billion per annum in recent years (2010-14). For every £1 paid in tax, a little over 1p goes to the EU. This takes into account both the UK's cash rebate and the money the UK receives from EU programmes.[164] The UK rebate, secured in 1984, is discussed in more detail in Box 1.K.

1.116 The UK receives funds from the EU budget, worth around £5.6 billion per annum in recent years. They go to recipients across the UK, including to farming communities, small businesses and universities. The majority of these receipts are administered by the UK public sector. The remaining portion is paid directly to recipients by the EU. Chart 1.J shows the expected split of UK receipts from the 2014-20 budget by sector.

Box 1.K: The UK's rebate

In the early 1980s, the UK was one of only very few net contributors to the EU budget. This was a consequence of its low share of receipts from the EU. As a result, the UK was awarded a permanent rebate, which reduces the size of the gross contribution that the UK makes to the EU each year. As a result, the UK does not pay its full theoretical gross contribution.

This correction is financed by other member states. Since 2010, the rebate has been worth on average £3.6 billion per year. Without the rebate, the UK's gross contribution would have been almost 30% higher.

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162 *A new settlement for the United Kingdom within the European Union: extract of the conclusions of the European Council of 18-19 February 2016*, Official Journal of the European Union (February 2016).

163 *The best of both worlds: the United Kingdom's special status in a reformed European Union,* HM Government (February 2016).

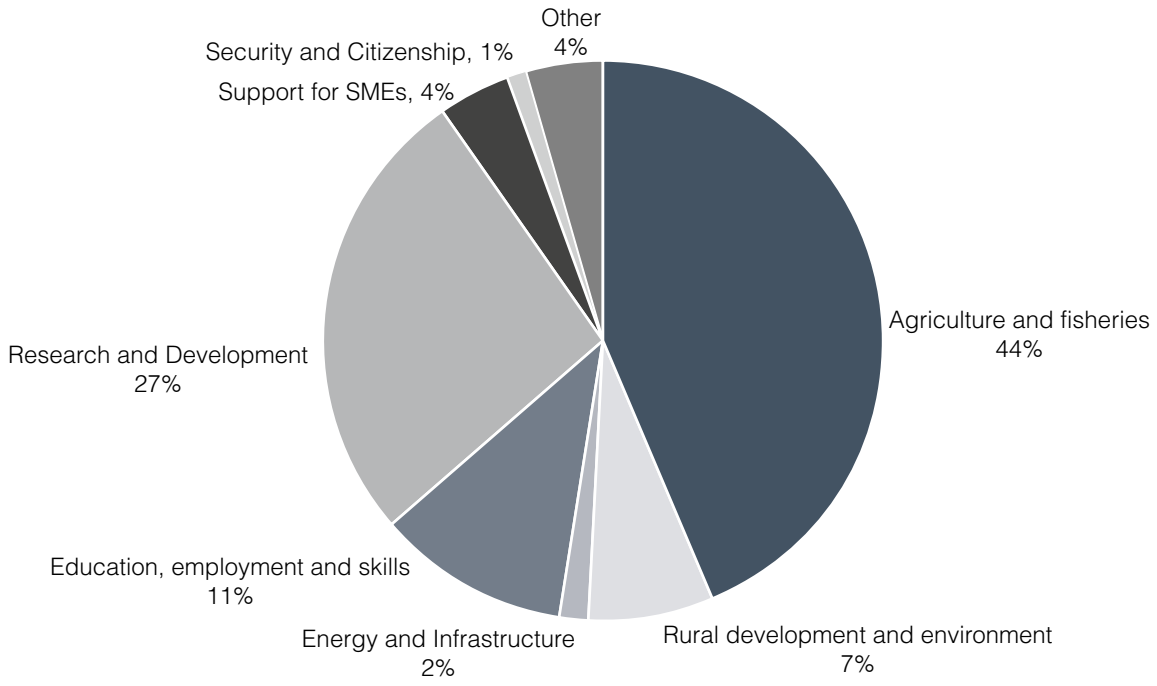
164 HM Treasury's approach to calculating the UK's contribution to the EU budget is set out in Annex B.

Table 1.B: Average UK payments to and receipts from the EU budget, 2010-14

	Sterling value
Theoretical UK gross contribution	£16.3 billion
UK rebate	- £3.6 billion
UK post-rebate gross contribution	**£12.7 billion**
UK receipts	**£5.6 billion**
of which administered by public sector	£4.3 billion
of which paid directly to UK recipients	£1.3 billion
UK net contribution	**£7.1 billion**

Source: European Commission and HM Treasury.

Chart 1.J: Expected UK receipts from the 2014-20 EU budget, split by sector



Source: European Commission and HM Treasury analysis.[165]

1.117 The distribution of EU receipts varies between different parts of the UK. Northern Ireland, Wales and Scotland receive a greater level of EU spending per head of population than England. Some regions within England attract significant levels of funding from particular EU programmes. For example, Cornwall and the Isles of Scilly have been allocated over €1,000 per head of population from Structural Funds alone across the current 7-year budget deal.[166]

1.118 As with other member states, the majority of the funding the UK receives is pre-allocated under the Common Agricultural Policy (CAP) and European Structural Funds programmes. While the CAP is focused on agriculture and rural development, Structural Funds cover projects across a range of different sectors relating to economic development. The UK decided that its 2014-20 Structural Funds allocation would focus on support for

165 This takes allocated and expected expenditure from the 2014-20 budget and splits by sector. The approach is explained further in Annex B.

166 Allocation for Cornwall and the Isles of Scilly available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/307492/bis-14-772-uk-allocations-eu-structural-funds-2014-2020-letter.pdf

innovation, SMEs, including boosting access to superfast broadband, and skills. In line with the government's wider commitment to devolution, local bodies play an important role in setting out how structural funds should be spent in local areas.

1.119 Many UK receipts cover research and development, providing an important source of funding for UK universities and research institutions, and are allocated through a competitive bidding process. As a world leader in these sectors, the UK has a strong track record at securing these funds – in recent years around 15% of such receipts from Horizon 2020, the EU's main research programme, have gone to the UK. British universities are the top 4 Higher Education recipients in the EU of Horizon 2020 funding to date.[167]

1.120 The UK meets its obligation to spend 0.7% of its national income on Official Development Assistance (ODA) in part via the EU's external spending. In 2014, around £800 million of the EU budget's ODA spending was attributed to the UK, representing around 7% of total UK ODA spending.[168] Contributing through the EU scales up the impact of UK ODA, as every pound of aid the UK spends through the EU institutions is matched by around £7 from other member states.[169] This aid is important in responding to global priorities. Since 2011, the EU has funded around £2 billion of overseas aid in response to the crisis in Syria.[170]

1.121 As part of the EU, the UK is also a member of the European Investments Bank (EIB), the largest multilateral lender in the world in terms of assets, which provides finance to projects across a range of sectors in EU member states. The UK's shareholding in the EIB is 16.11%. In 2015, EIB lending to the UK totalled a record €7.8 billion. As shown in Chart 1.K, the volume of EIB investment in the UK economy has more than doubled since 2012. Figure 1.D sets out recent EIB projects in the UK.

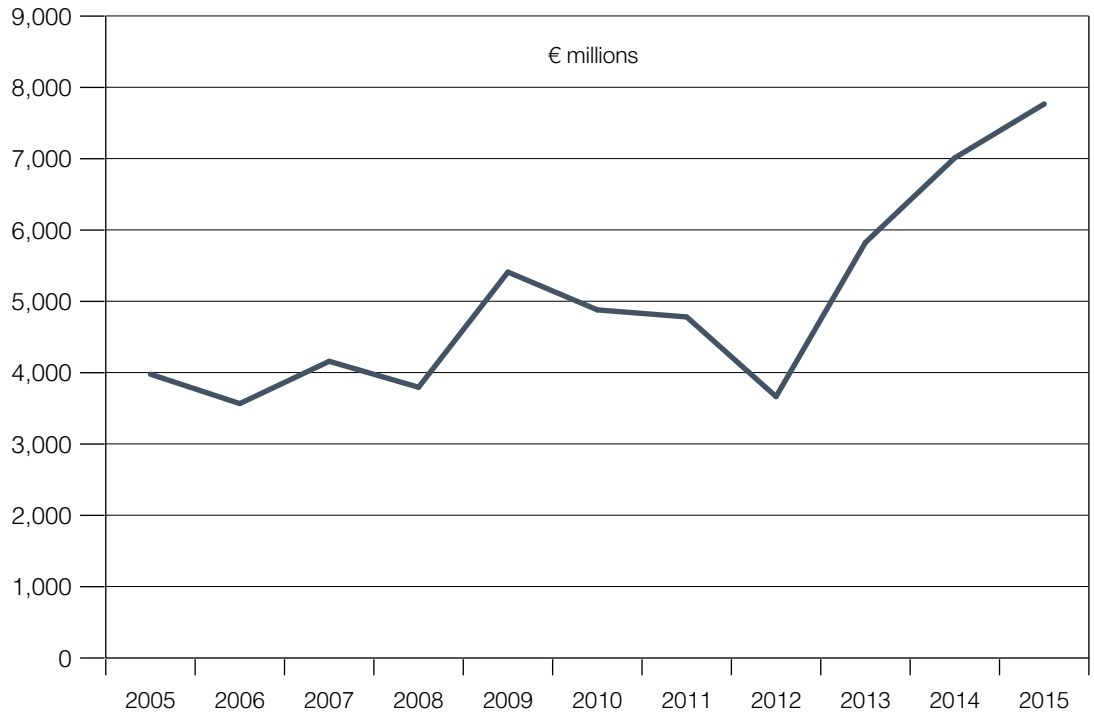
167 See tables 1.3 and 1.4 of *UK participation in Horizon 2020 and Framework Programme 7*, Department for Business Innovation and Skills (2016).

168 This relates to EU budget expenditure only. Including the separate European Development Fund, the contribution to UK ODA was around £1.1 billion in 2014. *Statistics on International Development,* Department for International Development (2015).

169 Comparing £1.1 billion UK-attributed EU ODA to total EU ODA imputed to member states, available at: http://europa.eu/rapid/attachment/MEMO-15-4748/en/2014%20ODA%20tables%20attachment.pdf

170 The European Commission confirmed EU spending on Syria since 2011 in the press release *EU support in response to the Syrian crisis* (2016), available at: http://europa.eu/rapid/press-release_MEMO-16-222_en.htm

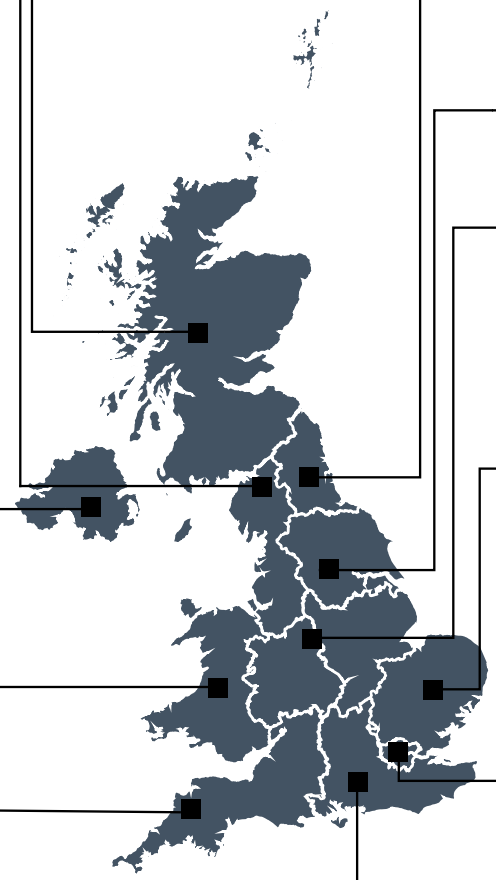
Chart 1.K: European Investment Bank funding in the UK (2005-2015)



Source: European Investment Bank[171]

[171] Data is for new loans signed in-year, https://www.gov.uk/government/news/new-figures-show-record-european-investment-bank-investment-in-uk-in-2015

Figure 1.D: Selected European Investment Bank investments in the UK, 2014-15[172]



NORTH WEST

- **£250 million** to **United Utilities** to support their infrastructure investment across the North-West region
- **£170 million** for a **new offshore wind farm** in the Irish Sea

SCOTLAND

- **£271 million** for a **new dual carriageway** around the City of Aberdeen
- **£200 million** to **Scottish Hydro Electric Transmission** to support their investments in renewable energy generation
- **£175 million** for **upgrades to the road links** between Edinburgh and Glasgow
- **£109 million** for the **construction of a new hospital** in Dumfries and Galloway

NORTH EAST

- **£235 million** to finance the deployment of **65 new express trains** for the East Coast Main Line.
- **£250 million** to **Northern Powergrid** to upgrade their electricity distribution infrastructure

NORTHERN IRELAND

- **£150 million** loan to support the **University of Ulster's** campus investment

YORKSHIRE & HUMBER

- **£152 million** for a new **household waste treatment facility**

MIDLANDS

- **£530 million** to support **Severn Trent's** infrastructure investment
- **£280 million** for **R&D at Rolls Royce's Derby** facilities
- **£258 million** for a new **transmission connection** between an offshore wind farm and the UK electricity network

EAST OF ENGLAND

- **£225 million** for a new **wind farm** off the Suffolk Coast
- **£120 million** to support **Johnson Matthey's** R&D into emission control technologies

WALES

- **£230 million** to help **Welsh Water** maintain and improve it services
- **£160 million** to help **Wales & West Utilities** upgrade its gas distribution network

LONDON

- **£1.48 billion** for improvements to the London transport network by **Transport for London**
- **£169 million** for investments in **urban infrastructure, social housing and energy efficiency**
- **£120 million** loan to support **University College London's** Campus investment
- **£140 million** loan to support **Imperial College London's** Campus investment

SOUTH WEST

- **£130 million** to **South West Water** to support their infrastructure investment across the South-West
- **£117 million** for **Airbus'** R&D activities

SOUTH EAST

- **£200 million** to support **Oxford University's** campus investment

INTERREGIONAL PROJECTS

- **£1.5 billion** for investment by the **National Grid** across its national electricity network
- **£400 million** for upgrades to **Scotia Gas Networks'** gas distribution network
- **£360 million** for the installation of more than **7 million smart meters** in homes across Great Britain
- **£350 million** for the construction of **new social housing** across the UK
- **£223 million** to help rebuild **over 25 schools** in poor condition
- **£200 million** to **Santander UK** for investment in renewable energy and energy efficiency projects
- **£190 million** for upgrades to **UK Power Networks'** power grids
- **£190 million** to support investment by **Arqiva** in a range of national infrastructure projects
- **£150 million** to upgrade **Northern Gas Networks'** gas distribution infrastructure
- **£150 million** to **Northumbrian Water** to support their infrastructure investment

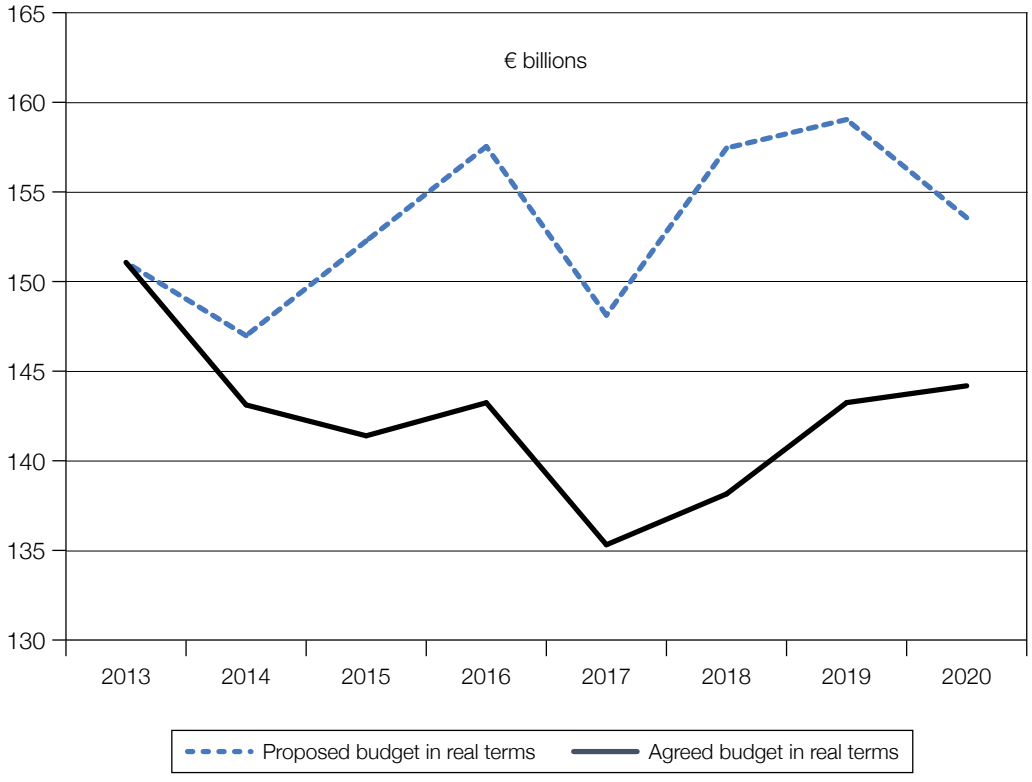
172 Top 35 EIB investments in the UK, 2014-15, by sterling signatures.

1.122 Last year, the European Fund for Strategic Investments (EFSI) was established to support investments across the EU. It uses an EU budget guarantee to enable the EIB to undertake additional lending. The UK was the second-largest beneficiary of EIB lending under EFSI at the end of the first calendar year of its operation, with UK projects receiving €972m of financing.

1.123 It has been a long-standing priority of the UK to control the size of the EU budget and secure better value from it for UK taxpayers. Reflecting this, in 2013 the UK secured the first ever real-terms cut to the 7-year budget.

1.124 The 2013 deal resulted in a downward shift in the trajectory of overall EU budget spending. The EU budget had been rising in real terms. The Commission's proposal for 2014-20 would have continued this upward trend. Instead, the final deal cut the budget in real terms, resulting in a budget that was €80 billion lower over the 7 year period than originally proposed by the Commission.[173] The size of the EU budget will fall to 0.89% of EU GDP by 2020, down from 1.06% at the end of the previous 7-year budget.

Chart 1.L: EU annual budget in real terms (2016 prices)



Source: HM Treasury analysis, based on European Commission, IMF and OBR.

173 Figure reached by comparing the size of the final budget deal with the original Commission proposal, *Laying down the multiannual financial framework for the years 2014-20*, European Commission (2012).

1.125 Within the smaller overall budget, the 2013 deal also redirected expenditure towards better value areas of the budget. The proportion of the budget spent on competitiveness, research, innovation and university funding has increased by over one third, and Horizon 2020's budget was almost 30% higher in real terms that its predecessor programme. At the same time, funding for the CAP over the current budget will fall by €55 billion in 2011 prices, or 13% compared to the previous 7-year budget period.

1.126 Notwithstanding this progress, the government remains commited to continuing to control the overall size of the EU budget and to focus on improving the effectiveness of how it is spent.

Influence arising from EU membership

1.127 The key impact of EU membership on the UK's influence is through the EU's own governance arrangements, set out in Part 1, which successive UK governments have supported as advancing UK interests. By participating fully in these institutions, the UK has significant influence over EU decision making that determines the shape of the Single Market and the rules associated with it:

- the UK has veto rights in the European Council when heads of state or government meet to take the most important decisions on the direction of the EU
- in the Council of Ministers, under weighted voting rules determined by population size, the UK has one of the three largest voting shares when legislation is decided, alongside Germany and France.[174] Individually the UK has over a tenth of the total votes. On crucial issues like tax, where decisions are taken by unanimity, the UK can use its veto when proposals are not in the UK's national interest
- in the European Parliament, the UK has 73 national members – the third highest of the 28 member states
- the UK has a Commissioner in the College of Commissioners which makes proposals for new EU rules – currently the Commissioner for Financial Stability, Financial Services and Capital Markets Union[175]
- the UK has a judge in the European Court of Justice and UK nationals are represented in the EU Institutions

1.128 Throughout its membership, the UK has used its participation and influence to maximise the benefits of openness in the Single Market and to pursue a proactive agenda of economic policy reform. When the UK joined the then European Economic Community in 1973, tariff-free trade between member states had been implemented and the customs union had been established. But in important respects the Single Market was undeveloped.

1.129 Following its accession, the UK was a driving force behind a period of economic liberalisation that culminated in the formal establishment of a Single Market with common rules between member states by the end of 1992.

1.130 Throughout the 1980s, the UK government worked together with partners from other member states to promote openness and trade liberalisation in Europe. In the European Parliament, UK MEPs and experts were among the leading voices for trade liberalisation;[176] in the Council of Ministers, UK ministers worked with their counterparts to support the removal of economic barriers between member states; and in the European Commission, the British Commissioner led proposals for producing nearly 300 separate recommendations to break down the remaining barriers to the free movement of goods, services, capital and people.[177] This formed the basis of the 1986 'Single European Act', the first major revision of the

174 http://www.consilium.europa.eu/en/council-eu/voting-system/voting-calculator/

175 See Box 1.N for further details on the Capital Markets Union.

176 For example, UK Conservative MEP Basil de Ferranti was a founding member and leader of the EP's "Kangaroo Group", promoting trade liberalisation, and British economist James Ball co-authored an influential paper for the EP highlighting the opportunity costs of the European Community's failure to establish a true Single Market.

177 For detail, see the commission White Paper, *Completing the Internal Market: White paper from the Commission to the European Council ((COM(85) 310)*, (June 1985).

European Treaties since the Treaty of Rome, and by the end of 1992, over nine tenths of Lord Cockfield's recommendations had been adopted.[178]

1.131 Since then the UK has continued to promote further reform to deepen the Single Market, particularly in relation to liberalisation of capital markets and services, and financial services, where the size of the UK's market and the level of expertise has given the government particular influence. The UK championed, for example, the introduction of the 'passporting' arrangements for financial service firms (see Box 1.D),[179] and promoted agreement on the 2006 'Services Directive'.

1.132 The UK has also played an active role in the establishment and design of EU-level strategies for the promotion of jobs and growth, including the 2000 Lisbon Strategy and the Europe 2020 Strategy, and retains influence over EU fiscal and macroeconomic policy debates through its participation in the European Semester.

1.133 In the wake of the financial crisis, the UK has also taken a lead in negotiating reforms to promote financial stability and protect taxpayers across the EU, and has been influential in arguing that post-crisis legislation should not create unnecessary barriers to global trade in financial services.

1.134 As outlined in Part 4, the UK continues to build on this long-standing agenda to drive the development of the Single Market and promote economic reform. This has been given fresh momentum by the UK's new settlement.

1.135 At the same time, the UK has also used its influence and access to EU institutions to protect the nation's broader economic interests within the EU. Some key examples include:

- using the UK's influence over reform of the European Treaties to preserve unanimity voting and national vetoes in sensitive policy areas, including tax, and foreign, security and defence policy, along with an opt-out from the euro
- using its position in the European Council to secure a rebate on UK contributions to the EU budget and, in 2013, the first ever real-terms cut to that budget
- using the UK's influence in the Council of Ministers to amend proposed EU legislation providing UK authorities with the flexibility they need to properly supervise its markets while ensuring full continued access to the Single Market
- using UK access to the European Court of Justice to challenge policies that threaten UK interests in the Single Market, such as the ECB's location policy

1.136 Finally, in the international economic policy sphere, the UK gains influence through its membership of the EU. It is an important way of influencing overall policy, for example helping the UK to drive united EU positions towards countries like Iran or Russia. It also helps strengthen international institutions. At the IMF, the UK has its own seat, with 4% of the vote. But, as part of the EU, the UK plays a leading role influencing the EU position, which represents nearly a third of the vote. In international standard-setting bodies such as Financial Stability Board and the Basel Committee, the weight that the UK exerts as a major economy and global financial centre is amplified by its ability to directly influence the rules and regulations of the world's largest free trade area.

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178 *The Single European Act,* Green Cowles (2012), in *The Oxford Handbook of the European Union*, Oxford University Press, pp107-120.

179 Such arrangements were first introduced to the banking sector through the introduction of the Second Banking Directive of 1993 and through subsequent legislation have spread to other financial service sectors.

Part 4: EU economic policy reform

- The Single Market has brought about significant benefits, but it is not yet complete.
- The new settlement for the UK includes an ambitious agenda of economic reform in the EU, including the next stage of development of the Single Market, alongside completing major ongoing trade deals and reducing the impact of EU regulation.

1.137 The UK's new settlement is supported by a European Council Declaration on Competitiveness and a European Commission Declaration on a subsidiarity implementation mechanism and a burden reduction implementation mechanism.[180] The European Council Declaration states that the EU recognises the need to act to "promote a climate of entrepreneurship and job creation, invest and equip our economies for the future, facilitate international trade, and make the Union a more attractive partner".[181] Specifically, EU member states and the Commission have made commitments to:

- focus on further extending the Single Market to help bring down the remaining barriers to trade within the EU, particularly in key areas like services, energy and digital
- pursue, with renewed commitment, FTAs with the world's most dynamic economies, so that the tariff and regulatory barriers faced by UK companies in large and growing non-EU markets are reduced or eliminated
- reduce the regulatory burden on businesses, particularly small businesses, with specific targets established in key sectors in line with the approach adopted in the UK

180 European Council conclusions (18-19 February 2016).

181 *European Council Declaration on Competitiveness*, Annex III to Conclusions of the February European Council (February 2016).

Box 1.L: Impact of EU membership on professional services

The UK professional services industry:

- contributes over £110 billion of UK GVA, 6.9% of the UK economy[182]
- employs almost 2 million people[183]
- 32% of the sector's total exports goes to the EU[184]

The professional services sector is comprised of a range of high value-added services industries, including: management consultancy, architecture, marketing, legal, accounting, engineering and other scientific and technical activities.

The UK professional services sector is internationally successful and includes many globally prominent companies. The sector makes the second highest contribution to the UK's large trade surplus in services with the EU, after the financial services sector.

If the UK was to leave the EU, the professional services industry would be worse off because of a reduction in access to the Single Market. An increase in non-tariff barriers would make trade in this sector more difficult.

The 'Services Directive' ensures that EU professional services firms can establish subsidiaries in other member states or trade across borders without facing discriminatory or unjustified barriers.[185] The Mutual Recognition of Professional Qualifications system means that a firm's employees can have their training and qualifications recognised throughout the EU, making this process easier in a way unparalleled outside the EU.[186] For example, these EU laws allow a UK architect to be recognised as qualified in other member states, and to provide their services across EU borders without the need to set up a subsidiary or requalify.

There would be substantial gains from further integration of services markets, and professional services in particular. As a first stage, a more ambitious implementation of the 'Services Directive' would remove a significant number of barriers to trade in the sector.

182 *GDP(O) low level aggregates*, current price Gross Value Added, SIC Sections 69 (legal and accounting activities), 70 (activities of head offices; management consultancy activities), 71 (architectural and engineering activities; technical testing and analysis), 73 (advertising and market research), 74 (other professional, scientific and technical activities), ONS (March 2016).

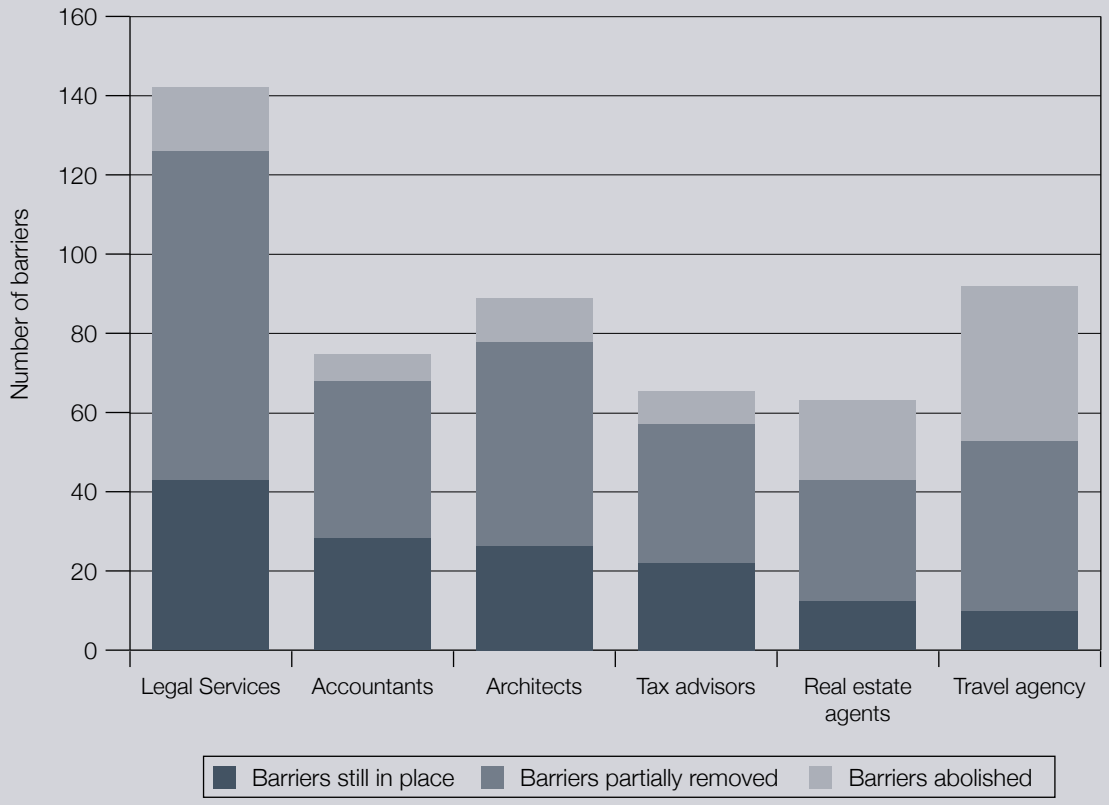
183 UK Non-Financial Business Economy (Annual Business Survey), Total employment average during the year, SIC sections as above (69, 70, 71, 73, 74) ONS (2014).

184 *United Kingdom Balance of Payments – The Pink Book*, ONS (2015).

185 Directive 2006/123/EC.

186 Directive 2005/36/EC and Directive 2013/55/EU.

Impact of EU membership on professional services



Source: Monteagudo et al 'The Economic Impact of the Services Directive' (2012)

None of the existing alternative relationships discussed in Section 2 would provide the same level of access for professional service firms. Firms would not have the same rights to operate across borders and would face additional restrictions on their activities. Large firms may be able to use alternative but less productive arrangements that are prohibitively expensive for SMEs.

Access to markets: deepening the internal Single Market

1.138 The further opening up of the Single Market for services is of particular importance to the UK given its highly-developed service sector and the increasingly important role it plays in the UK's trade with the rest of the EU. The European Commission's Single Market strategy was published in October 2015 and set out proposals for services liberalisation to remove distortions and ensure the proportionate regulation of professions.[187] The Commission's 2015 Single Market strategy stated that while the 2006 'Services Directive' "led to a welcome modernisation of the economy across a variety of sectors", as member states adopted more than a thousand measures to abolish barriers to services trade, "businesses and professionals still face too many difficulties operating across borders". The Commission has committed to reduce these restrictions, with the potential for significant economic gain to both the EU and the UK.

187 *Upgrading the Single Market: more opportunities for people and businesses*, European Commission, COM(2015) 550 final (October 2015).

1.139 There are a number of specific areas where the deepening of the Single Market is currently being prioritised, including digital, energy and Capital Market Union (see Box 1.M and 1.N). The European Commission published a Digital Single Market strategy in May 2015 and it sets out a framework for the measures that need to be brought forward to build a Digital Single Market,[188] including action on e-commerce and agreement of measures to end mobile roaming charges across the EU by June 2017. External research estimates that a fully-functioning Digital Single Market could be worth up to £330 billion a year to the EU economy or around 3% of EU GDP – providing benefits to consumers and businesses; the particular benefits to the UK are discussed in Box 1.M.[189] Of this, action has already been taken on e-procurement and e-invoicing. Combined these initiatives are estimated to provide gains of around 1% of EU GDP.[190,191]

1.140 The European Commission published an energy union package in February 2015 and it sets out proposals to increase energy security, sustainability and competitiveness – this will be of benefit to UK consumers and businesses. This includes a fully-integrated European energy market that enables energy to flow freely across the EU, with fewer technical or regulatory barriers.[192] The action being agreed to increase interconnection capacity through infrastructure investments in projects of common interest across the EU supports this objective.[193] It has been estimated that a fully-fledged energy union in gas and electricity markets could save £50 billion a year across the EU by 2030 and should lead to cheaper energy prices for consumers.[194]

188 *A Digital Single Market Strategy for Europe*, European Commission, COM(2015) 192 final (May 2015).

189 *Mapping the Cost of Non-Europe, 2014-19*, European Added Value Unit, Report for the European Parliament (April 2015). The source's benefit was originally calculated in euros.

190 *A strategy for e-procurement*, European Commission, COM(2012) 179 final (April 2012).

191 *SEPA: potential benefits at stake: Researching the impact of SEPA on the payments market and its stakeholders*, Capgemini, (2007).

192 *A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy*, European Commission, COM(2015) 80 final (February 2015).

193 *Factsheet on electricity interconnections*, European Commission (February 2015). As part of this, in the UK, interconnector capacity is expected to double by the early 2020s with studies showing they could deliver benefits to British consumers of nearly £12 billion over 25 years – see *Near-term interconnector cost-benefit analysis: Independent report*, Pöyry, Report for Office of Gas and Electricity Markets (December 2014).

194 *Benefits of an Integrated European Energy Market*, Booz & Company, Prepared for: Directorate-General Energy, European Commission (July 2013). The source's benefit was originally calculated in euros.

Box 1.M: Impact of the EU on the UK's digital sector

The UK digital sector:

- is worth £118.3 billion, equivalent to 7.3% of UK GVA[195]
- employs 1.4 million people[196]
- 43% of the sector's total exports goes to the EU[197]

The UK is home to a thriving digital sector. London's Tech City is one of the largest tech clusters in the world, at the forefront of pushing for technical advances as applied to financial services ('Fin Tech'). But digital companies are spread across the UK, including in tech clusters, such as in Dundee, Belfast, Manchester, and Bristol. Additionally, the UK is a world leader in sectors including retail and aerospace, both of which have been at the forefront of adopting new technology.

If the UK was to leave the EU, prospects for the digital sector would be worse because of a reduction in future access to the Single Market. Differing national regulatory regimes in areas such as consumer law, copyright, and data would represent a significant hindrance for start-ups who want to be able to easily offer their services across the EU. The EU is in the process of implementing the Digital Single Market, which modernises the EU framework making it significantly easier for consumers and businesses to take advantage of EU wide opportunities. For example, measures that simplify rules for cross-border online purchases will make it easier for consumers to access the best deals from across Europe, allowing businesses to take advantage of the greater opportunities that digital provides to sell across borders. The developed nature of the digital sector and the leading nature of many of its firms suggest the UK could disproportionately benefit from any liberalisation.

Reforms under the Digital Single Market are a clear example of how the Single Market is evolving in response to the development of the economy. Other trade deals lack the institutional arrangements to evolve in the same way, limiting their impact on trade barriers in new sectors or in response to developments in the wider economy.

195 *Digital Sector Economic Estimates*, DCMS, (Jan 2016).

196 Ibid.

197 *Summary of Economic Estimates for the Creative Industries and the Digital Sector*, DCMS, (April 2016).

Box 1.N: Capital Markets Union

The European Commission's Capital Markets Union action plan published in September 2015 sets out a range of proposals – both legislative and non-legislative – to be developed and pursued over the next 4 years.[198] This includes proposals to: revive securitisation and help banks lend to the real economy; reform the regulation on prospectus requirements to allow smaller firms to better access public markets; and review venture capital funds legislation to encourage more investment into venture capital across Europe and improve the range of options for investors.

These reforms will aim to help businesses, particularly SMEs in both the UK and the rest of the EU, get better access to the finance that they need to grow and succeed, and broaden and improve choices for investors. In the longer term, a well designed Capital Markets Union should help improve the EU's competitiveness and financial stability.[199] A Capital Markets Union will benefit all 28 member states, including the UK's financial sector.

Access to markets: extending external Free Trade Agreements

1.141 Completion of trade deals with the US, Japan, India and with the ASEAN and Mercosur countries, along with the implementation of the EU-Canada FTA will be of significant benefit to the UK. Completing these major ongoing deals could be worth more than £20 billion a year to UK GDP.[200] For example, an EU trade deal with the US could benefit the UK by up to £10 billion or 0.35% of UK GDP in the long run.[201] Additionally, there have been recent political commitments to negotiate trade and investment deals with China, Australia and New Zealand.

Obligations: improving the regulatory framework

1.142 As set out above, the UK has consistently made minimising the impact of regulation a priority, in particular for SMEs.

1.143 The government's agenda has been informed by consultation with business. This was demonstrated by the 2013 Business Taskforce report on EU red tape, which drew on evidence from 90 UK businesses and business organisations.[202] It made 30 clear recommendations, which have been pursued by the government. Half have already been delivered.[203]

198 *Building a Capital Markets Union*, European Commission, COM(2015) 063 final (February 2015).

199 *A European Capital Markets Union: implications for growth and stability,* Anderson, Brooke, Hume and Kürtösiová, Bank of England Financial Stability Paper No. 33 (February 2015). Capital Markets Union: a vision for the long term, Verón and Wolff, Bruegel (April 2015).

200 Department for Business, Innovation & Skills estimate, based on studies estimating the impact of individual deals.

201 *Estimating the Economic Impact on the UK of a Transatlantic Trade and Investment Partnership (TTIP) Agreement between the European Union and the United States*, Centre for Economic Policy Research, Report for Department for Business, Innovation & Skills (March 2013).

202 *Cut EU red tape*, Report from the Business Taskforce (October 2013).

203 Department for Business, Innovation & Skills internal analysis (2016).

1.144 Reflecting this, there has been important progress in recent years in improving the EU's regulatory framework.[204] Since 2014, the number of new initiatives proposed in its annual work programmes has been reduced by over 80%.[205] As a result of this, the flow of EU regulation has reduced in recent years, with the number of new directives and EU regulations falling sharply over time.[206] Moreover, reforms introduced last year mean that proposals for new legislation have to be put out for consultation with businesses and the public, and tested to ensure that they meet the needs of SMEs. And wherever possible, microenterprises – accounting for 95% of all UK firms – will be exempted from EU requirements altogether.[207]

1.145 This change of approach has also been put on a firmer institutional footing, with the creation of a new Regulatory Scrutiny Board in July 2015 in response to calls from the UK. This ensures that the Commission's impact assessments are based on robust evidence, in order to ensure the minimum necessary cost to business.

1.146 Under the UK's new settlement, the Commission has agreed for the first time to work toward setting specific targets to reduce the overall burden on business in key sectors. This will include EU specific targets in the 'most onerous areas' for businesses. The Commission will, in particular, focus on cutting costs for small businesses across the board; and the European Council Declaration on Competitiveness commits to "doing more to reduce the overall burden of EU regulation, especially on SMEs and micro enterprises".[208] The Commission will report to the European Council on an annual basis on progress against the targets, once they have been established.

1.147 To support this, the Commission will implement a burden review mechanism in which it will conduct an annual survey of the burdens imposed on businesses at the EU level. This will identify legislation that should be revised or repealed to bring costs down, and will also ensure that limiting the cost of regulation will be a priority when proposals are developed, negotiated and agreed.

1.148 This action will be supplemented by a commitment by the Commission to "establish a mechanism to review the body of existing EU legislation for its compliance with the principle of subsidiarity and proportionality", also secured under the new settlement.[209] This means that EU legislation will be reviewed every year to see what can be done better at the national level, and what can be dropped altogether. As a result, this will enable decision-making to be returned to the UK, when this is more appropriate. This 'downward ratchet' provides a practical mechanism to ensure that the EU adheres to its own principle "to ensure that decisions are taken as closely as possible to the citizen" and recognises that national parliaments are the fundamental source of democratic legitimacy.[210]

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204 *Better regulation for better results - An EU agenda*, European Commission, COM(2015) 215 final (May 2015).

205 *Better regulation for better results - An EU agenda*, European Commission, COM(2015) 215 final (May 2015).

206 The European Union Law database shows that the number of new EU Regulations and EU Directives has fallen steadily from nearly 3000 in the period from 1995 to 1999, to under 1500 in the period from 2010 to 2014.

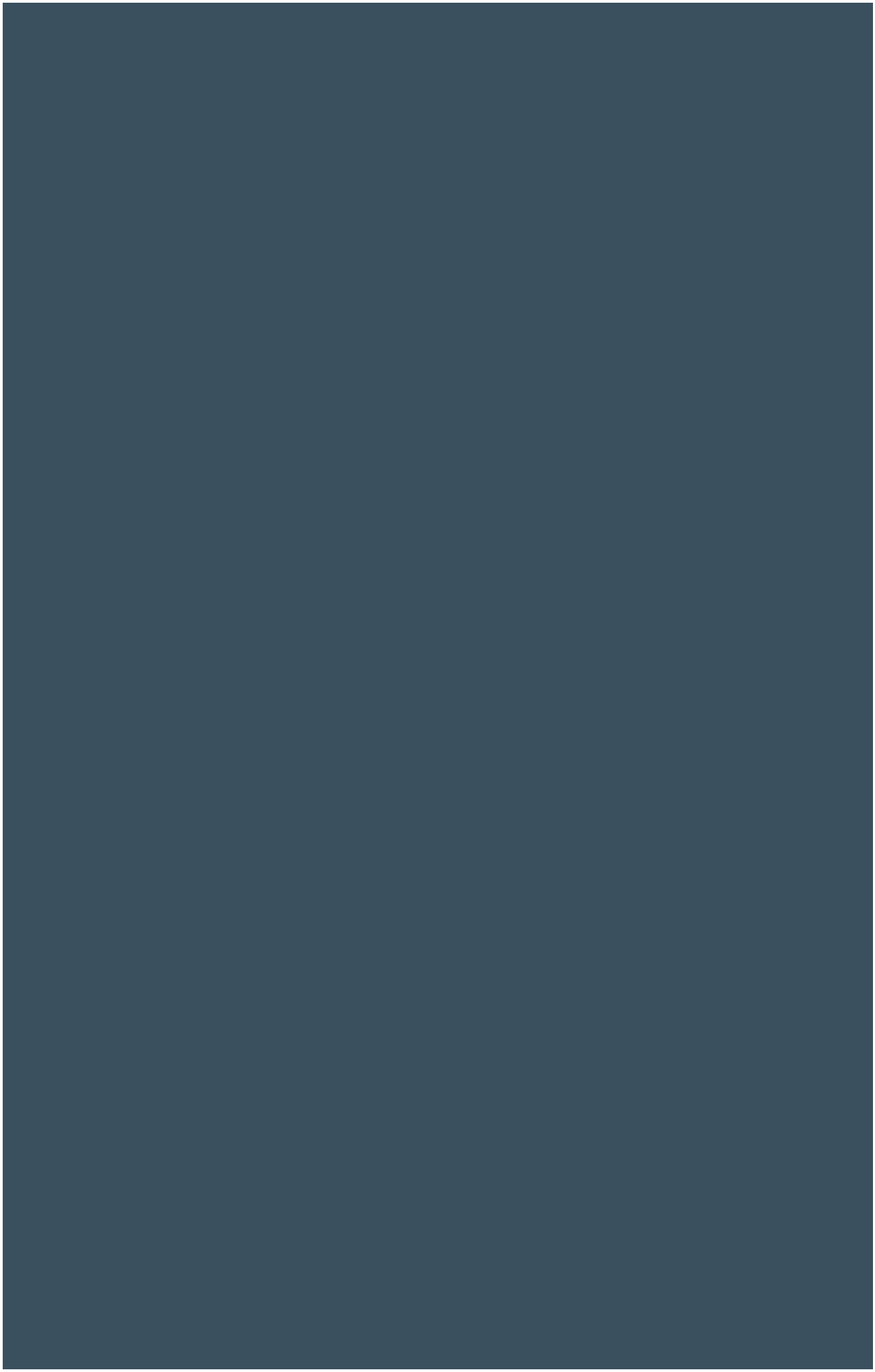
207 *Business Population Estimates for the UK and Regions 2015,* Department for Business, Innovation & Skills (October 2015).

208 *European Council Declaration on Competitiveness*, Annex III to Conclusions of the February European Council (February 2016).

209 Annex IV to Conclusions of the February European Council (February 2016).

210 Annex I to Conclusions of the February European Council (February 2016).

1.149 The EU now has an ambitious agenda for economic reform, and through the UK's new settlement there is a firm commitment to drive that agenda harder over the coming years to realise the full potential of the Single Market and create growth and jobs. There has never been such close alignment between the UK's own agenda for EU economic reform and that of the Commission and other member states.



Section 2 – The alternatives to EU membership

Summary

The key economic criteria for assessing EU membership against the alternatives – European Economic Area (EEA) membership, a negotiated bilateral agreement, or World Trade Organization (WTO) membership – is what it would mean for the UK's economic openness and its access to EU and non-EU markets. This needs to be considered alongside the obligations that come with securing that access and the influence the UK has over those obligations.

All the existing alternatives would increase the costs of trading with Europe, and none of the alternatives would involve the full access to the Single Market that the UK currently benefits from. Membership of the EEA would give the most access but would mean UK exporters facing increased transaction costs as a result of customs checks, and the re-introduction of tariffs for agriculture and fisheries. A negotiated bilateral agreement would give the UK some access to the Single Market but this, in particular, would be limited for the UK's large services sector. WTO membership would amount to a significant closing of the UK's access to global markets and would likely see the introduction of a much broader range of tariff and non-tariff barriers. The reduced access to the Single Market under all the alternatives would make the UK a less attractive destination for foreign investment.

All the alternatives would also reduce the UK's access to wider global markets. If the UK left the EU it would no longer have the right to benefit from the EU's Free Trade Agreements (FTAs) with third countries. While these FTAs fall short of the Single Market in terms of breadth and depth, they are some of the most advanced in the world. Just to maintain what the UK enjoys through the EU, would mean renegotiating new trade arrangements with the EU and over 50 other countries around the world, while commencing trade negotiations with a further 67. There is significant uncertainty about how long this would take and how much access the UK could achieve, as the UK's ability to negotiate beneficial deals as part of a large bloc would no longer exist.

If the UK simply relied on WTO rules it would set its own import tariffs. But if it kept tariffs at zero with EU countries it would have to lower tariffs unilaterally with all other WTO members where it did not have a preferential trade agreement, giving up a key bargaining position in negotiating new trade arrangements. The alternative would be to raise tariffs with the EU with implications for UK prices and higher costs for consumers.

Only the WTO alternative would free the UK from all the formal obligations that come with access to the Single Market. Under any of the alternatives, the potential gains from additional regulatory flexibility on leaving the EU would likely be significantly constrained

in practice, either because of the impact on domestic policy aims or because of the UK's wider international obligations. In any case, any such potential gains would be significantly outweighed by the losses from the additional regulatory barriers to trade from no longer being a member of the Single Market.

No other country has been able to agree significant access to the Single Market without having to accept EU regulations, the free movement of people and financial contributions to the EU. But in accepting these obligations, outside the EU the UK would have to give up its current significant influence over EU decision-making and become a rule-taker rather than a rule-maker. This matters much more to the UK than, for example, Norway or Switzerland as their economic weight means that they would have a much less significant influence even if they were members of the EU. It is inevitable that over time rules governing UK trade would develop in a way that favoured the remaining members of the EU and not the UK.

If the UK left the EU, negotiating the new arrangements with both the EU and the rest of the world would be extremely complex and cause a considerable period of economic uncertainty. There would be no incentive, and it would not be in their interest, for the remaining EU countries to provide the UK a better deal than any of the existing alternatives or a better deal than they themselves have. To allow the UK to access the Single Market without agreeing to the rules of the Single Market would put their own businesses and consumers at a disadvantage. While the UK is an important market for EU exports, the UK has its trading relationship with 27 countries at stake, whereas the rest of the EU have only their trading relationship with one country at stake – less than 8% of EU exports come to the UK while 44% of UK exports go to the EU. Only 3.1% of the rest of the EU's GDP is dependent on exporting to the UK, compared to 12.6% of the UK's GDP dependent on EU-UK trade.

No existing alternative outside the EU comes close to providing the balance of advantages and influence of the UK's current status inside the EU. All result in a decline in market access. Agreements that involve most access have the greatest obligations. All would result in a loss of influence. None would be in the UK's economic interest.

Part 1: The alternative models

The 3 alternatives considered are:

- membership of the European Economic Area (EEA), like Norway
- a negotiated bilateral agreement (e.g. Switzerland, Turkey, Canada)
- WTO membership (the default relationship)

2.1 This Section considers in detail the 3 existing alternatives to EU membership set out in the government's recent document *Alternatives to membership: possible models for the United Kingdom outside the European Union*[1] against the 3 key economic criteria of: maximising the extent of access to EU and global markets, minimising the cost of the accompanying obligations, and maximising the influence in determining those obligations. These alternatives are:

- membership of the EEA, like Norway
- a negotiated bilateral agreement (e.g. Switzerland, Turkey, Canada)
- WTO membership (the default relationship e.g. Russia, Brazil)

2.2 The long-term economic implications of each are considered in the rest of this Section, consistent with the focus of this document. Figure 2.A below provides an overview of the essential features of each alternative against the key criteria set out in the introduction.

2.3 The recent government document *The process for withdrawing from the EU* sets out the procedure, as provided for in Article 50 of the EU Treaty.[2] While this document considers the long-run economic impact of exit, and an assessment of the short-term economic implications of leaving the EU will be published in a further document, the transition period is relevant to these alternatives. On leaving the EU, if and until the UK reached an agreement with the remaining EU member states, it would default to WTO membership.

1 *Alternatives to membership: possible models for the United Kingdom outside the European Union*, HM Government (March 2016).

2 *The process for withdrawing from the European Union*, HM Government (February 2016).

Figure 2.A: Overview of economic aspects of alternative relationships[3]

		Access to the single market in goods & services			Obligations		Influence
		Tariff-free trade	Customs union & external trade	Level playing field/ non-tariff barriers	Other policy & regulation	Financial contributions	Votes on EU rules
EU membership		Full	Full. No customs costs. Access to EU FTAs	Full	Full	Full EU budget contributions	Full
The UK's special status		Full	Full. No customs costs. Access to EU FTAs	Full	UK is not a member of the single currency	UK receives rebate on EU budget contribution	Full
EEA (Norway)		Some tariffs remain on agriculture & fisheries	None. Customs costs apply. No access to EU FTAs	Agriculture & fisheries not substantively covered by the EEA agreement	Accepts most EU rules, including market/product standards, free movement of people, environment, energy, climate & social policy	Pays for EEA Grants, Norway Grants, admin costs & programme costs	None
Bilateral agreements	Switzerland	Some tariffs remain on agriculture	None. Customs costs apply. No access to EU FTAs	Minimises non-tariff barriers in sectors covered. Limited coverage for services. No financial services passport	Adopts EU rules in sectors covered. Participates in free movement of people & EU rules on e.g. environment, energy, climate & social policy	Gives grants to new EU member states. Pays admin & programme costs	None
	Turkey	Only applies to manufactured goods & processed agricultural goods	No customs costs for manufactured goods. Obligation to align external trade policy with EU	Removes most other barriers to trade in goods. No special access for services. No financial services passport	Adopts EU product standards, committed to equivalent rules on competition, state aid etc. & complies with environmental standards linked to goods trade	Turkey is in receipt of some EU funding	None
	Canada	Some tariffs remain on agriculture. Some tariffs on manufactured goods remain for a transitional period	None. Customs costs apply. No access to EU FTAs	Partial liberalisation of services. No financial services passport	Firms trading into EU conform to EU standards. International agreements & standards apply	None	None
WTO membership		EU external tariffs apply	None. Customs costs apply. No access to EU FTAs	International agreements and standards apply. No financial services passport	Firms trading into EU conform to EU standards. International agreements & standards apply	None	None

[3] The dotted line in the table broadly shows the scope of the EU's regulatory framework in relation to the Single Market and other relevant EU policies.

European Economic Area membership

2.4 The EEA comprises the 28 member states of the EU, along with Norway, Iceland and Liechtenstein. It extends elements of the Single Market to these members of the European Free Trade Association (EFTA). To join the EEA, the UK would first need to obtain EFTA membership, requiring the unanimous agreement of EFTA members. The UK could then join the EEA with the unanimous agreement of all EEA countries.[4]

2.5 EEA member is used here as a shorthand to describe the 3 non-EU members of the EEA. In considering EEA membership, Norway is used as the main example as it is the largest of the 3 EEA members.

2.6 As a member of the EEA, in terms of access, Norway:

- has tariff and quota-free trade with the EU on most goods, with the exception of agriculture and fisheries
- is outside the customs union, meaning Norwegian firms exporting to the EU face additional administrative costs
- has access to the level playing field, through reduced non-tariff and other barriers to trade
- is not party to the EU's trade deals with the rest of the world[5]

2.7 The EEA agreement evolves – as new or reformed EU regulations are agreed, these are adopted by EEA members. In turn, they are required to comply with the full regulatory framework of the Single Market, as well as EU legislation in areas not directly related to the Single Market, including elements of social policy, consumer protection and environmental standards.

2.8 Norway is also obliged to accept the free movement of people from both EU and other EEA countries.

2.9 Norway makes a significant contribution to EU spending. The EEA agreement obliges Norway and other members to contribute funds to reduce social and economic disparities in the EU. Norway also contributes to EU budget programmes on a case-by-case basis and pays administrative costs, including to the EEA and EFTA administrations. It does not receive a rebate.

2.10 Norway has no representation and no vote in deciding EU law. Norway has limited influence over decisions made by the EU, including on the further development of the Single Market through changes to the regulatory framework, so has no say on the rules associated with expanding market access.

Negotiated bilateral agreements

2.11 A number of countries have negotiated bilateral trade agreements with the EU. Switzerland has a complex set of over 120 bilateral agreements, which represents the most developed bilateral relationship with the EU. Turkey is in customs union with the EU and has a long-term aspiration to become an EU member state. A number of FTAs between the EU

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4 Norway has previously opposed possible expansions of EFTA/EEA. See: *Outside and Inside: Norway's agreements with the European Union*, Chapter 13, Norwegian EEA Review Committee (2012).

5 An overview of the EEA and EEA agreement is available at: http://www.efta.int/eea

and third countries have been agreed, providing for differing degrees of access to the Single Market. The FTA with Canada, which has been negotiated but is not yet in force, is the most comprehensive and so is used as the example in this Section.

2.12 A bespoke UK-EU bilateral agreement would be complex to negotiate. The precise process for negotiating that agreement could also require unanimous agreement by the remaining 27 member states and ratification by their national parliaments.[6] The European Parliament would also need to give its approval. Reaching agreement on such a wide range of issues with a large number of negotiating partners, each of which would seek to defend their individual interests, is likely to be difficult and could involve potentially unpalatable trade-offs. Any such process would clearly add to the complexity and hence, very probably, to the length of overall negotiations. Canada's agreement has taken 7 years and is not yet in force, while Switzerland's set of agreements have been negotiated over 2 decades.

Switzerland

2.13 Switzerland:

- has tariff and quota-free trade with the EU on most goods, with the exception of agriculture
- is outside the customs union, meaning Swiss firms exporting to the EU face additional administrative costs
- has only partial access to the level playing field through reduced non-tariff and other barriers to trade, with only some service sectors included
- is not party to the EU's trade deals with the rest of the world[7]

2.14 The bilateral agreements only provide limited guaranteed access to trade in services. Switzerland has no guaranteed access to the EU market in financial services, and in particular no access to the financial services passport. The agreements do not evolve, meaning that as the Single Market extends to new areas Switzerland must negotiate its access.

2.15 Switzerland is required to comply with the relevant regulatory framework of the Single Market, as well as EU legislation in areas not directly related to the Single Market, including elements of energy policy, and climate and environmental standards.

2.16 Switzerland is also obliged to accept the free movement of people.

2.17 Switzerland has also agreed to make significant financial contributions to the EU in return for access to the Single Market. It has committed to pay grants to reduce social and economic disparities and participates in various EU programmes. It does not receive a rebate.

2.18 Like Norway, Switzerland has no representation and no vote in deciding EU law. It has no influence on the further development of the Single Market through changes to its regulatory framework. Unlike Norway, it is not required to update its laws to match developments in the EU, but failure to do so risks an end to access to the relevant parts of the Single Market.

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6 For more on the likely negotiating process, see *The process for withdrawing from the European Union*, HM Government (February 2016).

7 An overview of major Swiss-EU bilateral agreements is available at https://www.eda.admin.ch/dam/dea/en/documents/folien/Folien-Abkommen_en.pdf

Turkey

2.19 Turkey's relationship with the EU is based on an association agreement signed by the EU and Turkey in 1963 (known as the Ankara agreement). In addition, since 1995, Turkey has been in customs union with the EU. Turkey is also a candidate country for EU membership. Negotiations began in 2005 and are ongoing.

2.20 The Turkish model is founded on its status as an emerging market and its aspiration to join the EU.

2.21 Turkey:

- has tariff and quota-free trade with the EU on most goods (raw agricultural produce is excluded)
- is in customs union with the EU, eliminating the need for customs checks in industrial goods and processed agricultural products
- has only partial access to the level playing field through reduced non-tariff and other barriers to trade, with services not covered by the agreement
- is not party to the EU's trade deals with the rest of the world[8]

2.22 Turkish firms wishing to export into the EU must meet EU rules and standards in the areas that are covered by Turkey's agreement, while EU firms can trade freely in Turkey if they meet EU rules.[9] In areas where Turkey has access to the EU market, it is required to enforce rules that are equivalent to those in the EU.

2.23 Turkey has no say over the EU's external trade policy but must abide by the trade agreements the EU has agreed with third countries. It has to reduce its tariff rates to match those agreed by the EU with any third country, but the country in question does not need to reciprocate that improved access to Turkey. Instead Turkey has to negotiate separate trade deals with these countries, having already provided improved access to its own market.

2.24 As a candidate country, Turkey is a recipient of some EU funding.

2.25 Turkey has no representation and no vote in deciding EU law, and has no influence on the further development of the Single Market through changes to its regulatory framework.

Free Trade Agreement: Canada

2.26 FTAs involve a more detached relationship with the EU. Countries negotiate some market access, agree tariff levels with the EU, and set quotas for trade between them. They agree obligations in return for that access. EU rules form the basis of requirements that underpin the EU's FTAs, for example exporters to the EU are required to comply with relevant Single Market rules in the same way as exporters from Norway, Switzerland and Turkey.

2.27 The EU-Canada FTA was agreed in September 2014, and is expected to be ratified in early 2017, with provisional application soon after.

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8 Detail of the EU-Turkey Customs Union agreement can be found at, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:21996D0213(01):EN:HTML

9 As the EU-Turkey Customs Union agreement states: "When Turkey has put into force the provisions of the Community instrument or instruments necessary for the elimination of technical barriers to trade in a particular product, trade in that product between the Parties shall take place."

2.28 Canada:

- will not have tariff and quota-free access to the EU in all areas, with permanent exclusions for some agricultural produce and tariffs remaining for key goods such as car exports for up to 7 years after entry into force
- will continue to be outside the customs union, meaning Canadian firms exporting to the EU face administrative costs
- will have only limited access to the level playing through reduced non-tariff and other barriers to trade, with significant impediments to services exports
- will not be party to the EU's trade deals with the rest of the world[10]

2.29 Significant non-tariff barriers to trade remain, which place additional burdens on Canadian businesses wishing to trade into the EU.

2.30 Canadian exporters are required to comply with EU product standards and technical requirements.

2.31 Financial services passporting provisions are not included in the EU-Canada or any other EU FTA.

2.32 The Canada FTA, and similar FTAs, do not require financial contributions to the EU.

2.33 Canada has no say over future EU rules. Outside the EU it has little influence and no ability to try to block measures that put its companies at a disadvantage.

World Trade Organization membership

2.34 The WTO provides a global framework for trade relations between 162 countries. As stated above, in the absence of any other arrangements between the UK and the remaining EU countries, the UK would fall back on its WTO membership as the basis of its trading relationship with the EU in the same way as, for example, Brazil or Russia.

2.35 WTO rules represent a minimum threshold. It would be the least integrated economic relationship the UK could have with the EU. It would be a definitive break, offering none of the economically important features of the EU.

2.36 Under the WTO alternative the UK would be:

- subject to the EU's common external tariff on imports
- outside the customs union
- no longer an automatic beneficiary of future efforts to create a level playing field for trade through reduced non-tariff and other barriers to trade, and
- excluded from the EU's trade deals with the rest of the world

2.37 Without a preferential trade agreement, the EU and other international partners would only be obliged to give the UK access in line with WTO rules. This provides a much more basic framework, rather than guaranteed access.

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10 The text of the EU Canada Free Trade Agreement can be found at: http://trade.ec.europa.eu/doclib/docs/2014/september/tradoc_152806.pdf

2.38 The UK would not be required to implement any EU rules. However, UK businesses that wished to trade with the Single Market would still have to comply with EU legislation on product standards, the environment and safety. WTO membership would not require any payments to the EU. The UK would still be required to meet its commitments under the trade in services agreement (GATS) in the WTO, which allows the temporary movement of certain professionals. If relying on WTO membership, the UK would have no say over EU decisions.

2.39 The UK would retain its current WTO membership – the UK is a WTO member in its own right, while the EU negotiates on behalf of all member states as one trading bloc.

2.40 However, the UK would need to update the terms of its WTO membership where the commitments taken have previously applied to the EU as a whole, which would not be straightforward. This is because it would need all other WTO members to agree how the UK will take on the rights and obligations which it has formerly taken as part of the EU. This would mean submitting UK schedules setting out UK tariff levels at the WTO. Until this process was completed there could be questions surrounding the UK's rights to access WTO members' markets, and its ability to enforce those rights.

Part 2: Access to global markets

- All the alternatives to EU membership offer less access to the Single Market and wider global markets than the UK has as an EU member.

2.41 This part assesses the alternative models against the 3 broad elements that make up the benefits of access to the Single Market:

- removal of tariffs and quotas on goods trade
- creation of the customs union
- creation of a level playing field by reducing non-tariff and other barriers to trade[11]

2.42 It then assesses the alternatives against the access they provide to markets beyond the EU through the EU's FTAs with third countries.

2.43 As shown in Figure 2.B below, there is a spectrum of access to the Single Market, from the most integrated – EEA membership, like Norway – to the least, a reversion to the default of WTO membership.

Access to the EU market

Tariffs and quotas

2.44 There are no internal tariffs on trade within the EU. Under any of the alternatives, tariffs would be reintroduced on some goods exported from the UK to the EU. Each agreement is different but none provides full tariff-free trade. The effects of this would be felt immediately on exit.

2.45 EEA membership provides for tariff-free trade in most goods within the EEA but would not give tariff-free access for agriculture and fisheries, which are largely excluded from the EEA agreement. Similar arrangements apply to Switzerland and Turkey, through their bilateral agreements. Box 2.A sets out the implications of leaving the EU for the agricultural sector.

2.46 Bilateral FTAs provide a range of tariff-free access. Canada's is the most comprehensive. However, it will not offer full tariff-free access for agricultural products. Moreover, a number of quotas on agricultural products will remain. Canada will also continue to face tariffs for car exports for a further 7 years after the introduction of its FTA. The EU external tariff on cars is 10%. Levying this on current UK car exports to the EU would be equivalent to a tariff of more than £1 billion a year on UK annual car exports.[12] Were the UK to be subject to the same conditions as Canada, it would take 7 years to fully remove this tariff.[13]

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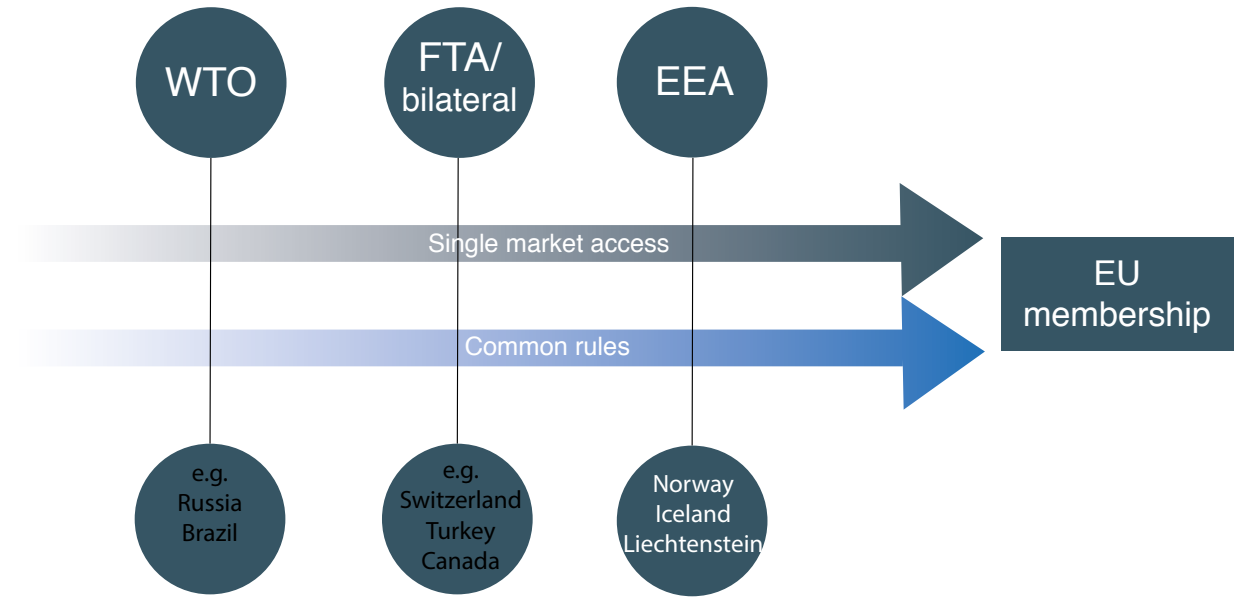
11 The OECD definition states that "non-tariff barriers refers to all barriers to trade that are not tariffs. Examples of these include countervailing and anti-dumping duties, "voluntary" export restraints, subsidies which sustain in operation loss making enterprises, technical barriers to trade, and obstacles to the establishment and provision of services." *The OECD Economic Outlook: Sources and Methods. Glossary of statistical terms,* OECD (2014).

12 HMT calculations based on HMRC 2015 export data.

13 For further information on the UK automotive sector, see Box 1.F.

Figure 2.B: Levels of integration with the EU



Source: HM Treasury

2.47 Were the UK to default to WTO rules (as it would in the absence of any kind of agreement with the EU or while such an agreement was negotiated following an exit from the EU), tariffs on UK exports to the EU would be based on the EU's standard Most Favoured Nation (MFN) tariffs, which the EU currently applies to third-countries. This would be in contrast to a 0% tariff on trade with the EU at present.

Box 2.A: Impact of the EU on agriculture

As a member of the EU, the UK participates in the Common Agricultural Policy (CAP).

Under any of the alternatives, UK farmers and food manufacturers would face new barriers to trading. There would be additional rules and burdens for exporting products, as well as tariffs to access the EU market.

In the absence of a specific agreement on agricultural products, the default would be WTO rules and the EU applying its Most Favoured Nation (MFN) tariffs to UK agri-food exports. In 2014 for dairy products these tariffs averaged 36% with a very broad range of duties applied.[14] This is significant because the EU accounted for 61% of UK agri-food exports in 2014,[15] with EU member states accounting for 7 of the UK's top 8 agricultural export markets.[16]

As part of Norway's membership of the EEA, agriculture is not included in the agreement and so EU MFN tariffs apply (even though for some processed food goods, the tariffs faced by Norway are lower as set out in the EEA treaty).[17] Such tariffs can be substantial, whereas there are no tariffs within the Single Market.

Under the FTA with Canada, agricultural tariffs are eliminated in most areas, but trade in beef, pork, poultry and fruit and vegetables remain protected. For some of these products, quotas allowing a limited amount of low or tariff-free trade are introduced. For example, Canada will only be able to export about 50,000 tonnes of beef to the EU,[18] beyond which it will be subject to the EU's MFN tariffs, which are equivalent to over 70% on some beef products.[19] More than 90% of UK beef and UK mutton and lamb exports go to the EU (over 90,000 tonnes and 75,000 tonnes per year respectively).[20] Based on the Canada agreement, whatever beef exports the UK made to the EU beyond the agreed quota would face these high MFN tariffs (the UK's annual beef exports to the EU are worth more than £300 million).[21] For other areas, where the EU had defensive interests against Canadian exports, the EU's MFN tariffs will remain in place indefinitely.[22]

The UK would also need to make a decision about the level of tariffs it imposed on imports from the EU and beyond. If the UK simply replicated the EU's agricultural tariff regime for EU imports, then it could result in a significant increase in the cost of food in the UK. In 2014, a significant proportion of UK food imports came from the EU (see Chart 2.A) with EU member states accounting for the UK's 8 most important sources of imports of food, drink and animal feed.[23] For example, just 5 member states (in particular Spain and

14 2014 dairy tariffs: *WTO Trade Policy Review of the European Union* (2015), available at https://www.wto.org/english/tratop_e/tpr_e/s317_e.pdf

15 DEFRA calculations based on HMRC trade data.

16 *Agriculture in the United Kingdom*, Department for Environment, Food and Rural Affairs (2015).

17 For full detail on the treatment of trade in processed agricultural goods under this relationship, see Protocol 3 of the EEA agreement.

18 Detail of the EU-Canada Comprehensive Economic and Trade Agreement can be found at http://trade.ec.europa.eu/doclib/docs/2014/september/tradoc_152806.pdf.

19 DEFRA calculations of effective tariff rates based on HMRC trade data.

20 DEFRA calculations based on HMRC trade data.

21 Ibid.

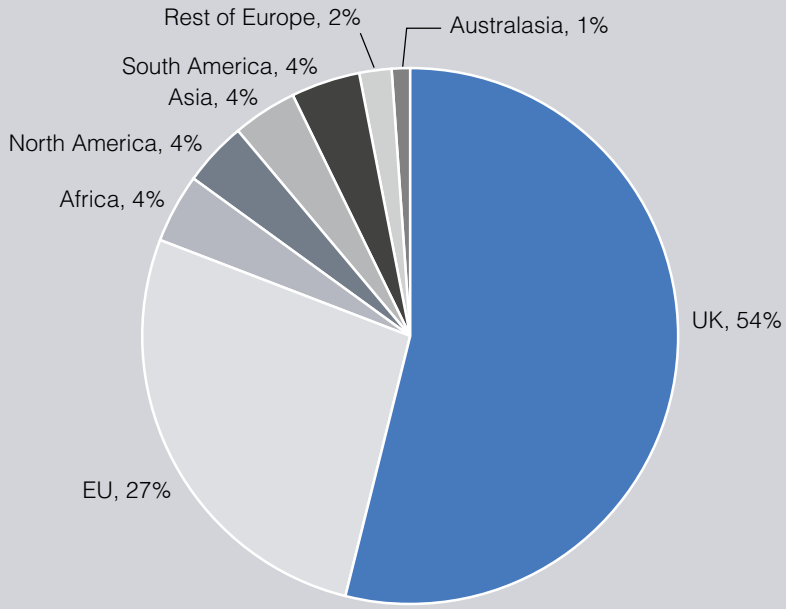
22 For example, tariffs on chicken, turkey meat, eggs and egg products will remain subject to such tariffs.

23 *Agriculture in the United Kingdom*, Department for Environment, Food and Rural Affairs (2015).

the Netherlands) accounted for 80% of the UK's imports of fresh vegetables.[24] The EU's agricultural tariffs average 13% on fruit, vegetables and plants.[25]

There would also need to be a decision about whether farmers and the wider rural community would receive support outside of the CAP, and if so, at what level, and with what conditions attached. Fully replacing UK CAP receipts, for example, would require an increase in the domestic support for agriculture of approximately £3 billion, which would be subject to the spending priorities of the government at the time.[26]

Chart 2.A: Origins of food consumed in the UK (2014)



Based on the farm-gate price of raw food: consumption of UK origin consists of UK domestic production minus UK exports.

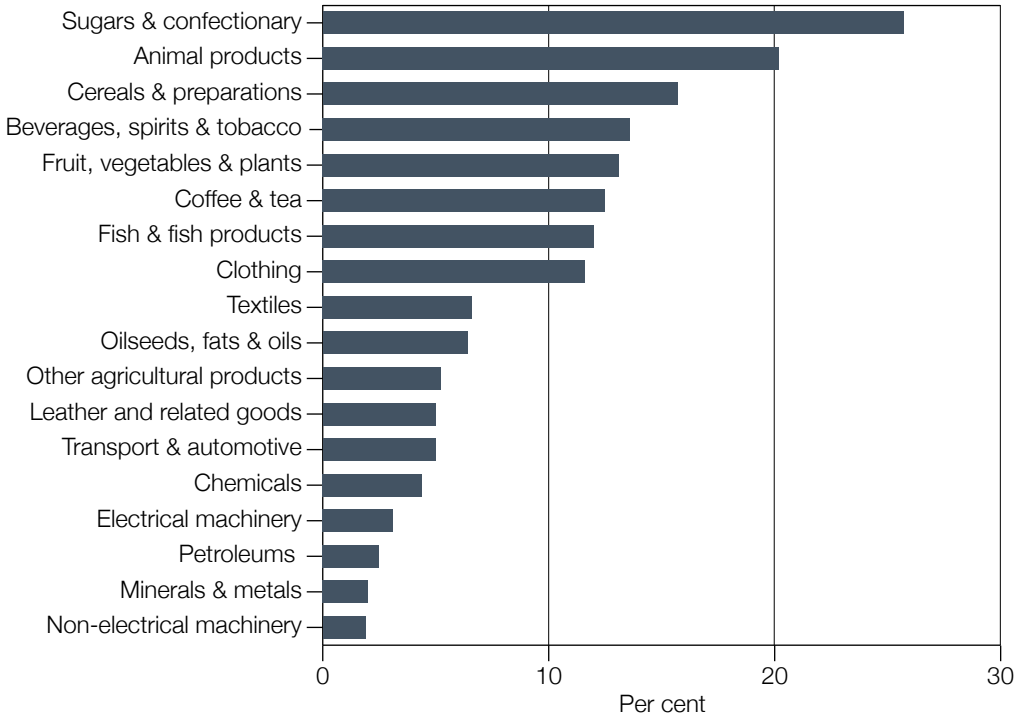
Source: *Agriculture in the United Kingdom*, Defra (2015)

24 Ibid.

25 *WTO Trade Policy Review of the European Union 2015*, available at https://www.wto.org/english/tratop_e/tpr_e/s317_e.pdf

26 Commission Document C(2014) 7461 final Annexes 1 to 2 found at: http://data.consilium.europa.eu/doc/document/ST-14561-2014-ADD-1/en/pdf Assuming an exchange rate of 1.30.

Chart 2.B: Tariff rates applied by the EU, by broad category of goods



Note: The graph shows average tariffs across broad categories of goods. Tariffs on specific goods may vary – for example within leather and related goods the tariff on sports footwear is 16.9%.

Source: World Trade Organization

2.48 As shown in Chart 2.C, the EU's average tariff rate was 5.3% in 2014, higher than many other advanced economies, including the USA at 3.5%.[27] Furthermore, the EU's import tariff schedule has an extremely wide range of tariffs around its average. Chart 2.B shows tariff rates applied in the EU, by broad category of goods. The UK would be subject to all tariffs on exports to the EU if it relied on WTO membership.

2.49 There would be some high tariffs on key goods, such as 12% on clothing.[28] Other UK industries which are heavily integrated and have significant trade within the EU are chemicals and pharmaceuticals, worth over £22 billion, nearly 140,000 jobs, and selling over 50% of their exports to Europe; and the food industry, worth almost £20 billion, over 370,000 jobs and selling almost 55% of exports to Europe.[29]

2.50 All other things being equal, EU tariffs on UK goods would raise the price of UK goods in the EU Single Market, reducing demand for UK products. In the short-term this would reduce the competitiveness of UK goods, and UK exports would fall as a result.[30] Where this

27 WTO figures for 2014 applied unweighted average Most Favoured Nation tariff. Data available at: http://stat.wto.org/TariffProfile/WSDBTariffPFView.aspx?Language=E&Country=E28%2cCA%2cUS%2cJP

28 Further information on individual tariff rates can be found using HM Government's trade tariff tool, available at www.gov.uk/trade-tariff

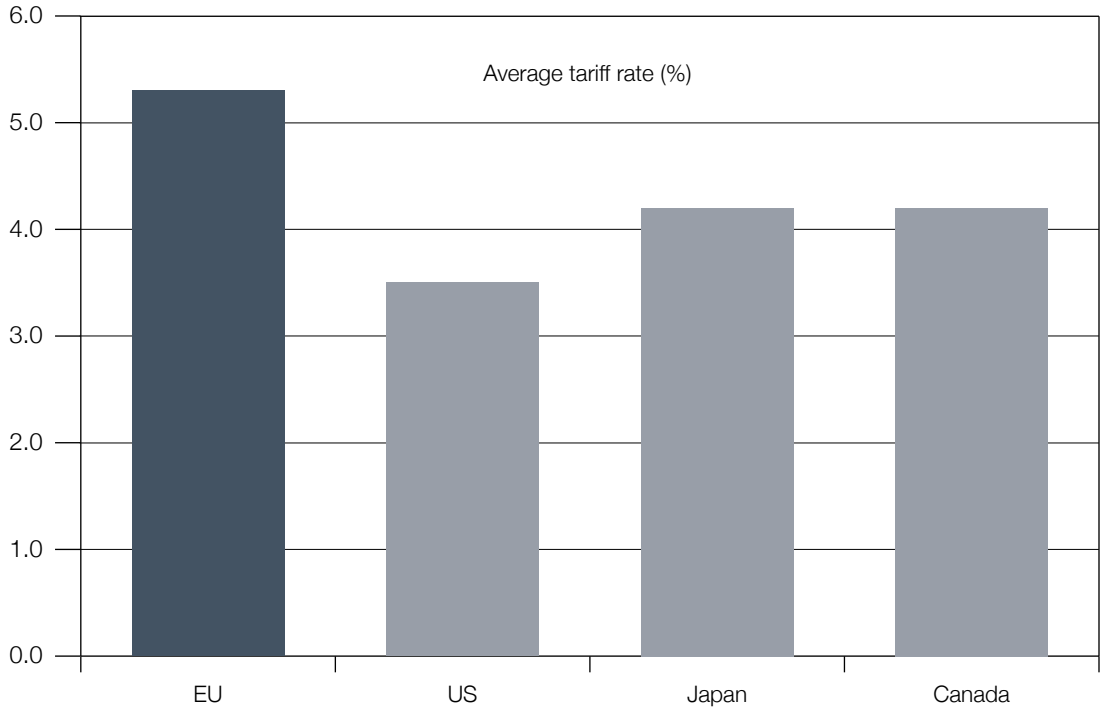
29 ONS, GDP Low Level Aggregates (February 2016); HMRC UK Trade Info Extract; ONS Workforce Jobs.

30 In principle there could be some offsetting effect from a Sterling exchange rate depreciation, but this would not be able to compensate for the differential sectoral impact of the EU's external tariffs, as illustrated in Chart 2.B.

effect is particularly strong, industries would need to rapidly adjust, which may involve job losses as the least competitive firms fail and the industry downsizes.

2.51 Alongside tariffs imposed on UK exports by the EU, in the absence of a bilateral agreement with the EU, the UK would have flexibility to impose tariffs on EU imports. But, in practice, the UK's flexibility would be constrained by WTO rules and the policy choices they imply. These rules state that in the absence of an FTA covering the relevant product, WTO members must set the same tariffs on imports from all other WTO members (the Most Favoured Nation rules). In other words, the UK would have to set a single tariff for each type of import, whether from the EU or anywhere else in the world. The UK could not give preferential treatment to the EU.

Chart 2.C: EU tariff rates relative to other G7 countries



Source: World Trade Organization

2.52 This would present a difficult policy choice. Imposing tariffs on imports from the EU would make these goods more expensive. All other things being equal, this would mean the price of imported goods including cars, clothing and foodstuffs would rise. This would affect the disposable income of households, as for the same earnings consumers could purchase fewer of these goods.

2.53 As set out in Section 1, many advanced manufacturers have complex cross-border supply chains that rely on imports from the EU as components in their products and import inputs in order to later export finished goods.[31] Higher import prices would put these UK businesses at a competitive disadvantage. This would make the UK a less attractive destination for international companies, lowering investment and employment.

[31] In 2014, 44% of all UK merchandise imports were in imports of intermediates. https://www.wto.org/english/res_e/statis_e/miwi_e/GB_e.pdf

2.54 Not introducing tariffs on EU imports would avoid these consequences but, as set out above, under WTO rules the UK would also need to unilaterally eliminate tariffs on all imports, for the EU and the rest of the world alike. There is no guarantee that this would be reciprocated by others and other countries would in future have no incentive to give preferential access to their own markets for UK companies. As discussed later, the UK would lose a significant lever in trade negotiations.

Customs union

2.55 The customs union allows for the removal of routine customs controls within the EU Single Market, supplementing tariff-free trade. With the exception of Turkey, all the alternatives involve leaving the customs union. The effects of this would apply immediately on exit.

2.56 Imports to the EU from outside the customs union, which include imports from the non-EU EEA member states, are required to comply with EU customs procedures. These would apply to the UK if it left the EU.

2.57 Specifically, all goods imported into the EU would need to be declared to the customs authorities. The relevant form has more than 50 boxes requesting information, and the guidance is 78 pages long. It can involve providing documentary evidence proving that products are either made inside the EEA, or that they comply with a number of product-specific rules.[32] Depending on the nature of the imported goods, additional documents might be required to support the declaration, such as proof of origin, customs value declaration, or inspection certification. An entry summary declaration, which contains advance cargo information about consignments entering the EU, must also be lodged at the first customs office of entry to the EU.

2.58 Outside of the customs union, as a result of these processes, UK-based firms would likely incur both time delays and costs. This would reduce the competitiveness of UK-based firms and potentially jeopardise their role in the production process. There would be particular implications for Northern Ireland given its land border with Ireland (see Box 2.B).

[32] Full details of EEA rules of origin requirements are available at: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L:2005:321:FULL&from=en

Box 2.B: The economic implications of introducing customs controls on the UK-Ireland border

The UK and Ireland are both part of the EU. Since the 1920s they have operated a common travel area and they are both part of the EU customs union. There are no routine customs controls on current imports and exports between the UK and Ireland.[33]

Outside the customs union, goods being exported across the border could be subject to various forms of customs controls and their liability to duty determined according to complex rules of origin.

This would affect the current high level of cross-border activity and trade flows. Indeed, Ireland is Northern Ireland's single largest export market. The latest data shows 37% (£3.6 billion) of Northern Ireland's goods and services exports go to Ireland.[34] In 2014, Northern Ireland manufacturing sales to Ireland were worth £1.4 billion, approximately 10% of Northern Ireland's total external manufacturing sales and equivalent to 37% of Northern Ireland's total domestic sales.[35]

2.59 Some businesses would be disproportionately impacted by being outside the customs union. For example, small UK firms in particular are likely to find it difficult to navigate these complex rules and procedures, raising the barriers for small firms to use exporting as a route to growth, jobs and productivity.

2.60 Key sectors are also likely to be disproportionately impacted. In particular, as with tariff free trade, businesses that rely on complex cross-border supply chains, where a substantial proportion of the value in the goods they produce has been imported, would face significantly higher costs of production because of the resulting administrative and financial costs involved in managing the supply chain outside the customs union.

2.61 The impact of not being a member of the customs union is likely to be much more significant for the UK than the countries with the alternative models set out above. As an economy with complex supply chains that cut across borders in both manufacturing and services, the introduction of rules of origin requirements would be a significant factor. By contrast, Norway's and Canada's exports rely much more heavily on raw materials and other primary products, where such requirements are much less important. Chart 2.D shows that, in 2014, agricultural, basic materials and fuels products accounted for almost three quarters of Norway's goods exports and nearly one-half of Canada's goods exports. By contrast, such primary products accounted for less than a fifth of UK goods exports.[36]

2.62 As an illustration of the importance of the customs union to the UK, it is estimated that over half of UK goods exports to the EU would need to be certified as complying with rules of origin requirements in order to continue to receive tariff-free access into the Single Market

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33 Risk-based anti-smuggling checks on intra-EU traffic targeting drugs, weapons and excessive quantities of excise goods such as tobacco and alcohol, as well as other goods subject to national or EU prohibitions and restrictions still apply.

34 Department of Enterprise, Trade and Investment for Northern Ireland. Experimental Statistics for 2012.

35 Based on: *Broad Economy, Sales and Export Statistics*, Department of Enterprise, Trade and Investment (2014). Available at: https://www.detini.gov.uk/publications/current-publication-broad-economy-sales-exports-statistics

36 Agricultural basic materials and fuel products refer to SITC sections 0 to 4: food and live animals; beverages and tobacco; crude materials, inedible, except fuels; mineral fuels, lubricants and related materials; and animal and vegetable oils, fats and waxes.

under a Canada style deal.[37] This would impact many sectors of the economy, including agriculture, clothing, cars, and machinery and mechanical appliances.[38]

2.63 The cost of complying with the rules of origin procedures reduces the benefits of tariff-free access for some firms. Firms can regard rules of origin requirements as sufficiently onerous that they sometimes choose to pay the tariffs even though they are entitled to tariff-free access on the domestic content of their products.[39]

2.64 Being outside the EU's customs union could also impact consumers directly. Restrictions, such as duty-free allowances on alcohol and tobacco, could be reintroduced, making purchases of goods that consumers wanted to transport across borders more expensive.

2.65 As outlined above, of the alternative models examined only Turkey's includes customs union with the EU. Adopting any of the other alternative models would result in new administrative burdens from being outside the customs union, which would reduce trade flows and the openness of the UK economy, with the attendant consequences in terms of productivity and living standards.[40]

37 HMT estimate using HMRC trade data and World Bank tariff data.

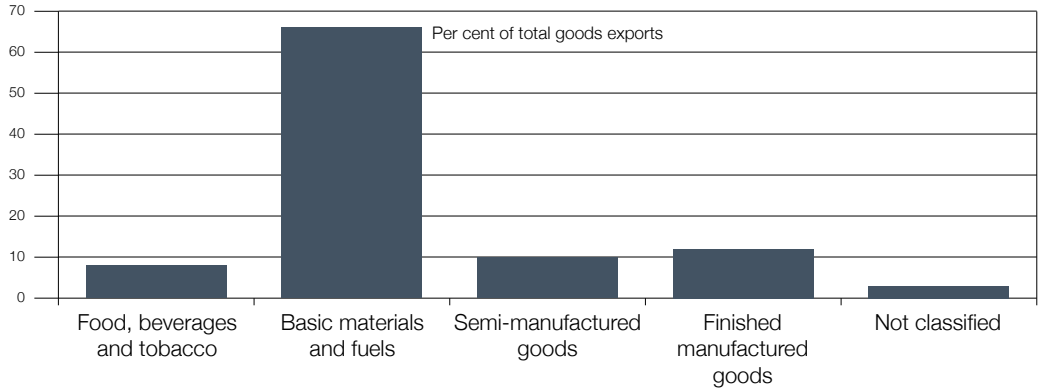
38 Ibid.

39 A review of the literature by the Centre for Economic Policy Research, commissioned by the Department for Business, suggests complying with rules of origin could add "from 4 percent to perhaps 15 percent to the costs of goods sold" under a UK-EU FTA. *Trade and Investment Balance of Competence Review*, Project Report, Centre for Economic Policy Reform (November 2013).

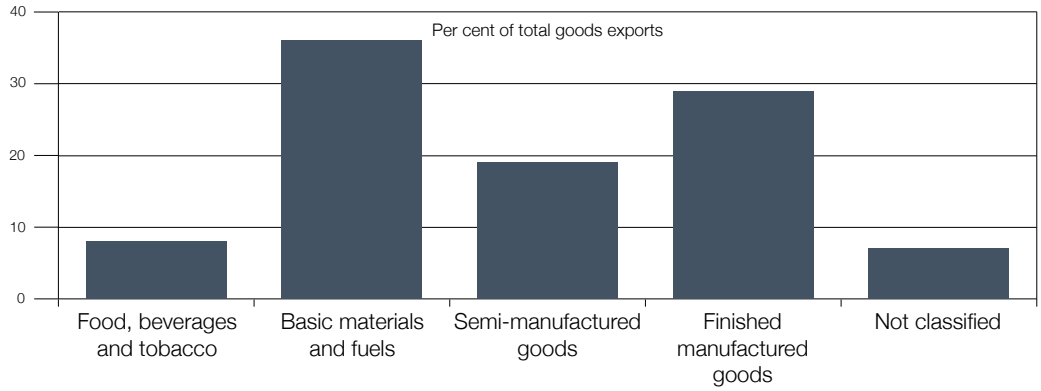
40 See Section 1, Part 2 for further discussion of the economic implications of customs union.

Chart 2.D: Composition of Norway, Canada and UK goods exports

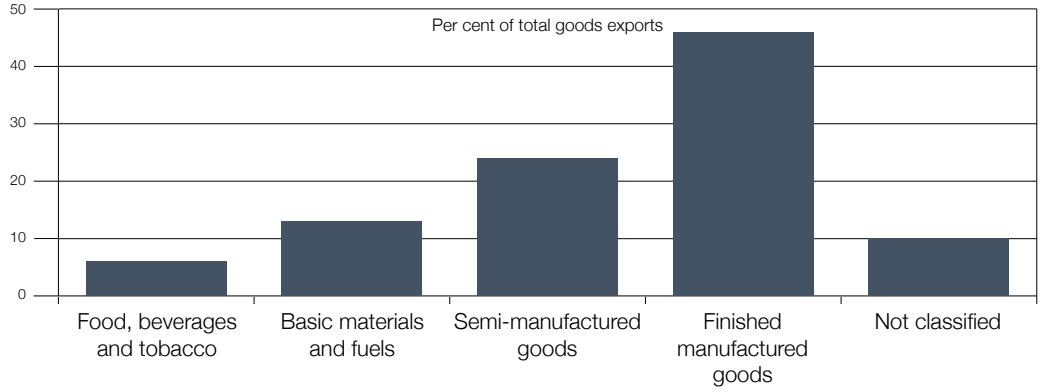
Norway



Canada



UK



Source: COMTRADE (2014)

The level playing field and non-tariff barriers

2.66 A key element of the access the UK enjoys as part of its membership of the Single Market is the creation of a level playing field by reducing non-tariff and other barriers to trade within the EU. Such barriers include different requirements and specifications which make it hard to trade, such as product regulations and standards in goods and recognition of qualifications in services. The Single Market has not yet eliminated all barriers in the EU but it has gone further than any other free-trade area in reducing such barriers.

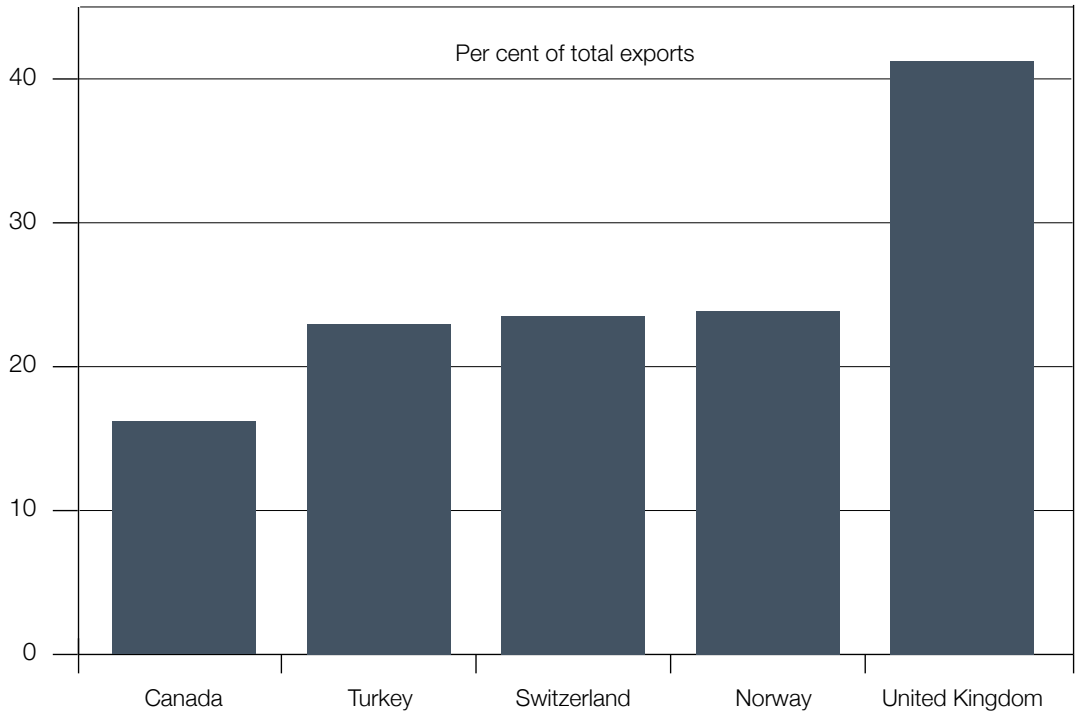
2.67 These sorts of barriers affect both goods and services exports, but are particularly important for services. This is especially significant for the UK given the larger share of UK services exports as a proportion of its total exports compared to countries in alternative arrangements like Norway and Canada, as shown in Chart 2.E.

2.68 In some cases, the loss of benefits that flow to the UK economy from the removal of such barriers would take place over time as the UK's regulations and requirements diverged from those of the EU, with which they are currently aligned. In others, the loss of benefits would be more immediate, for example if the new relationship did not include the financial services passport and participation in competition and state aid policies.

2.69 With the exception of agriculture and fisheries, EEA membership offers the same access to a level playing field for trade as EU membership. However, as discussed in the next part, this involves accepting the same obligations as EU membership without any say over them.

2.70 No other alternative offers the same access to a level playing field for trade.

Chart 2.E: Services exports as a percentage of total exports (2013)



Source: Organisation for Economic Co-operation and Development[41]

41 OECD Balance of Payments (MEI) BPM6.

2.71 Switzerland, through its more than 120 specific agreements, has negotiated partial access to the EU market, but it falls well short of what both the Single Market and EEA membership provides.

2.72 It has access to the level playing field in goods through an agreement on mutual recognition.

2.73 However, only some services sectors are covered, such as non-life insurance and public procurement. Switzerland has limited guaranteed market access for professional services, including accountancy and legal services. Relevant individuals, including self-employed professionals, can only provide services in the EU for a maximum of 90 days each year.[42] This places significant constraints on Switzerland's capacity to export to the EU.

2.74 Swiss firms are also bound by EU rules regulating the market access of third-country firms, where such rules exist. Switzerland's 'third-country' status, and the barriers to EU market access this entails, is likely to be one reason for the large amount of financial services FDI from Switzerland into the UK. In 2014, 26.4% of European investment in UK financial services came from Switzerland.[43] Swiss firms do not enjoy the flexibility of UK firms in how they deliver their services in the EU, and do not enjoy the same rights in respect of establishing these subsidiaries.

2.75 Alternative FTA arrangements offer less guaranteed access and allow countries to impose barriers. The types of barriers services firms could expect to face include nationality requirements, requirements to locate their offices in an EU member state, and barriers on the ownership of companies.

2.76 The Canadian agreement is the most substantive EU FTA but falls well short of both the Single Market and EEA membership. The agreement is over 1500 pages long, over 800 of which are reservations from free trade demanded by either side.[44]

2.77 The agreement covers mutual recognition of goods in some but not all areas. Where this is not the case, Canadian firms will have to comply with EU rules over which they have no say or vote if they want to sell to the EU. In the case of the UK, this could create new non-tariff barriers to trade as regulatory standards diverge over time, leaving the UK with a difficult choice: accept future EU rules over which the UK has no say, produce to 2 different standards, or stop selling to the EU.

2.78 While there is some services liberalisation, the EU retains over 500 reservations limiting Canadian access and this alternative does not provide guaranteed access to services markets in the way that EU membership does.[45] The UK would face barriers to accessing every major services sector in the EU. For example, the audio-visual and broadcasting sectors are excluded from the deal entirely and Canadian airlines are, and will continue to be, able only to operate routes in Europe if they start or end at a Canadian airport, unlike UK companies, which are currently free to operate routes between and within other EU member states.

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42 Detail can be found in the 2002 Swiss-EU agreement on the free movement of persons. This can be found at: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=URISERV:em0025&from=EN

43 ONS data on Inward Foreign Direct Investment (FDI) Involving UK Companies (2014).

44 See the text of the EU-Canada FTA: http://trade.ec.europa.eu/doclib/docs/2014/september/tradoc_152806.pdf

45 Ibid. Details of reservations are given from p979 onwards.

2.79 Mutual recognition of professional qualifications is subject to future negotiations between Canada and the EU whereas, as part of the EU, many UK professionals such as doctors, architects, lawyers, and vets have their qualifications recognised by other EU countries. There are some limitations in terms of public procurement, where there remain a number of restrictions and exemptions that do not apply to EU firms. Overall, sectors accounting for almost half of UK services exports to the EU would face significant impediments if the UK were to replicate the Canada agreement following an exit from the EU.[46]

2.80 As outlined in Box 2.C below, one area where all of the non-EEA alternatives offer significantly less access to the Single Market is financial services. The EU financial services passport allows firms to operate across the EU under a single licence. Where financial services operators are legally established in one member state they are able to establish branches or provide their authorised services in the other member states without further authorisation.

2.81 Neither Turkey, Canada nor Switzerland has access to the passport. Instead, when conducting business on a cross-border basis, firms based in these countries need to meet authorisation requirements separately in each EU country in which they want to do business.

2.82 The financial services passport is particularly important to the UK because of the strength of its financial services sector. Losing access to it in the event of a UK exit from the EU would have a significant impact on the UK economy. In addition it would disproportionately impact on the scale of the UK's guaranteed services access in any alternative, given the high-level of completion of the Single Market in financial services as a result of the passport, the correspondingly lower level of guaranteed services access under the alternatives arising from its loss, and the relative importance of financial services exports to the UK.

2.83 Negotiated bilateral agreements are largely 'static', with rules set at one point in time, rather than evolving over time to reflect changing circumstances like the EEA agreement. They do not automatically offer further access as the Single Market develops into new areas where there are currently barriers, as EU membership does. Many of the reforms to the Single Market discussed in Part 4 of Section 1 will not apply to these countries. In this respect, the difference in access between these alternatives and the Single Market will only increase over time as the Single Market is further developed.

2.84 If the UK did not reach a new agreement with the EU, or until it did, the standard WTO market access arrangements would apply, which offer very limited access to the level playing field. There are limited reductions in non-tariff barriers through the WTO compared to EU membership. Trade in services would be affected significantly: international partners would only be obliged to provide guaranteed access in line with WTO rules. This provides a much more basic framework, and much less access for business. WTO membership would therefore represent a significant closing of the UK's access to global markets. The UK would be the first major economy in history to reduce its guaranteed access to the EU market in services.

46 HM Treasury estimate based on ONS data.

Box 2.C: Consequences of being outside the Single Market in financial services

The deepening of the Single Market for services has gone furthest in the financial sector. The implications of EU exit for this sector are significant and also show some of the challenges leaving the EU would have for other service sectors.

No negotiated bilateral agreement between the EU and a non-EU/EEA country (including the Swiss agreement) provides access to the financial services passport. The passport allows firms to operate across the EU under a single licence, whereas firms outside the EEA need to be authorised in each country in which they do business. For example, if unable to sell services directly from the UK or through a branch, firms may need to establish a subsidiary in the continuing EU. As a result, some firms may relocate activities, moving jobs and tax revenue away from the UK. For affected firms the cost, complexity and uncertainty associated with their European business would increase. This restructuring could also result in less efficient capital and liquidity management. For example, the efficient deployment of capital is a key benefit of the Single Market for Lloyd's of London.[47]

Outside the EEA, in some areas UK firms would be caught by EU rules which determine how third-country firms can trade with the Single Market. For these firms to continue accessing the EU market under these regimes, the UK would need to keep its financial regulation equivalent to the EU's despite no longer having a say over the content of the EU regulation.[48] There would also be uncertainty about how the European Commission would judge equivalence and any decision could be rescinded at any time. Furthermore, the remaining EU could repeal or amend the access regime in the future.

The European Commission, supervisory agencies,[49] individual member states and the European Court of Justice (ECJ) would continue to have a large bearing on the UK's access to the EU's financial services market.

As a global trading hub, the UK has a strong interest in influencing EU and international rules to secure more open and better functioning global markets, and this influence would be significantly diminished outside the EU. While the UK would continue to influence international rules, this influence could also be diminished. Moreover, the UK would have no say over how international standards are implemented by the continuing EU, which is important given the interconnections between UK and EU financial sectors.

Losing full access to the Single Market and influence over EU rules would significantly disadvantage the financial sector. A substantial loss of EU market access would erode the UK's competitiveness as an international financial centre and could damage the UK's cluster of financial services. Once destabilising forces have taken root they can be very difficult to reverse. If significant financial firms moved operations out of the UK as a result of impaired market access, this could encourage further relocations as the agglomeration benefits associated with the UK's cluster of financial services are weakened.

47 *Implications of Brexit for the London Insurance Market*, Lloyds (2016).

48 Firms would also be subject to a registration and monitoring regime.

49 Passporting rights for EEA countries are currently subject to implementing EU financial services legislation since the creation of the European Supervisory Authorities.

As set out in Box 1D, in 2014 financial and insurance services contributed more than 7% of UK GDP.[50] It employs over 1 million people, around two thirds of whom are based outside of London.[51] In 2014-15 the sector contributed an estimated £66.5 billion in taxes.[52] Any alternative to EU membership that substantially reduced guaranteed access to EU markets would therefore have a negative impact on UK GDP, productivity, employment and tax revenue.

Access to non-EU markets

2.85 Just as exiting the EU would offer less access to EU markets, so it would offer less access to wider global markets.

2.86 As an EU member, the UK benefits from access to non-EU markets through the EU's FTAs with them. While these fall short of the Single Market in terms of breadth and depth, they are some of the most advanced external FTAs in the world. As set out in Table 1.A, completing all the deals currently under negotiation would mean that 82% of the UK's current exports will be with either the EU or to markets with which the EU has external trade deals.

2.87 None of the alternatives discussed in this Section provide access to the EU's FTAs around the world. Even Turkey which is in customs union with the EU must negotiate access to these markets separately, even while opening its own markets immediately to third countries who have signed an FTA with the EU. For example, Turkey is yet to conclude trade deals with Mexico and South Africa, while the EU reached trade deals with both of these countries in 2000.[53]

2.88 The UK would therefore have to renegotiate the existing FTAs it has with the rest of the world through the EU, as well as seeking to negotiate arrangements with countries the EU is currently negotiating with. This would involve seeking to renegotiate arrangements with the EU and over 50 other countries around the world while commencing trade negotiations with a further 67.[54] As discussed in the government's recent document *Alternatives to membership*, it would take up to a decade or more to negotiate a new agreement with the EU and to replace the UK's existing trade deals with other countries. In the meantime, the remaining EU would continue to negotiate the planned new agreements it is seeking.

2.89 In the period between exit and negotiating new trade deals, the UK would revert to the standard WTO arrangements and associated tariffs set out above. The disruption caused during this period could have a lasting impact.

2.90 Where specific agreements were negotiated – either to replace existing EU FTAs or to agree new ones – there is no guarantee the UK would manage to secure terms as good as EU FTAs offer. To improve market access with the rest of the world through a newly

50 GDP figure based on ONS Blue Book 2015.

51 Employment figures based on ONS workforce jobs by industry (SIC 2007) – seasonally adjusted, available at: https://www.nomisweb.co.uk/reports/lmp/gor/2013265927/report.aspx#tabwfjobs

52 This estimate is based on a research report conducted on behalf of the City of London Corporation: Total Tax Contribution of UK Financial Services, Eighth Edition, PwC (2015).

53 Information on Mexico's trade agreement with the EU can be found at http://rtais.wto.org/UI/PublicShowRTAIDCard.aspx?rtaid=73
Information on South Africa's trade agreement with the EU can be found at: http://rtais.wto.org/UI/PublicShowRTAIDCard.aspx?rtaid=91

54 See: http://ec.europa.eu/trade/policy/countries-and-regions/agreements/index_en.htm

independent trade policy, the UK would need to be able to agree more trade deals of the same or higher quality than the EU without being part of a large negotiating bloc. There are a number of reasons why this is unlikely.

2.91 There is a growing trend towards regional arrangements involving groups of countries for the most advanced trade agreements. Two of the most advanced agreements in the world are the Trans-Pacific Partnership between 12 countries of the Pacific Rim and the TTIP currently being negotiated between the US and the 28 member states of the EU.[55] The size of the EU market makes negotiating with the EU a priority for other countries or trade blocs and gives the EU a strong negotiating hand with its partners. It is likely therefore that other large economies would prioritise completing trade deals with the remaining EU over a specific deal with the UK.

2.92 With an economic weight 5 times the size of the UK, the EU is one of the most influential powers in trade negotiations.[56] As discussed in Section 1, it is a major force for global trade liberalisation and plays a key role in WTO agreements. The 2013 Balance of Competences review saw the EU's negotiating weight as an advantage, and this is supported by academic analysis which shows the rigidity of negotiating as a single entity gave additional influence.[57] Reflecting the importance of negotiating weight, other countries group together in trade negotiations, for instance Mercosur, to strengthen their position.

2.93 In contrast, outside the EU, the UK would be in a weaker position, which could impact the quality and favourability of the deals it would be able to strike with its negotiating partners, as well as the priority they would attach to such negotiations.

2.94 Taking the US as an example, it is instructive to consider how reliant the EU and the UK would be on exports to the US relative to US exports in the opposite direction measured in terms of the share of those exports as a proportion of GDP. The UK is roughly 7 times more reliant on exports to the US than vice versa. By comparison, the EU is only one and a half times more reliant on US exports than vice versa. The UK negotiating position with the US would therefore be weaker if the UK were outside of the EU.[58]

2.95 This is reinforced by the experience of some EFTA countries. For example, the Switzerland-China Trade Agreement came into force in 2014. It requires Switzerland to reduce tariffs on almost all Chinese imports with immediate effect. In return, 84% of Swiss exports to China will be exempt from tariffs, but reductions will be phased in over a 15-year period to the late 2020s.[59] Negotiations between Norway and China were suspended in 2011 and EFTA has not yet begun FTA negotiations with some large economies, such as the US, as the focus of these countries has been on negotiations with the EU.

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55 TPP participating countries include the US, Canada, Japan, and Australia. Further details and full membership list available at https://ustr.gov/tpp/

56 IMF *World Economic Outlook* Database (April 2016).

57 Meunier, Sophie, and Kalypso Nicolaidis. *The European Union as a Conflicted Trade Power.* Journal of European Public Policy Vol. 13.No. 6 (2006): pp. 906-925.

58 In 2014, EU exports to the US represented 3.4% of EU GDP whereas US exports to the EU represented 2.2% of US GDP. UK exports to the US represented 4.9% of GDP, whereas US exports to the UK represented only 0.7% of US GDP. All EU figures refer to the EU excluding the UK. Data sources: COMTRADE (goods data), OECD (services data), and World Bank (GDP data).

59 Available at: http://www.seco.admin.ch/themen/00513/02655/02731/04118/index.html?lang=en&download=NHzLp Zeg7t,lnp6I0NTU042l2Z6ln1ad1lZn4Z2qZpnO2Yuq2Z6gpJCGdYB3f2ym162epYbg2c_JjKbNoKSn6A--

2.96 The specific nature of the UK's economy and composition of its exports would also complicate any negotiating dynamic. As a large exporter of services, any UK negotiation with a non-EU country would need to reflect the UK's priorities in services, while the priority of the non-EU partner country would likely be in goods. Securing new access to their services markets, which are traditionally kept closed, in return for access to the UK's traditionally open goods market would be a new and real challenge. These sector-specific dynamics arise much less in EU-level negotiations.

2.97 Finally, as set out in the government's recent document *The process for withdrawing from the European Union*, while UK negotiations on exit and a new relationship with the EU continued, the UK would be constrained in its ability to negotiate and conclude new trade agreements with countries outside the EU. The countries with which it currently has preferential trade agreements through the EU are likely to want to see the terms of the UK's future relationship with the EU (and at the WTO) before negotiating any new trade agreements with the UK. In addition, many of the UK's trading partners, including the US, are already negotiating with the EU. Before they start negotiations with the UK they are likely to want those deals to conclude.

Part 3: Obligations and influence

- All alternatives that provide access to the Single Market involve accepting obligations associated with that access.
- No other country has been able to agree significant access to the Single Market – especially for services – without having to accept EU regulations, free movement of people and financial contributions to the EU.
- It would not be in the economic interests of the rest of the EU to offer the UK an alternative that is better than they themselves enjoy.

Obligations

2.98 As set out in Section 1, most of the economic obligations arising from EU membership are associated with the Single Market and the access it provides. There is a direct relationship between the access the different alternatives provide and the obligations arising from them.

Regulatory framework and other policies

2.99 As the alternative with most access to the Single Market, EEA membership comes with the greatest obligations. Under the EEA agreement, Norway is required to ensure its domestic law complies with any EU legislation that forms part of the EEA agreement. This is to ensure a level playing field based on common rules and equal conditions of competition. An independent study commissioned by the Norwegian government in 2012 calculated that, in return for its access to the EU market, Norway has had to incorporate approximately three quarters of all EU laws into its own domestic legislation.[60] This includes not only sector-specific product and service rules, but also cross-cutting legislation in areas such as competition policy, state aid, and intellectual property.

2.100 In addition, Norway is required to comply with EU legislation in areas not directly related to the Single Market, including elements of social policy, consumer protection and environmental standards. This includes the Working Time Directive, the Agency Workers Directive and the Renewable Energy Directive.[61]

2.101 Norway is also obliged to accept the free movement of people from both EU and EEA countries. EEA and EU nationals moving to Norway to work or find a job are entitled to be treated on the same basis as nationals. This means that they have the right to access benefits, including unemployment allowances, sickness benefit and housing benefit. In 2015 more than 6% of the population resident in Norway were nationals from other EU countries, a higher proportion than in the UK.[62]

2.102 Norway is also subject to the jurisdiction of the EFTA Court, based in Luxembourg and comprised of judges from the EFTA countries. In the vast majority of cases, the EFTA Court follows the principles in the ECJ's rulings. Norway is also subject to the EFTA surveillance

60 Norwegian government, *Outside and Inside: Norway's agreements with the European Union, Chapter 1, p6,* Norwegian EEA Review Committee (2012).

61 Directive 2003/88/EC, Directive 2008/104/EC and Directive 2009/28/EC.

62 Data for 2015. The equivalent figure for the UK is 4.6%. Source: Population on 1 January by five year age group, sex and citizenship [migr_pop1ctz], Eurostat (Accessed 13/04/2016).

authority which plays a similar role to the European Commission in policing the rules of the Single Market in the non-EU EEA countries.

2.103 Where they have access to the Single Market, Turkey and Switzerland are obliged to accept the obligations associated with that access. In order to access the EU market, they must adopt and enforce rules that are equivalent to those in the EU, in particular to remove technical barriers to trade in the relevant products. Failure to do so risks the EU blocking access to the related parts of the Single Market. Both Turkey and Switzerland are required to follow competition, state aid and environmental rules, without full access to the Single Market.

2.104 Turkey does not face wider EU regulatory requirements outside the areas where it has access to the Single Market.

2.105 Switzerland has wider obligations. Like Norway, Switzerland is obliged to accept the free movement of people from both EU and EEA countries**.** In 2015, 16% of the population resident in Switzerland were nationals from EU countries, a higher proportion than in the UK**.**[63] While Switzerland is not generally subject to ECJ jurisdiction, the EU has made it a central part of the current negotiation of a new institutional agreement that Switzerland should be subject to binding ECJ jurisdiction more generally.

2.106 Countries participating in FTAs accept certain obligations associated with the access to the EU market that the deals give them. Reflecting the development of FTAs towards reducing non-tariff barriers, regulatory convergence and the obligations associated with that are a growing feature of such trade deals, whether with the EU or more generally. Canadian exporters are required to comply with relevant EU products standards and technical requirements to access the EU market without Canada having a say in those standards.

2.107 In addition, FTAs also require signatories to make their best endeavours to comply with environmental standards, human rights, labour rights and intellectual property. In particular, EU trade deals include requirements on human rights, sustainable development, good governance and respect for the environment. For example, the EU-Canada Strategic Partnership Agreement seeks to broaden the scope of the bilateral cooperation between the EU and Canada on a wide range of issues, from international peace and security, terrorism and the fight against drugs to the promotion of human rights and non-proliferation. It provides for the possible termination of the Canada bilateral agreement in the event of a particularly serious and substantial violation of human rights or non-proliferation commitments.

2.108 The Canada agreement also contains a number of chapters relating to commitments on other issues, such as greater transparency of governance. There is also a chapter relating solely to commitments on the temporary movement of people. As part of this chapter, both parties will commit to allow temporary entry for up to 18 months for certain classes of business workers. FTAs generally contain commitments on the temporary movement of professionals in line with WTO commitments. In ongoing negotiations for trade agreements with the EU, other countries, such as India and Japan, have prioritised access to the EU labour market as part of the FTA.

2.109 Under an FTA, business would face a weaker level of enforcement of the rights provided under the agreement. In the EU, a UK company operating in the Single Market can bring an action against discriminatory or anti-competitive practices using the domestic courts

63 Source: Population on 1 January by five year age group, sex and citizenship [migr_pop1ctz], Eurostat (Accessed 13/04/2016).

of the member state where the infringement took place. The UK government or the European Commission can also bring a case to the ECJ to protect companies' interests.

2.110 Finally, as the alternative that provides least access to the Single Market, a WTO arrangement would involve fewest obligations. However, even then in practice UK business would have to comply with many EU regulations, such as on the environment or safety, in order to trade within the Single Market. The UK would still need to comply with WTO obligations relating to the temporary movement of certain professionals.

2.111 The WTO provides much more limited arrangements to handle trade disputes than the Single Market. Businesses cannot directly enforce their rights under WTO rules. Only governments can bring cases on behalf of businesses. The WTO dispute-settlement process is burdensome, both in time and resources. Outside the EU, trade disputes around services tend to be particularly difficult to tackle – in 21 years, only 24 cases concerning services trade have been dealt with by the WTO.[64]

Contributions to EU financing

2.112 The alternatives that provide most access to the Single Market also require financial contributions to the EU.

2.113 While EEA countries do not contribute to the EU budget in the same way as EU member states, the EEA agreement obliges members of the EEA to contribute funds to reduce social and economic disparities. This means that they pay for EU regional policy objectives without being eligible for any receipts. These contributions take the form of 'EEA grants' to poorer EU member states. The size of these grants are determined by the size of the EEA member's economy. Following the EU's enlargement in 2004, Norway has also made additional payments to fund development in the new EU member states.[65]

2.114 EEA countries also participate in EU budget programmes on a case-by-case basis, including the EU's main research programme, Horizon 2020. Institutions in EEA countries can bid for receipts from those EU programmes that they choose to participate in. Finally, EEA countries pay administrative costs, including contributions to the EEA and EFTA administrations. No EEA member states receive a rebate on these contributions.

2.115 Switzerland also makes financial contributions to the EU in return for access to the Single Market. Since the enlargement of the EU in 2004, Switzerland has committed to pay grants to reduce "the social and economic disparities" in the member states that joined in 2004, 2007 and 2013. These obligations are currently ongoing, with the last of these programmes, relating to Croatia, expiring in May 2017.[66]

2.116 Switzerland has also opted to participate in various programmes funded by the EU budget, for example EU research programmes. As with Norway, Switzerland is required to contribute to the cost of these programmes, and its institutions can bid for funding from them. Again, it does not receive a rebate.

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64 Details of WTO (GATS) dispute settlements can be found at: https://www.wto.org/english/tratop_e/dispu_e/dispu_agreements_index_e.htm?id=A8#

65 For further details, visit: http://eeagrants.org.

66 *Swiss enlargement contributions: Activities and results for 2014*, Swiss Agency for Development and Cooperation SDC & State Secretariat for Economic Affairs SECO (2015).

2.117 The Canadian FTA does not require financial contributions to the EU. Nor does the WTO option. But if the UK adopted the same relationship with the EU as Norway's and Switzerland's current arrangements, it would continue to be obliged to make financial contributions to spending in the EU. The size of these contributions would be a matter for negotiation. The UK's rebate is part of its EU membership, and so the UK would lose this rebate on any such contributions. This negotiation would take place in the run up to the EU's negotiation of its next Multiannual Financial Framework. The UK would also have to decide which programmes to participate in. Participation would increase the cost of the relationship for the UK.

2.118 Separately, the UK government would have to choose whether to replicate from domestic spending the £5.6 billion a year of receipts currently received from the EU.[67] Even countries that can choose to participate in some EU programmes, such as Norway and Switzerland, do not have access to receipts from the Common Agricultural Policy or Structural Funds. These currently account for around three quarters of the UK's receipts. Proposals for replicating such receipts would have to be weighed against other public spending priorities, and would be subject to the spending priorities of the government at the time.

Balancing access and obligations

2.119 The balance between access to the EU market and obligations associated with it is a source of tension in some of the countries with alternative arrangements.

2.120 For example, Swiss relations with the EU are at an important juncture. Ongoing concerns over the process for Swiss adoption of EU rules remain an impediment to agreements on further Swiss access to the Single Market (e.g. on electricity). Similarly, following a Swiss referendum to introduce quotas for immigration of EU nationals to Switzerland, the EU has made it clear that this would be a breach of the EU-Switzerland bilateral agreements and refused to accept any arrangements that would compromise Swiss participation in the free movement of people. It has suspended negotiations on further Swiss access to the Single Market, and noted the existence of the so-called "Guillotine clause" which means a number of connected agreements could fall if the free movement bilateral agreement is violated.[68]

2.121 There is also wider pressure from the EU to agree further financial contributions as a price of further progress on deepening Single Market access.[69]

2.122 At the same time, the EU has called for "an ambitious and comprehensive restructuring of the existing system of sectoral agreements" to put the Swiss relationship on a more formal institutional footing, increase the speed of Swiss implementation of EU standards, and "ensure homogeneity and legal certainty in the internal market."[70]

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67 As set out in Table 1.B in Section 1.

68 Council conclusions on a homogeneous extended Single Market and EU relations with Non-EU Western European countries, General Affairs Council, Brussels, 16 December 2014, paragraph 52. Available at http://eeas.europa.eu/switzerland/index_en.htm

69 Ibid.

70 Ibid.

Influence

2.123 As an EU member, the UK has a significant voice in shaping the rules associated with membership. It has used that influence to maximise economic benefits from the Single Market.

2.124 Under any of the alternatives to EU membership the UK would not participate in the EU's governance and would lose the influence that goes with that. It would surrender its vote and have no right of veto in areas that are decided by consensus or through unanimity voting.

2.125 Norway has no representation and no vote in deciding EU law. The Norwegian Prime Minister does not attend the European Council. Norway does not participate in the Council of Ministers, has no MEPs, no national member of the European Commission, and no judge in the ECJ. Norway therefore has very limited influence over decisions made by the EU that directly affect it.

2.126 Norway can contribute expert views and does have some rights to be consulted over new EU laws through an EEA Joint Committee. Norway has a 'Right of Reservation' over the application of new Single Market rules, but has never used it, and invoking it could lead to suspension of Single Market access in the related area.[71]

2.127 Like Norway, Switzerland has no representation in the EU's institutions and no role in the EU's legislative processes. Switzerland has no right to be consulted on laws drafted by the European Commission.

2.128 Neither Turkey, Canada nor countries with an FTA have any say over future EU rules.[72] Outside the EU they have little influence and no ability to try to block measures that put their companies at a disadvantage. If relying on WTO membership, the UK would have no direct say at all over EU decisions. Some limited influence might be possible through diplomatic contact and indirectly through other international organisations.

2.129 If the UK wanted continued access to EU markets following exit, it would have to accept the obligations which go with that access and so accept further limits over its domestic regulatory framework in addition to those already discussed in Section 1. So influence over these obligations matters.

2.130 Influence over EU rules matters particularly to the UK compared to countries which have these alternative arrangements. The UK has a much larger population than other European nations outside the EU, such as Norway and Switzerland. The UK therefore has a much larger voting share in EU decision making than these countries would were they EU members, and so has much greater influence to lose. The UK's voting share is over 12 times larger than Norway's would be and 8 times larger than Switzerland's would be (see Chart 2.F). The EU is a much larger trading partner for the UK than countries outside Europe with EU FTAs, such as Canada.

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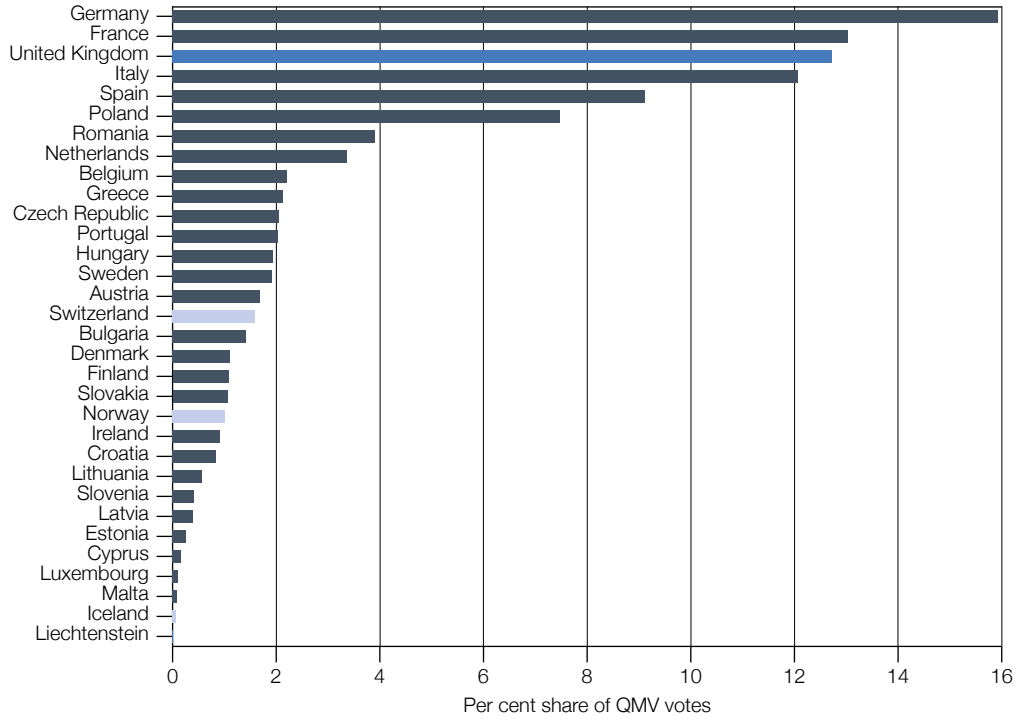
71 The "right of reservation" is set out in Article 102 of the EEA Agreement.

72 Turkey attends some Commission-chaired customs working groups, but has no vote and cannot be present when voting takes place.

Chart 2.F: Imputed vote share of EFTA Members if they were to become full EU members*



*The QMV vote shares for non-EU countries are illustrative, and are calculated on the basis of what that country's share of EU population would be if that country joined the EU. Shares for EU countries are based on the current EU population.

Source: HM Treasury calculations, Eurostat, European Council

2.131 Without the UK's influence, there is a high risk that the EU's rules and policies would diverge from the UK's preferred outcome. The UK has used its level of influence to steer the EU in the direction of economic liberalisation and reform, as set out in Section 1. The absence of the UK from EU decisions would remove the EU's leading voice for open, liberal markets, better regulation and completing the Single Market. The views of more protectionist member states could come to hold sway in EU policy debates, influencing EU rules in a direction that would not be in the economic interests of the UK.

2.132 Over time, this would have a cumulatively damaging impact on the UK economy, meaning it is highly likely access to the Single Market would deliver lower benefits to the UK.

2.133 It is inevitable that if the UK were to leave, the remaining EU members would write the rules to suit companies remaining inside the EU, not those outside. If the UK wanted to avoid UK producers having to work to 2 sets of standards over the longer term, each time the rules changed it would need to update domestic legislation.

2.134 As set out in Section 1, on exit from the EU the UK would retain its single voice in a number of international institutions, like the IMF and World Bank, and global standard setting bodies, like the Financial Stability Board. However, given the important role the EU plays in many of these bodies, it is likely the UK would lose influence over these global standards. It would no longer have the significant influence over the EU's position in such bodies that it does today.

2.135 In or out of the EU the UK will still be subject to EU and international obligations, but the UK would have far less say or no say at all over those rules from outside the EU. Loss of influence over the obligations associated with market access would have a significant negative impact. Having a say over the important rules that affect UK businesses gives greater economic sovereignty to the UK.

Implications for the UK

2.136 The long-run impact of leaving the EU would depend on the new relationship between the EU and the UK. This would involve choices. But based on the evidence from the alternatives discussed in this Section, there are a number of implications.

2.137 First, all alternatives would give less access to the EU and wider markets than continued EU membership. As set out in the previous Section, the Single Market is uniquely broad and deep, and none of the existing alternatives or indeed any FTA in the world comes close to providing the access it does to its market. The UK has significantly benefited from this access. If the UK wanted to avoid the most damaging consequences of losing these benefits on leaving the EU, it would need to negotiate as much access to the Single Market as it could. But this would come at a price.

2.138 This is because, second, all the alternatives involve obligations in return for the access they get. No other country has been able to agree significant access to the Single Market – especially for services – without having to accept EU regulations, free movement of people, and financial contributions to the EU.

2.139 Third, all the alternatives involve losing participation in EU decision making and the loss of influence that goes with that. There is no alternative to EU membership that would give the UK a say over the obligations it would continue to face in return for access to the Single Market. This would mean that even in a scenario where the UK could secure access to the EU market, it would move from being a rule-maker to rule-taker over the obligations relating to the market that is the destination for almost half its trade.

2.140 Finally, all the alternatives would also involve reduced access to global markets. If the UK left the EU it would lose participation in its FTAs with non-EU countries. As set out in Section 1, while these fall short of the Single Market in terms of breadth and depth, they are some of the most advanced in the world. The UK would need to seek to renegotiate such access to these markets.

2.141 There is significant uncertainty about how long this would take, how much access the UK could achieve, and how comprehensive new FTAs would be for the UK in sectors of particular importance, including services.

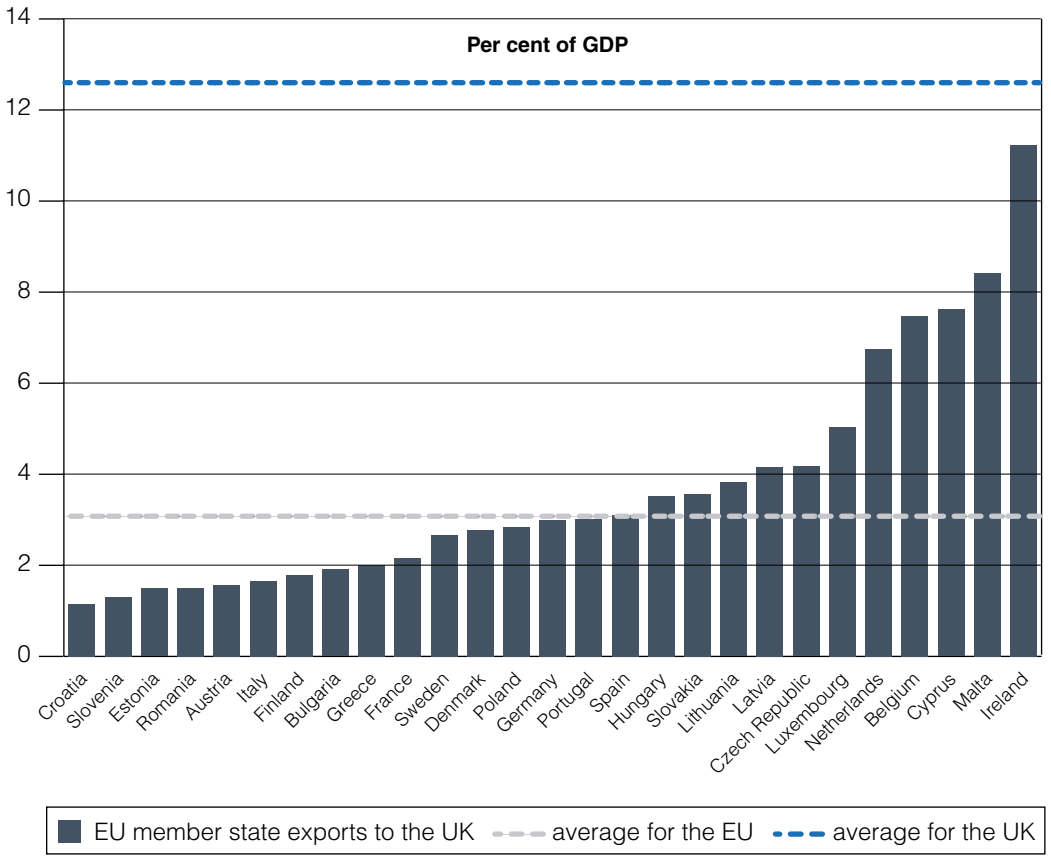
2.142 From this, it is clear that no existing alternative is in the UK's economic interest. Negotiating a new arrangement would be extremely complex. Indeed there would be multiple, simultaneous and overlapping negotiations: securing a deal to withdraw from the EU, seeking restored access to EU markets, and securing restored access to global markets.

2.143 It would not be in the economic interests of the rest of the EU to offer the UK an alternative that is better than EU membership, and the special status the UK has already negotiated within it. The EU countries have never done so with any other country.

2.144 If EU countries were to offer the UK significant access to the Single Market, they would certainly insist that the UK accepts the associated obligations and rules, as every other country has had to do. Otherwise they would be giving the UK a better deal than they themselves enjoy, and would be putting their businesses at a competitive disadvantage.

2.145 Negotiating incentives would not favour the UK. Of course, if faced with this situation any UK government would seek to secure the best possible outcome, but trade with the EU is more economically significant to the UK than trade with the UK is to the rest of the EU. While the UK is an important market for EU exports, the UK has its trading relationship with 27 countries at stake, whereas the rest of the EU have only their trading relationship with one country at stake – less than 8% of EU exports come to the UK while 44% of UK exports go to the EU.[73] Seen another way, as Chart 2.G shows, while EU exports to the UK are worth only 3.1% of EU GDP, UK exports to the EU are worth 12.6% of UK GDP.[74]

Chart 2.G: Exports of EU member states to the UK compared to UK exports to the EU (2014)



Source: All figures for 2014. Trade from ONS. GDP data from Eurostat.

2.146 Neither would timing incentives favour the UK. The 2 year deadline of the Article 50 process described in the government's document *The process for withdrawing from the EU*, and the need to minimise the considerable and damaging economic uncertainty of leaving the EU, would mean the UK would be under a greater incentive to agree a new deal quickly than the remaining EU. This would weaken the UK's negotiating position.

73 ONS Pink Book data for UK exports, OECD EBOPS 2010 services data and UN COMTRADE goods data for EU exports. EU export data includes intra-EU trade. All data for 2014.

74 ONS Pink Book trade data and Eurostat GDP data for 2014.

2.147 Additionally, the UK would be embarking on these negotiations as the rest of the EU began to consider its future financing arrangements for the next Multiannual Financial Framework. The EU would have just lost the UK's net contribution. It is inconceivable that the remaining EU would be prepared to consider UK access to its market without a financial contribution. Nor would the UK receive its rebate, which it would give up on leaving the EU. The EU's negotiating position would inevitably be to maximise the UK's contribution.

2.148 Even if the UK could secure significant access, it is likely that the rules associated with that access would worsen over time because EU rules are developed in the interests of its members. If the UK was not a member of the EU it would lose all influence over the rules, and the remaining members would have no incentive to write the rules in the UK's interest. Indeed, as economic competitors, they would have an interest in not doing so. Outside of the EU, the UK would have no opportunity to address that or seek redress through the protections it currently has as an EU member.

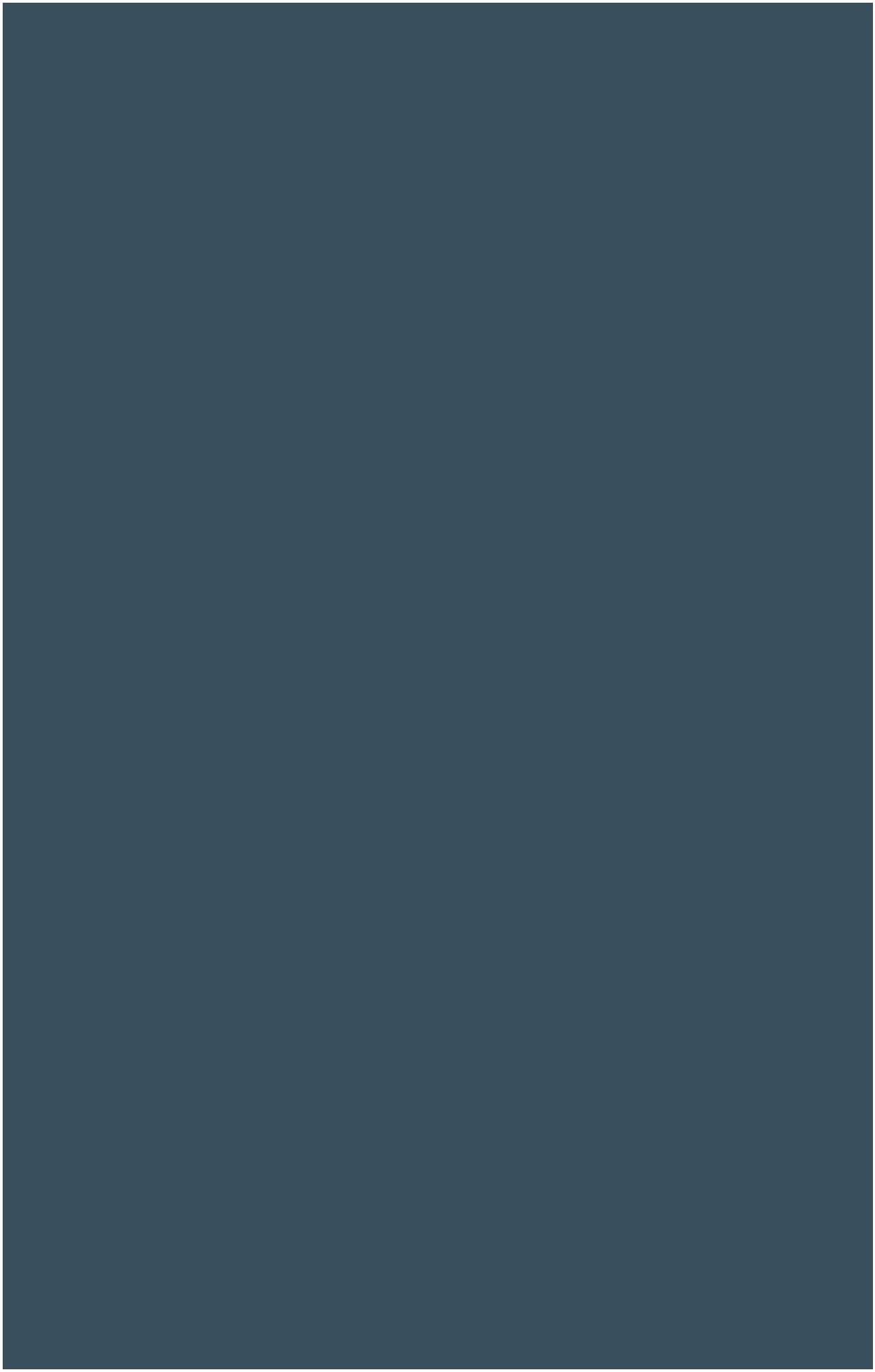
2.149 This would force a difficult choice on the UK: either develop separate rules, making it difficult for businesses to export to the EU, or accept the EU's rules that would increasingly develop in a way that would not meet the UK's interests. Either way, there would be an economic cost to the UK giving up the influence it gains from EU membership. As set out above, and in the previous Section, that cost is likely to be large given the UK's significant influence in EU decision making and its success in shaping rules relating to the Single Market to reflect its interests.

2.150 Furthermore, the UK could not quickly replicate the expanding access to wider global markets that EU membership provides. As set out above, the UK would have to renegotiate the existing FTAs it currently has with the rest of the world through the EU, as well as seeking to negotiate arrangements with countries with which the EU is currently seeking agreements. These deals would have to be of the same or higher quality than the EU's current trade deals to replicate or improve the UK's position. Given the negotiating weight of the EU as a bloc compared to that of the UK as an individual country, this is highly unlikely.

2.151 In the meantime, the remaining EU would continue to negotiate the planned new agreements. These would no longer have to include the UK's interests and, as a new economic competitor to the UK, it is likely the EU countries would use their superior negotiating power to reach agreements with all the major economies before the UK, and in such a way that could disadvantage the UK.

2.152 Finally, the UK's multiple negotiating priorities would weaken its position in them all. Indeed, the different negotiations would have competing incentives. If the UK defaulted to WTO membership, it would face a difficult choice on import tariffs. If it kept trade with the EU tariff-free, it would have to unilaterally lower tariffs with all other countries, losing critical negotiating leverage in trade agreements with the rest of the world. But the alternative would be higher tariffs on EU trade with implications for UK prices and tariffs on UK exports.

2.153 Overall, if it left the EU, the UK would be seeking to conclude multiple negotiations quickly – its exit from the EU, its future arrangements with the EU and its trade deals with the rest of the world. The UK would be seeking to secure a better deal than current membership of a reformed EU offers the UK. This would mean securing the agreement of the rest of the EU to offer a better deal to the UK than those EU members have themselves. This would not happen as it would not be in any other EU country's interest.



Section 3 – Macroeconomic analysis of the alternatives to EU membership and the benefits of EU reform

Summary

In the long term, greater openness to trade and investment boosts the productive potential of the economy. Openness increases competition among firms, allows access to finance from abroad, improves the quality of production inputs, and creates incentives to innovate and adopt new technologies. The HM Treasury analysis estimates the impact on trade and foreign direct investment (FDI) and what this means for productivity and Gross Domestic Product (GDP) under EU membership and the alternatives. Higher productivity means better quality jobs which lead to higher real wages and household incomes.

This document provides rigorous and objective economic analysis of the long-term impact of remaining a member of the EU compared to the alternatives. The analysis uses a widely adopted gravity modelling approach, which distinguishes the specific effect of EU membership and the alternatives from all the other influences that determine trade and FDI. The consequences for productivity and GDP are then estimated based on the most relevant external evidence on the impact of trade and HM Treasury modelling of FDI. Through a range of realistic assumptions, many of them cautious, the analysis produces robust estimates, which are within the range of external studies.

Leaving the EU to join the European Economic Area (EEA) would maintain considerable (but not complete) access to the Single Market, but there would still be an increase in trade barriers with the introduction of a customs border with the EU. It would also mean accepting EU regulations, the free movement of people and financial contributions to the EU. It would mean having to accept EU rules without getting any say over them. In the long term, reduced openness hits productivity which feeds through into lower GDP and living standards.

After 15 years, the UK is estimated to be between 3.4% and 4.3% of GDP better off inside the EU. In 2015 terms, the GDP impact of leaving the EU for the EEA would equate to a long-term loss of £2,600 a year for each household in the UK.

A negotiated bilateral agreement (such as a free trade agreement (FTA)) provides less access to the Single Market than the EEA alternative, in particular in relation to services, which are of critical importance to the UK. The bilateral agreements that involve most access have the greatest obligations: no other country has been able to agree significant access to the Single Market without having to accept EU regulations, the free movement of people and financial contributions to the EU.

After 15 years, the UK is estimated to be between 4.6% and 7.8% of GDP better off inside the EU than with a negotiated bilateral agreement. In 2015 terms, leaving the EU for a negotiated bilateral agreement would imply a long-term loss of GDP of £4,300 a year for each household in the UK.

Relying solely on the World Trade Organization (WTO) rules would result in a significant reduction in the openness of the UK economy to the outside world. It would be the alternative with the most negative long-term impact.

After 15 years, the UK is estimated to be between 5.4% and 9.5% of GDP better off inside the EU than adopting WTO rules. In 2015 terms, leaving the EU and relying on the WTO rules would mean a long-term loss of GDP of £5,200 a year for each household in the UK.

In terms of the long-term economic impact, recourse to WTO rules would be the least attractive of the 3 alternatives. It would, nevertheless, be the default relationship should the UK fail to reach an agreement with the EU. In all scenarios that retain access to the Single Market, the UK would have to accept rules that it has no control over, and would have to rely on other member states to implement the EU reform agenda that the UK has been a key champion of. Either of these factors could further increase the economic costs of these alternatives.

The performance of the economy is central to determining the health of the public finances. The analysis therefore considers the implications of these losses in GDP for tax and other public sector receipts. It finds that any potential fiscal gain from reduced financial contributions to the EU would be substantially outweighed by the negative impact on public sector receipts from the deterioration in the broader economic environment under any of the alternatives.

The net impact on receipts would be £20 billion a year in the central case of the EEA, £36 billion a year in the case of the negotiated bilateral agreement, and £45 billion a year in the case of the WTO. This assumes in all three scenarios that the UK would not have to make any financial contribution to the EU at all. However, as set out above, an alternative that provides significant access to the Single Market would require financial contributions to the EU and so the fiscal impact would be higher.

These estimates are based on the EU as it is today, without further reform. The total cost of leaving is likely to be higher. The new settlement for the UK negotiated by the Prime Minister in February 2016 included an ambitious agenda of economic reform in the EU. This will include the next stage of development of the Single Market, with a focus on bringing down the remaining barriers to trade in services, energy and digital, alongside completing major ongoing trade deals. If the economic benefits of reform are realised this could increase UK GDP by up to a further 4% – which equates to £2,800 for every household in the UK. With the UK outside the EU these economic reforms would be less likely to happen. So the cost of exit in terms of the potential loss of GDP would be correspondingly greater.

Part 1: Approach to modelling

- The assessment of the effects of leaving the EU is based on a rigorous quantitative analysis using a range of assumptions, many of them cautious. The analysis produces robust estimates of the impacts on productivity of the alternatives to EU membership described in Section 2.
- These are then combined using a global macroeconomic model to produce estimates of the impact on GDP.
- This provides the overall long-term effects of each alternative and allows a comparison of the effects of the alternatives against each other.

3.1 This section provides a rigorous quantitative analysis which combines long-term estimates of the impact on trade and FDI, two key elements of openness, into a set of macroeconomic scenarios of the impact on productivity and GDP. This produces robust estimates of the overall economic costs of the different alternatives as set out in Section 2 compared with the UK remaining in the EU. The impacts are estimated using well-established econometric techniques, either using HM Treasury estimation or the most relevant external analysis. HM Treasury's approach to key aspects of the modelling is set out below and compared where relevant with the approach taken in external studies. Annex A sets out the modelling approach in detail.

3.2 The focus of the analysis is on the long-run economic impact of exit. It assumes that after a 15-year period the nature of the UK's future relationship with the EU would be clear, uncertainty would have been resolved and the economy would have adjusted to a new structure, driven by the relevant changes in the UK's relationship with the EU. The 15-year horizon is consistent with both PwC's study for the CBI and the Oxford Economics analysis;[1] it is also consistent with the horizons often used in external analysis of changes in trade policies.[2]

3.3 A range of external studies conclude that a vote to leave the EU would lead to a period of uncertainty during the transition period with negative economic consequences, as set out in Box 3.D. A subsequent document will consider in more detail the short-term risks to the economy, labour market and public finances that would arise. For the purpose of this long-term analysis, an allowance for the persistent effect of the near-term impact of the shock of leaving the EU is included.

3.4 Any analysis also has to consider how UK domestic economic policies might change outside the EU. Consistent with the approach to other areas of domestic policy, the HM Treasury modelling analysis does not prejudge future government decisions and assumes no changes to other policy variables. Nevertheless, for the modelling analysis some assumptions

1 *Leaving the EU: Implications for the UK economy*, PwC, report for the CBI (2016). *Assessing the economic implications of Brexit*, Oxford Economics (2016).

2 For example, see *Estimating the Economic Impact on the UK of a Transatlantic Trade and Investment Partnership (TTIP) Agreement between the European Union and the United States*, CEPR, report for BIS (2013); *The Economic Effects of the Trans-Pacific Partnership: New Estimates*, Petri and Plummer (2016); *Do Economic Integration Agreements Actually Work? Issues in Understanding the Causes and Consequences of the Growth of Regionalism*, Baier et al (2008); *Policy Brief 2015/05 Brexit – potential economic consequences if the UK exits the EU,* Bertelsmann Stiftung (2015).

need to be made. These have been chosen to be as neutral as possible and are described in Part 2.

3.5 The economic evidence, as discussed by the Bank of England,[3] shows that openness can increase incentives to innovate and adopt new technology and promote the dissemination of ideas, increasing productivity and GDP.[4] Some analyses of the economic impact of EU membership do not quantify this effect which is important when looking at long horizons such as 15 years.[5]

3.6 A key issue in modelling these technological progress effects is whether they would have an impact on the level or the growth rate of GDP. In some theoretical growth models, trade liberalisation can raise the rate of economic growth permanently,[6] but it is difficult to capture these effects empirically and so the HM Treasury analysis captures the impact on productivity and GDP as a levels effect.

3.7 All the elements of the analysis are brought together and combined in a global macroeconomic model maintained by the National Institute of Economic and Social Research and used by the IMF, OECD, Bank of England and others.[7] The model is used to assess the overall macroeconomic impact on the UK (and the EU) under the different alternatives in the long term. Using a macroeconomic model in this way allows different economic channels, such as trade and investment, to be considered within the same framework. While the focus is on key variables such as GDP and GDP per capita, Box 3.A considers the implications for broader notions of economic well-being.

3.8 There is no precedent for an economy like the UK leaving the EU. Any quantitative analysis is therefore subject to uncertainty. To ensure the analysis is robust it:

- uses a set of realistic assumptions, many of them cautious, alongside empirically-based estimates
- presents ranges for each alternative, with the upper and lower ends of the ranges combining several different effects and allowing the analysis to test the sensitivity to using different assumptions in the key areas of trade, FDI and productivity. Additional caution is introduced to the assumptions used to produce the lower end of the range as explained in Part 2. In the estimates of the overall impact on GDP, the middle of the range provides a robust central estimate of the alternatives to UK membership of the EU
- builds the analysis on a baseline which does not take into account the potential benefits from implementation of the next stage of the EU Single Market, which would have a positive impact on UK GDP inside the EU

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3 *EU membership and the Bank of England,* Bank of England (2015).

4 *Dynamic Selection: An Idea Flows Theory of Entry, Trade and Growth,* Sampson (2016).

5 *Brexit – The Economic Impact: A Meta-Analysis*, Cologne Institute for Economic Research (2016). The authors note that a number of forward-looking studies do not cover all the relevant channels by which economic integration raises welfare and growth. Their study highlights that these welfare and growth effects are robustly supported by empirical research.

6 *The Growth Effects of 1992*, Baldwin (1989). *Measuring the Dynamic Gains from Trade,* Wacziarg (2001). *Trade Liberalization and Growth: New Evidence,* Wacziarg and Welch (2003). *Trade induced technical change? The impact of Chinese imports on innovation, IT and productivity,* Bloom et al (2009). *Trade, firm selection, and innovation: the consumption channel,* Impuillitti and Licandro (2013). *The Growth Effects of EU membership for the UK: a Review of the Evidence*, Crafts (2016).

7 NiGEM is developed and maintained by the National Institute of Economic and Social Research. NiGEM is used, to different degrees, by over forty organisations including the IMF, OECD, Bank of England and ECB.

3.9 Using caution means that the assumptions may underestimate the full costs of an unprecedented disruptive event like the UK leaving the EU. In addition the analysis does not allow for potential 'tipping point' effects, such as the risk that leaving the EU would threaten the UK's cluster of global financial services and related activities, or that there might be a sudden stop in the UK's ability to finance its large current account deficit outside the EU. Importantly it assumes an orderly, though undeniably difficult, adjustment. Adding tipping points would lead to greater estimated economic effects of leaving the EU.

3.10 Furthermore, as already described, the analysis models the link between openness and productivity as a levels effect rather than a growth effect. If it had been modelled as a growth effect then the loss of GDP would have been larger and this would also make the impact of leaving the EU even greater.

Box 3.A: Implications of leaving the EU for economic well-being

The analysis focuses on the impact on GDP but there are also well-being impacts from changing the UK's relationship with the EU.

While GDP remains the most widely used and recognised indicator of progress in an economy, in 2010 the UK government asked the ONS to measure broader economic well-being. It also commissioned an independent review of UK economic statistics by Sir Charles Bean[8] to review whether economic statistics in general – including GDP – were keeping pace with changes in the economy.

The focus of economic well-being is predominantly concerned with consumers. In the context of EU membership, there are a number of ways that UK consumers are likely to have benefitted from being part of the EU that are not captured by GDP:

- a core benefit of EU membership for the UK is trade. One channel through which trade has benefitted the UK economy is by increasing the choice of goods and services on offer to consumers.[9] While this is not captured in GDP, a wider variety of products increases the chances of a match between a consumer's tastes and the goods and services on offer and thus increases well-being
- quality improvements in goods and services are not fully captured in economic statistics such as GDP or consumer price indices despite the benefits from trade raising consumer welfare. Berlingieri et al (2016) note that the gains to well-being of trade agreements implemented by the EU have primarily benefitted UK consumers by raising the quality of imported goods[10]
- there are a number of EU regulations where the focus is on consumer protection and safety. This ranges from a set of rules and standards for products and services to regulations on environmental protection

GDP does not capture broader impacts on consumers from trade and GDP itself may not be keeping pace with changes in the economy as identified by the Bean Review. As a result, it is likely that the results reported in GDP terms could understate the overall net benefits of EU membership relative to the alternatives.

8 *Independent Review of Economic Statistics*, Bean (2016).

9 *Scale Economies Product Differentiation and the Pattern of Trade*, Krugman (1980). Krugman uses a theoretical approach to show that a group of countries with open trade will produce a greater diversity of goods than would one country alone. *The Payoff to America from Global Integration*, Bradford et al (2005) estimate the gains to US households from the expansion of trade and investment, which include lower prices and greater choice.

10 *The Impact of Trade Agreements on Consumer Welfare*, Berlingieri et al (2016).

Part 2: Long-run implications for the UK of the alternatives to the EU

- The key long-term estimates are described, including the impact on trade, FDI and productivity.
- The analysis compares the 3 main alternatives described in Section 2: the EEA; a negotiated bilateral agreement (such as an FTA); and relying solely on the WTO rules.
- To varying degrees, all the alternatives reduce openness and drive a reduction in GDP in the long term relative to remaining in the EU.

3.11 This part sets out the long-term estimates of the impact of trade, FDI, productivity and GDP for the 3 alternatives to UK membership of the EU:

- membership of the EEA, like Norway
- a negotiated bilateral agreement (e.g. Switzerland, Turkey, Canada)
- WTO membership (the default relationship e.g. Russia, Brazil)

The negotiated bilateral agreement category is broad and it includes a wide range of different arrangements. The modelling work for this category is based on the impact of FTAs. As described in Section 2, where bilateral agreements with the EU have pushed towards greater integration, as in the Swiss case, the differences with the EEA case diminish, both in terms of access and obligations. Further discussion on how to interpret the particular Swiss and Canadian arrangements is provided in Box 3.G.

3.12 More detail on the modelling is given in Annex A. As already explained, ranges are presented to show the sensitivity to some of the key assumptions in the analysis. The elements in constructing the upper and lower ends of the range are set out in more detail below and are:

- the size of the trade effects from leaving the EU
- the size of the FDI effects from leaving the EU
- the strength of the link between trade and productivity

Summary of key long-run modelling inputs

3.13 All the estimates in the HM Treasury analysis that follows are shown as percentage differences from the levels of GDP and other variables which would occur in 15 years time if the UK were to remain in the EU. This baseline does not take into account the potential benefits from the implementation of the next stage of the EU Single Market. These benefits are considered in Part 3.

Trade

3.14 As discussed in Sections 1 and 2, if the UK were to adopt either the WTO or negotiated bilateral agreement alternatives, new trade barriers would have a very significant impact on UK imports from and exports to the EU. The trade impact in the EEA case would be lower,

but leaving the EU customs union – the principal difference in access compared to EU membership – would impose some new barriers on trade at the border.

3.15 The HM Treasury analysis uses a widely adopted gravity modelling approach to estimate the impact of the EU and the alternatives on trade. This draws on the extensive economic research that has been carried out to establish the impact of different trade agreements. By looking across countries and back over time, the gravity modelling approach allows the analysis to isolate the influence of EU membership and alternative relationships relative to all the other influences affecting bilateral trade such as distance, historical ties, GDP and population. Some studies examine the impact of preferential trade agreements in general and treat negotiated bilateral agreements and EU membership together, which does not allow any differentiation between them. The HM Treasury modelling has been done to match the alternatives as closely as possible so that the results can provide robust estimates of the reduction in trade that would occur under each of the 3 alternatives.

3.16 Once the effect of each relationship has been identified they can be combined with other data, such as for UK goods and services trade, to estimate the UK specific impacts of moving from one sort of relationship to another, having controlled for all the other influences on bilateral trade. The analysis can then estimate the impact of moving from EU membership to another of the alternatives which is assumed to happen over a period of 15 years.

3.17 When the analysis of the effect of the alternative relationships on trade is used to model the effects of leaving the EU, an assumption is made that the effects of increasing economic openness and of reduced economic openness, which characterise the EU exit scenarios, are symmetrical. Section 2 notes that while some trade barriers would appear immediately on leaving the EU – such as those arising from the re-introduction of a customs border outside the customs union, tariffs and the loss of access from the loss of the financial services passport[11] – the speed with which other non-tariff barriers would emerge due to regulatory divergence would be a function of policy choices both in the UK and the rest of the EU. Nevertheless, it is reasonable to expect these differences to build over time and 15 years is long enough to expect such differences to have re-emerged.

3.18 In the EEA case, the full impact of re-introducing a customs border would be felt immediately and so no reduction in the full estimated trade impact is assumed for the upper and lower ends of the range. To allow for caution in the other 2 alternatives, the analysis assumes that at the lower end of the range, only half of the trade effect of going from the EEA to the negotiated bilateral agreement or the WTO rules comes through within 15 years. This effectively implies a slower degree of regulatory divergence compared with assuming a symmetrical effect. It is cautious because even in these cases some trade barriers would come through quickly. The upper end of the range uses the full estimated trade effects for these cases as for the EEA case.

3.19 The analysis makes an assumption about how non-EU trade arrangements would develop. As Section 2 set out, the UK would face an extended period of negotiation simply to retain its current level of access to non-EU markets. There is significant uncertainty about how long this would take and how much access the UK could achieve, as the UK's ability to negotiate beneficial deals as part of a larger bloc would no longer exist.

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[11] There may also be temporary trade barriers that exist in the short term but not in the long term. For example, problems linked to capacity constraints at borders can be resolved over time but could cause delays initially.

3.20 On balance, this is likely to mean lower access to non-EU markets. But because there is no way of estimating the degree of reduced access with precision, a stylised modelling assumption is made that after 15 years the UK has replicated the scope of current trade access to non-EU countries that it currently enjoys but not beyond this. In practice this is unlikely.

3.21 In addition, the effects of the existing non-EU trade agreements falling on leaving the EU would have a persistent effect on productivity. This is one part of the estimate of the persistent effect of the shock of the transition, discussed further below.

3.22 The results of the HM Treasury analysis are summarised in Table 3.A which shows the lower and upper ends of the range of the percentage reduction in the UK's total trade volumes (both exports and imports) under each alternative relationship. Box 3.B compares the HM Treasury results on trade with those in the external literature. A fuller discussion is provided in Annex A.

3.23 Section 1 also assessed the evidence for a trade diversion effect from FTAs on trade with non-members and concluded the size of the effect was very small, and negligible in comparison to the trade creation effect.[12] The HM Treasury analysis detailed in Annex A finds no evidence of a trade diversion effect of EU membership on trade with non-EU countries.

Table 3.A: Effect of leaving the EU on total trade volumes (% difference from level in EU after 15 years)

	EEA	Negotiated bilateral agreement	WTO
Lower end of the range	-9	-14	-17
Upper end of the range	-9	-19	-24

Details of the supporting analysis are given in Annex A.

3.24 Overall, with EU trade falling and with a negative impact on non-EU trade, there is a clear reduction in total UK trade under all the alternatives to EU membership.

Box 3.B: Comparison of HM Treasury results on trade with external studies

The modelling in Table 3.A is based on the HM Treasury gravity model results presented in the trade section of Annex A. The goods and services results have been weighted by goods and services flows for each trade partner to get a total UK trade effect. In order to estimate the trade impact of the scenarios considered, different variables have been combined. For example, the EEA alternative is the net result of a fall in trade from leaving the EU and a rise in trade from joining the EEA. This means that the EEA scenario results reported in Table 3.A are not directly comparable to the external studies which typically report the impact of the EEA variable without combining it with the EU variable. HM Treasury's results are described for these purposes below in a way that is comparable with the external studies.[13]

12 For example: *Is the WTO passé,* Bagwell et al (2015); *New measures of trade creation and trade diversion,* Magee (2008); *Fitting Asia-Pacific agreements into the WTO system,* Hufbauer and Schott (2007).

13 The range of the HM Treasury results for the different trade relationships has been constructed using the standard error values from the trade modelling as described in Annex A. The upper end of the range of the trade results presented in Table 3.A is based on the central estimates in Annex A with the lower end of the range adjusted down to allow for a slower degree of regulatory divergence as described in paragraph 3.18.

For the EU membership effect, HM Treasury estimates suggest that EU membership increases trade with EU members by 68% to 85%[14] relative to a baseline position of WTO membership.[15] This is comparable to other studies detailed in Section 1. The OECD[16] finds that being a member of the European Economic Area (the EU-28, Norway and Iceland) increases trade by approximately 60% but consider these results a lower bound. A widely used study, and the most comparable to the HM Treasury estimate, is from Baier et al (2008)[17] which finds that EU membership increases intra-EU trade by 92%. Carrere (2006)[18] reports larger effects from EU membership estimating that EU membership increases intra-EU trade by an average of 104%. Eicher et al (2012)[19] find that EU membership increases trade with EU members by 51%.

For the negotiated bilateral agreement effect, HM Treasury estimates suggest these increase trade among those party to the agreement by 14% to 21%.[20] This is a little lower than some external studies, for example Hufbauer and Schott (2007) find the FTA membership effect to be 27%. Baier et al (2008) find the FTA effect to be much larger (58%) although this is still smaller than their estimated EU effect (92%).[21]

For the EEA[22] membership effect, HM Treasury estimates suggest that EEA membership increases trade with EEA members by 35% to 53%.[23] This is a little higher than other studies in this area. Baier et al (2008) and Eicher and Henn (2011)[24] find that EEA membership increases trade by 21% and 34% respectively. However, there are limited studies in this area possibly due to the small number of countries involved.

Foreign Direct Investment

3.25 Section 1 described the evidence that EU membership has supported international investment flows into the UK. In line with earlier studies,[25] the focus has been on the impact on FDI inflows because there is evidence that they are associated with technology transfer, technological diffusion and the transfer of the best managerial practices[26] in the long term. In

14 See Table A.4 in Annex A.

15 Note, all trade results reported in this box are relative to a position of WTO membership with no trade agreement.

16 *Implicit Regulatory Barriers in the EU Single Market: New Empirical Evidence from Gravity Models*, Fournier et al, OECD (2015).

17 *Do economic integration agreements actually work? Issues in understanding the causes and consequences of the growth of regionalism*, Baier et al (2008).

18 *Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model*, Carrere (2006).

19 *Trade creation and diversion revisited: Accounting for model uncertainty and natural trading partner effects*, Eicher et al (2012).

20 See Table A.4 in Annex A.

21 Head and Mayer (2013) conduct a meta-analysis of gravity model results (*Gravity equations: Workhorse, toolkit, and cookbook*, Head and Mayer, 2013).

22 EEA membership here refers to Norway and Iceland.

23 See Table A.4 in Annex A.

24 *In search of WTO trade effects: Preferential trade agreements promote trade strongly, but unevenly*, Eicher and Henn (2011).

25 *Fiscal incentives, European integration and the location of Foreign Direct Investment*, Pain and Hubert (2002).

26 *Americans Do IT Better: US Multinationals and the Productivity Miracle,* Bloom et al (2012).

2014, expenditure on research and development performed in UK foreign-owned businesses increased by 2% and accounted for 52% of total expenditure.[27]

3.26 A body of economic evidence, summarised in Section 1, including studies of the 'export platform effect',[28] considers the role that a country's market access plays in a country's FDI. Survey evidence regularly demonstrates the weight that firms place on the UK's access to the Single Market when they are considering where to invest. According to one survey,[29] 72% of investors cite access to the European market as important to the UK's attractiveness as a destination for investment. Moreover, there is evidence to suggest that regional integration has a strong positive effect on FDI into the most attractive countries within a regional block.[30, 31]

3.27 As with the approach to modelling trade, the HM Treasury analysis of the impact on FDI of EU membership is based on the use of a gravity model. The gravity modelling approach allows the analysis to isolate the influence of EU membership and alternative relationships, relative to all the other influences affecting FDI inflows which are broadly the same as in the trade modelling.

3.28 Gravity modelling is used to provide estimates of the effect of moving from the EU to the WTO alternative, as detailed in Annex A. In the case of FDI, the data are more limited than for trade which creates challenges in producing estimates. To address these, the FDI effects for the negotiated bilateral agreement and EEA cases were generated by assuming the effects are proportional to the trade effects given in Table 3.A. In the negotiated bilateral agreement case this can be considered cautious as the formal modelling did not identify any difference from the WTO case.

3.29 Given the weight of the evidence, including the recent study by the LSE's Centre for Economic Performance (CEP), a modelling assumption for an effect on non-EU FDI flows has been made to ensure the impact on total FDI inflows into the UK is captured as a result of leaving the EU in all the alternatives.[32] In terms of the modelling, the analysis has made an assumption that the impact of EU membership on non-EU FDI flows is the same as for EU FDI flows.

3.30 Table 3.B shows the percentage reduction in total FDI inflows under each alternative relationship used in the analysis.[33] As for the trade effects, because the full impact of reintroducing a customs border would be felt immediately on leaving the EU, no reduction in the FDI effect of moving to the EEA is assumed. Again, as for the trade effects, in the negotiated bilateral agreement and WTO cases the lower end of the range is constructed assuming that only half the additional FDI effect of going from the EEA to the negotiated bilateral agreement or the WTO rules comes through within 15 years. The upper end of the range uses the full FDI effects for these cases, as with the EEA case.

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27 *Business Enterprise Research and Development: 2014*, ONS (2015).

28 *Export-Platform Foreign Direct Investment,* Ekholm et al (2003). *Trade Costs and Foreign Direct Investment,* Neary (2007).

29 *UK attractiveness survey,* Ernst and Young (2015).

30 *Regional Integration and the Location of FDI,* Daude et al (2003).

31 According to the *UK attractiveness survey,* Ernst and Young (2015) the UK was ranked fourth as the most attractive FDI destination in the world, behind only China, the US, and India.

32 *The impact of Brexit on foreign investment in the UK,* Dhingra et al (2016a).

33 See Annex A.

Table 3.B: Effect of leaving the EU on FDI inflows (% difference from level in EU after 15 years)

	EEA	Negotiated bilateral agreement	WTO
Lower end of the range	-10	-15	-18
Upper end of the range	-10	-20	-26

Details of the supporting analysis are given in Annex A.

3.31 A recent empirical study from the CEP (2016) also finds that EU membership has a significant positive impact on both EU and non-EU FDI flows.[34] Total FDI flows into the UK would be about 22% lower from moving from EU membership to their implied alternative of WTO membership. This is consistent with the centre of the range of the HM Treasury estimates in Table 3.B.

Impact of openness on productivity

3.32 The key transmission channel through to the economy in the long term comes from the impact of reduced openness, both from trade and FDI, on productivity. This is the main driver of the estimates of the long-term effects of EU membership on the economy. It embodies a variety of potential mechanisms including: increased market size, allowing firms to specialise and generate economies of scale; increased incentives for innovation and technological diffusion; and a better allocation of resources through increased competition and better matching.[35]

3.33 The approach has used the most relevant external evidence to derive the range of estimates of the relationship between trade and productivity, using an elasticity of 0.2 to 0.3 from trade to GDP per capita to represent the relationship.[36] This is combined with a small additional effect from FDI on productivity based on HM Treasury analysis using a panel of UK industry sectors over time.

3.34 A full discussion of the estimates used is provided in Annex A. The impact on productivity of reduced openness (in terms of trade and FDI) in the different alternatives relative to EU membership are shown in Table 3.C. These are then combined in the global macroeconomic model in order to obtain the overall GDP impact.[37] The modelling does not include any allowance for the potential negative impact of the UK leaving the EU on productivity in the rest of the EU from the reduced trade and FDI between the UK and the rest of the EU.

Table 3.C: Effect of leaving the EU on the level of productivity due to reduced trade and FDI (% difference from level in EU after 15 years)

	EEA	Negotiated bilateral agreement	WTO
Lower end of the range	-2.0	-3.0	-3.7
Higher end of the range	-2.8	-6.0	-7.7

34 Dhingra et al (2016a).

35 For example, as discussed in Bank of England (2015), IMF (2016), Cologne Institute for Economic Research (2016), Section 1 and Annex A.

36 The range is informed by *Distance, Trade, and Income – The 1967 to 1975 Closing of the Suez Canal as a Natural Experiment*, Feyrer (2011) and *Estimating the effect of currency unions on trade and output*, Frankel and Rose (2000).

37 The model's adjustment to the new optimal capital stock from the change in productivity has an additional impact which means that there is an additional effect on GDP over and above the effect from productivity shown in Table 3.C.

3.35 The CEP study discussed in Box 3.E[38] uses a significantly larger elasticity of 0.5 to 0.75 from trade to GDP per capita.[39] One argument for assuming a larger estimate would be that it may capture the additional effects of openness and not just those from trade.[40] In the HM Treasury estimates, some of these additional effects are captured by the modelled effect of FDI on productivity. Even so, given the HM Treasury analysis uses lower estimates of the effect from trade, it may not encompass all of the wider aspects of global integration. This would increase the losses associated with leaving the EU under all the alternatives.

Persistent impact of the shock of the transition on productivity and GDP

3.36 Although a detailed analysis of the adjustment path to the alternative relationship modelled is beyond the scope of this document which focuses on the period after 15 years, an allowance can be made for the persistent effect of the shock of transition on productivity.

3.37 The government document, *The process for withdrawing from the European Union*, sets out the complex process for withdrawing from the EU. It concludes that the process: "could lead to up to a decade or more of uncertainty".[41] As discussed in Box 3.C, the period of uncertainty in the aftermath of a vote to leave the EU would affect the behaviour of households, businesses and financial markets. Box 3.D summarises the results of a number of recent analyses by business economists of the short-term risks associated with leaving the EU and the impact of increased uncertainty. The UK's twin deficits, the fiscal deficit and current account deficit, are an additional source of risk.

3.38 Overall, a decision to leave the EU would be likely to have a significant negative effect on the economy in the short term with GDP growth lower, higher unemployment and a deterioration in the public finances. The IMF stated in April 2016 that a UK exit from the EU, "could do severe regional and global damage by disrupting established trading relationships" and that, "negotiations on post-exit arrangements would likely be protracted, resulting in an extended period of heightened uncertainty that could weigh heavily on confidence and investment, all the while increasing financial market volatility."[42]

3.39 The Bank of England's Monetary Policy Committee (MPC) recently considered the likely implications for monetary policy of a vote to leave the EU and noted: "Such a vote might result in an extended period of uncertainty about the economic outlook, including about the prospects for export growth. This uncertainty would be likely to push down on demand in the short run. Uncertainty regarding the supply side of the economy might also increase, reflecting any alterations to product or labour market regulation, adjustments in labour flows or changes in the rate of technology adoption as a result of different arrangements governing foreign trade and capital flows. A vote to leave could have significant implications for asset prices, in particular the exchange rate."[43]

3.40 A common feature of many of the analyses in Box 3.D is a sharp sterling exchange rate depreciation. This would put upward pressure on inflation in the short term, especially in areas where there is a high import content, such as household goods. The additional possibility of increased import tariffs discussed in Section 2 could further add to price pressures, especially

38 *The consequences of Brexit for UK trade and living standards,* Dhingra et al (2016b).

39 Based on *Trade and Income: Exploiting Time Series in Geography*, Feyrer (2009).

40 As suggested by Feyrer (2009).

41 *The process for withdrawing from the European Union*, HM Government (2016).

42 *World Economic Outlook: Too Slow for Too Long,* IMF (April 2016).

43 *Minutes of the Monetary Policy Committee Meeting ending on 13 April 2016,* Bank of England (2016).

in areas like food. In these circumstances, monetary policy would have to balance the effects of higher inflation with reduced demand and potentially impaired supply.[44] For mortgage rates, the additional impact of heightened uncertainty on credit conditions would put upward pressure on mortgage spreads. A subsequent document will examine in detail the short-term economic implications associated with leaving the EU.

Box 3.C: Why a decision to leave the EU would lead to higher uncertainty and how that would affect the economy

If the UK decided to leave the EU, the UK government would have to take decisions in 3 core areas. It would need to:

- negotiate the terms of exit with the EU
- negotiate the future arrangements with the EU (if any)
- negotiate new trade deals with non-EU partners

The UK Parliament and the devolved administrations would also need to consider how to replace EU laws, including how to maintain a robust legal regulatory framework where that had previously depended on EU laws.

There would be considerable uncertainty around all 3 aspects of the exit process. Under any alternative there would be a period of intense negotiation, the results of which would be uncertain. For a business, for example, knowing whether it still had access to the Single Market could be critical for its investment decisions. As discussed in Section 2, both the EEA and negotiated bilateral agreement alternatives could only be adopted with the agreement of others and so they could not be guaranteed at the outset. Even when the alternative arrangement was known, there would still be uncertainty about its economic impact.

The immediate economic impact of a decision to leave the EU would reflect the interaction of these negotiations and decisions with the behaviour of households, businesses and financial markets. In addition to the longer-term adjustment processes required to deal with new barriers to trade and investment, the shorter-term uncertainty generated by a decision to leave the EU would lead to increased financial market volatility. The Governor of the Bank of England has said that leaving the EU, "is the biggest domestic risk to financial stability."[45] When uncertainty is elevated, firms are unsure about future sales and profits and they tend to postpone investment decisions[46] and decisions to enter new markets, and this has knock-on implications for other components of demand. For example, the effect of lower demand on unemployment leads households to increase precautionary savings and cut back on consumption.[47]

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44 The MPC noted that it "would have to make careful judgements about the net effects of these potential influences on demand, supply and inflation. Ultimately monetary policy would be set in order to meet the inflation target, while also ensuring that inflation expectations remained anchored." (Bank of England (2016).) *Brexit Risk – Implications for Economies and Markets,* Citi (2016) commented: "…we see risks that sterling weakness in a Brexit scenario might trigger a surge in inflation expectations that pressures the MPC to hike rates significantly 2-3 years ahead to reaffirm their commitment to economic stability even amidst economic weakness and heightened uncertainty."

45 Oral evidence to the Treasury Committee on 'The economic and financial costs and benefits of UK membership of the EU', 8 March 2016.

46 *Investment and Institutional Uncertainty*, Brunetti and Weder (1997).

47 *Does job insecurity affect household consumption?,* Benito (2004) finds that in the UK a one standard deviation rise in unemployment risk for the head of the household reduces consumption by 2.7%.

3.41 It is likely that the shock of transition would have some effect on economic activity that would persist. A number of recent studies have found evidence that economic shocks can have persistent effects on the level of output relative to the pre-shock trend.[48] For example, recent analysis by the US Federal Reserve has found evidence that all recessions, not just banking and financial crises, are associated with persistent negative effects on the level of GDP.[49] This could work through several channels but the dominant effect is likely to be through the persistent effects of lower investment, including lower intangibles investment, on the economy's capital stock. In the face of elevated uncertainty and tighter credit conditions, firms would become more cautious and they would cut back on investment projects.[50]

3.42 The experience of the 2008 and 2009 financial crisis provides a stark illustration of the potentially lasting effects of an economic downturn. The shortfall in output relative to the pre-shock trend has been called 'the productivity puzzle' as it is due to persistently weak productivity growth since the financial crisis. As the Office for Budget Responsibility (OBR) stated in their November 2015 *Economic and fiscal outlook*, "the slow pace of financial system normalisation and the related pace at which resources are reallocated to more productive uses will continue to weigh on the sustainable rate of growth – by diminishing amounts – for some years."

3.43 Bank of England analysis[51] suggests that increased macroeconomic uncertainty might have led firms to postpone profitable investment projects in both physical and intangible capital. The analysis estimated that at the end of 2013 between a fifth and a third of the weakness in productivity could be explained by low levels of investment, while the remainder could be due to some combination of measurement error, temporarily subdued demand, impaired reallocation of resources and unusually high firm survival rates.

48 *Inflation and Activity: Two Explorations and Their Monetary Policy Implications*, Blanchard et al (2015). *Potential Output and Recessions: Are We Fooling Ourselves?*, Martin et al (2015).

49 Martin et al (2015).

50 *The Impact of Uncertainty Shocks,* Bloom (2009). In addition, if there were a serious shock to financial conditions, such as seen in the financial crisis, then the normal process of the economy reallocating resources to more efficient and productive uses could be impaired, leading to slower productivity growth at the aggregate level (see *Productivity and the allocation of resources*, speech at Durham Business School, Broadbent (2012)).

51 *The UK productivity puzzle*, Barnett et al, Bank of England (2014).

Box 3.D: External studies on impact of leaving the EU in the transition

Most studies by business economists expect a vote to leave the EU to lead to a slowdown in economic growth in the short term. Medium and long-term impacts are generally not considered in detail, though the duration and progress of exit negotiations, as well as the nature of the future UK-EU relationship, are recognised by most of these studies as key factors in determining the persistence of these effects.

A vote to leave the EU is identified as a risk in the independent OBR's latest forecast[52] which, "could usher in an extended period of uncertainty regarding the precise terms of the UK's future relationship with the EU." The OBR's forecast makes no judgement of the impact of leaving the EU. But they note this uncertainty, "could have negative implications for activity via business and consumer confidence and might result in greater volatility in financial and other asset markets."

The IMF stated in April 2016 that a UK exit from the EU, "could do severe regional and global damage by disrupting established trading relationships" and that, "negotiations on post-exit arrangements would likely be protracted, resulting in an extended period of heightened uncertainty that could weigh heavily on confidence and investment, all the while increasing financial market volatility."[53]

The GDP impacts of a number of external studies are summarised below:

	Effect on level of GDP (%)
PwC/CBI[54]	-3.1 to -5.5 (over 5 years)
Citi[55]	-4.0 (over 3 years)
Credit Suisse[56]	-1.0 to -2.0 (over 2 years)
Deutsche Bank[57]	-3.0 (over 3 years)
HSBC[58]	-1.0 to -1.5 (over 1 year)
JP Morgan[59]	-1.0 (over 1 year)
Morgan Stanley[60]	-1.5 to -2.5 (over 2 years)
Nomura[61]	-4.0 (over 1 year)
Société Générale[62]	-4.0 to -8.0 (over 5 years)

The uncertainty caused by a vote to leave is a key driver of the slowdown. Uncertainty is expected to last until the UK's relationships with the EU and the rest of the world are clarified, decreasing investment and lowering consumer confidence as discussed in Box 3.C.

52 *Economic and fiscal outlook*, OBR (March 2016).

53 IMF (April 2016).

54 *Leaving the EU: Implications for the UK economy,* PwC, report for the CBI (2016).

55 *Brexit Risk – Implications for Economies and Markets,* Citi (2016).

56 *Brexit: Breaking up is never easy, or cheap*, Credit Suisse (2016).

57 *The UK & EU: Exit Emergency*, Deutsche Bank (2016).

58 *Brexit Strategies: What if the UK leaves?*, HSBC (2016).

59 *Brexit: What impact might uncertainty have on UK GDP?*, JP Morgan (2016).

60 *What Brexit Would Mean for Europe*, Morgan Stanley (2016).

61 *Brexit carries a recessionary risk*, Nomura (2016).

62 *What if…? The Brexit Briefing*, Société Générale (2016).

The UK's current account deficit is identified by many of the studies as a risk. The decline in investor confidence could be amplified should overseas investors reassess the sustainability of the UK current account, leading to a sharp fall in sterling. A sterling depreciation is a common feature of the external analysis, with a trade-weighted fall of 15% to 20% anticipated by Citi, Goldman Sachs[63] and HSBC.

Most analyses recognise the potential for higher inflation caused by the exchange rate depreciation to reduce household real incomes and further depress consumer spending. Citi estimate Consumer Price Index (CPI) inflation at 3% to 4% year-on-year for several years, and HSBC see inflation increasing by up to 5 percentage points in the near term depending on how far import price rises are passed on to consumers.

Unemployment effects have generally not been reported in these studies. PwC's report for the CBI estimates unemployment would reach 7% to 8% in 2020, compared with a projected rate of 5% if the UK remained in the EU. The impact on total UK employment is estimated to be a fall of 550,000 to 950,000.

3.44 Given the evidence of the impact of previous economic shocks, a slowdown caused by the uncertainty generated by leaving the EU is likely to have a persistent negative impact, in particular through the effect on the capital stock. A realistic assumption is made that some proportion between a fifth and a third of the short-term shock on the economy has a persistent impact. This persistent negative effect is estimated to be 1% of GDP under each alternative.

Net migration

3.45 The population and migration projections which underlie the modelling were used by the OBR in their *Economic and fiscal outlook* accompanying Budget 2016. It is assumed that population growth will slow in line with the ONS's current principal population projections. In the principal projection, total net international migration to the UK falls from 329,000 per year in 2014 towards 185,000 per year from 2021 onwards.[64] This is a stylised projection rather than a forecast.

3.46 Section 2 demonstrated that no country has been able to agree significant access to the Single Market without having to accept EU regulations, financial contributions to the EU and the free movement of people. In the case of the EEA, there would be no change to net migration relative to being inside the EU as the same rules would apply. Among the negotiated bilateral agreements those that grant the greatest access, such as the Swiss arrangement, involve accepting free movement of people. The migration implications of the WTO alternative would depend on the government's policies following a vote to leave. Further, it is also likely that any action by the UK government to reduce immigration would be met with reciprocal action by other EU countries, which would potentially reduce emigration from the UK. This would offset some of the reduction in overall net migration. There could also be pressure to pursue more liberal immigration policies vis-à-vis non-EU countries in order to promote new free trade deals.

3.47 Given the above unknowns, no additional effect from net migration has been assumed in the modelling. This is consistent with adopting a cautious approach for the purpose of modelling the effects on overall GDP, reflecting uncertainty about the type of arrangement the UK may have with the EU and so about future migration policies and migrant behaviour. In

63 *GBP, 'Brexit' and the kindness of strangers*, Goldman Sachs (2016).

64 *Chart 5.6, Economic and Fiscal Outlook Charts and Tables*, OBR (March 2016), *National Population Projections, (2014 base),* ONS (October 2015).

addition, the analysis does not model the impact on migration of the recent renegotiation, in line with the approach taken by the OBR at Budget 2016.[65]

Regulation

3.48 Section 1 explained how the EU regulatory framework is integral to the functioning of the Single Market and so it cannot be separated from the benefits of the market access that it enables. It presented international comparisons which indicate that the UK, along with some other EU countries such as the Netherlands, is already one of the strongest performers among the OECD economies in terms of its regulatory framework.[66]

3.49 Section 2 set out that in the event of leaving the EU, the alternative arrangements that involved the most access to the EU market have the most obligations to keep the regulatory frameworks aligned. In the EEA case, the UK would need to continue to conform to most of the EU regulatory framework. Negotiated bilateral agreements cover a broad range of arrangements but the link between increased access and increased regulatory alignment is very clear. In the WTO case, the UK might appear to have more scope for regulatory changes. However, under any of the alternatives, the potential gains from additional flexibility on leaving the EU are likely to be significantly constrained, including because of domestic priorities and international obligations. These would be future government decisions. In any case, any potential gains from reduced EU regulatory burdens in specific areas would be significantly outweighed by the losses from the increased regulatory barriers and divergence from no longer being a member of the Single Market.

3.50 Consistent with this assessment and the approach throughout this analysis, the modelling does not prejudge these decisions and no further assumptions on regulation are made over and above the increase in regulatory barriers that would emerge over time, as captured in the modelling of the effects of the alternative arrangements on trade and FDI. Similarly, to ensure a consistent approach, the analysis of the scenario for the implementation of the next stage of the Single Market in Part 3 does not include any allowance for the potential gains from improved regulation at the EU level for the UK as a continuing member of the EU.

Financial contributions to the EU

3.51 One consequence of leaving the EU is that the UK may no longer make a contribution to the EU budget although under the EEA alternative, and some versions of the negotiated bilateral agreement alternative (such as the Swiss arrangement), financial contributions would still be required.

3.52 Lower (or zero) budget contributions would have no impact on the long-run size of the UK economy as measured by GDP as it would have no impact on the supply-side of the UK economy. There would be some positive fiscal impact, although this would be substantially outweighed by the broader impact on receipts of leaving the EU, as set out below.

3.53 The assessment makes no presumption about what policy the UK government might adopt relating to receipts from the EU budget on leaving the EU as these would be decisions for the government at the time. Consistent with the approach throughout this analysis the modelling does not prejudge these decisions. For the modelling, a simple assumption has been made that current EU receipts are replicated. In practice, it is highly unlikely that the UK

65 *Economic and Fiscal Outlook*, OBR (March 2016).

66 See discussion of OECD product and labour market regulation indicators in Section 1.

would have exactly the same expenditure priorities as the EU. The modelling assumption is that this spending occurs in the UK but no assumption is made about what it is spent on.

The long-term effect of leaving the EU on the UK economy

3.54 The long-term estimates are driven by the impacts on the supply-side of the economy. These effects can be summarised in terms of their broad effects on productivity. The UK's comparative advantage is in high value-added services and manufacturing activities. These are the sectors that are likely to benefit the most from an open economy. The increase in trade barriers that would occur as a result of leaving the EU under all the alternatives would be expected to shift both capital and labour away from these sectors towards those that are less reliant on trade and/or have lower value-added. The shift of labour towards lower value sectors would lead to a fall in average wages, given the lower productivity in these sectors.

3.55 In the long term – over 15 years – wages and prices are the adjustment mechanism. This does not mean the adjustment is painless, however. The labour market adjustment would involve many workers losing their jobs and having to find new ones at lower wages. At the economy-wide level, the negative impact of leaving the EU on productivity would feed through to lower quality jobs and lower real wages. To the extent wages and prices do not adjust as assumed, for whatever reason, unemployment would be higher.[67] For firms, the adjustment would likely involve some businesses reducing in size or closing down altogether.

3.56 The modelled long-term effects are constructed around the upper and lower ranges based on the estimates and assumptions described above. Table 3.D summarises the main results for GDP, GDP per capita (in £ terms) and GDP per household (in £ terms) and also includes an estimate for the centre of the range.

Table 3.D: Annual impact of leaving the EU on the UK (difference from being in the EU after 15 years)

	EEA	Negotiated bilateral agreement	WTO
GDP (%) – central	-3.8	-6.2	-7.5
GDP (%)	-3.4 to -4.3	-4.6 to -7.8	-5.4 to -9.5
GDP per capita[a] – central	-£1,100	-£1,800	-£2,100
GDP per capita[a]	-£1,000 to -£1,200	-£1,300 to -£2,200	-£1,500 to -£2,700
GDP per household[a] – central	-£2,600	-£4,300	-£5,200
GDP per household[a]	-£2,400 to -£2,900	-£3,200 to -£5,400	-£3,700 to -£6,600

[a] Expressed in terms of 2015 GDP in 2015 prices, rounded to the nearest £100.

3.57 The results for each alternative to EU membership are set out in more detail below.

Alternative 1: EEA

3.58 The impact of leaving the EU for the EEA alternative implies a loss ranging from 3.4% to 4.3% of GDP after 15 years:[68]

- the lower end of the range introduces further caution to the assumptions on trade, FDI and productivity. **The lower end of the range implies leaving the EU for the**

67 In the short term, the uncertainty generated by a decision to leave the EU would also have an impact on unemployment. Box 3.D reports on how external studies have considered this.

68 GDP per capita would fall by the same percentage, reflecting the fact that the population size is unchanged.

EEA alternative would reduce GDP by 3.4% after 15 years compared with remaining in the EU

- the higher end of the range represents the case where the full modelled effects on trade and FDI are assumed to come through in 15 years and a higher estimate of the impact of trade on productivity is assumed. **The higher end of the range implies leaving the EU for the EEA would leave GDP 4.3% lower after 15 years compared with remaining in the EU**

3.59 **Translating the impacts into a loss of GDP per household would equate to losing £2,600 every year (in 2015 terms) for the centre of the range.**

3.60 As a check on robustness and caution Box 3.E compares these results with the most comparable recent study. The range of the HM Treasury results is above the CEP's 'static' results but well below the more comparable 'dynamic' results.

Box 3.E: External analysis of the long-run impacts of leaving the EU

A broadly comparable approach to HM Treasury's in terms of the counterfactual, time period and type of impact considered is provided by the CEP work (2016).[69]

The CEP (2016) presents what they describe as 'static' and 'dynamic' approaches to calculate the impact on the UK of leaving the EU. The static approach considers an 'optimistic' case based on the EEA and a 'pessimistic' case based on the WTO.

Their static approach calculates that an increase in non-tariff barriers on exit would lead to a fall of 1.3% in average income per capita in their optimistic (EEA) case and an overall loss of 2.6% in the pessimistic (WTO) case. These calculations do not account for the effects of trade on productivity.

The dynamic estimates use the empirical estimates of the effects of EU membership on trade and then from trade on productivity, and combines them together to obtain an estimate that leaving the EU for the EEA would reduce UK income by between 6.3% and 9.5%.

The results are based on a higher estimate of the elasticity between trade and productivity than in the HM Treasury work with the result that the overall effect for the EEA alternative is higher than the top of the HM Treasury range, even after a shorter period of 10 years. This is an illustration of the degree of caution in the HM Treasury estimates relative to this study.

	Time period	Static/dynamic approach	Alternative arrangement	Impact of leaving EU on UK GDP
Dhingra et al (2016)	10 years	Static	Optimistic: EEA Pessimistic: WTO	**-1.3%** **-2.6%**
		Dynamic	EEA	**-6.3% to -9.5%**
HM Treasury	15 years	Comparable to CEP's 'dynamic' approach	EEA	**-3.4% to -4.3%**

Overview of CEP (2016) results.

3.61 In all scenarios that retain access to the Single Market, and particularly for the EEA, the UK would have to accept rules that it had no control over, and would have to rely on other member states to implement the EU reform agenda that the UK has been the main champion of. Either of these factors could further increase the economic costs of these alternatives.

69 Dhingra et al (2016b).

3.62 One recent study, discussed in Box 3.F, considers the experience of Norway and suggests that the lack of influence may have been a significant negative factor.

Box 3.F: Norway's experience in the EEA compared with Sweden, Austria and Finland

The additional economic costs and risks of losing the ability to influence EU policy are hard to quantify but may be particularly important in the case of the EEA alternative.

Recent academic work looked at the Norwegian experience in the EEA since 1995 compared with Sweden, Austria and Finland. Based on an analysis of the regions of Norway, Sweden, Austria and Finland, the main finding was that if Norway had joined the EU in 1995 along with the 3 other countries, productivity levels would have been 6% higher in an average Norwegian region between 1995 and 2000.[70] The authors suggest their results identify an economic benefit of influence in EU institutions.

This analysis estimates the impact of EU membership using the 'synthetic counterfactual'[71] method to consider dynamic effects, rather than average pre- and post-accession cases. Growth in an EU country (post-accession) is then compared with growth of a weighted combination of other countries selected to match the EU country before accession. Countries in the synthetic comparison did not join the EU.

Work on Norway's experience built on earlier analysis[72] of the historic economic impacts of EU membership. The results, summarised below, find substantial and statistically significant positive growth impacts relative to remaining outside the EU. The average impact after 10 years is estimated to have been a 6.4% increase in GDP, with the UK showing a 8.6% increase.

	Post-accession differences between the level of actual and synthetic GDP per person (%)	
Country	**After 10 years**	**Post-accession to 2008**
Denmark	14.3	**23.9**
Ireland	9.4	**48.9**
UK	8.6	**23.7**
Greece	-17.3	**-19.8**
Portugal	16.5	**18.4**
Spain	13.7	**19.8**
Austria	6.4	**7.2**
Finland	4.0	**4.4**
Sweden	2.4	**3.2**

Source: Campos et al (2014).

70 *Norwegian rhapsody? The political economy benefits of regional integration*, Campos et al (2015).

71 Pioneered by *The Economic Costs of Conflict: A Case Study of the Basque Country*, Abadie and Gardeazabal (2003).

72 *Economic Growth and Political Integration: Estimating the Benefits from Membership in the European Union Using the Synthetic Counterfactuals Method*, Campos et al (2014).

Alternative 2: Negotiated bilateral agreement

3.63 The impact of leaving the EU for the negotiated bilateral agreement alternative implies a loss ranging from 4.6% to 7.8% of GDP after 15 years:

- the lower end of the range introduces further caution to the assumptions on trade, FDI and productivity. **The lower end of the range implies a negotiated bilateral agreement would reduce GDP by 4.6% after 15 years compared with remaining in the EU**
- the higher end of the range represents the case where the full modelled effects on trade and FDI are assumed to come through in 15 years and a higher estimate of the impact of trade on productivity is assumed. **The higher end of the range implies leaving the EU for a negotiated bilateral agreement would leave GDP 7.8% lower after 15 years compared with remaining in the EU**

3.64 **In terms of GDP per household, leaving the EU for a negotiated bilateral agreement would equate to losing £4,300 every year (in 2015 terms) for the centre of the range.**

3.65 There is a significant degree of variation in what is covered under a negotiated bilateral arrangement as discussed in Section 2. Switzerland, for example, has to accept the free movement of people and make financial contributions to the EU in return for access to the Single Market. The analysis here necessarily is of a representative negotiated bilateral agreement. Box 3.G considers how to interpret specific relationships in relation to these results, and in particular the Canadian and Swiss arrangements.

Box 3.G: Interpreting results for specific relationships – the cases of Canada and Switzerland

The modelling approach taken in this paper uses representative variables to estimate the impact of different trading relationships on historic trade flows.

As set out in Section 2, there is significant variation between the different negotiated bilateral agreements and the detail of any relationship can have an economic impact. For example, the recently agreed EU-Canada deal is a relatively comprehensive FTA. However, at their core, all these FTAs share a wide range of features. Therefore the representative approach taken provides a reasonable basis for estimating the scale of the impact of leaving the EU to pursue an alternative like the Canadian one.

The Swiss relationship sits between the Canadian FTA and the EEA. It is a relatively comprehensive bilateral relationship that goes beyond typical FTAs. Market access is significantly better than other FTAs and Switzerland has many of the obligations that comes with that access, notably in terms of accepting free movement of people and making financial contributions to the EU. The unique nature of the Swiss relationship makes estimates based on historic data particularly difficult. This is both due to the small sample size and the evolving nature of the agreement. Successive agreements make identifying the true impact of the Swiss relationship using the approach applied to other relationships impossible.

Comparing the representative EEA and negotiated bilateral agreement results provides the basis for putting a range on more detailed specific scenarios, such as an alternative based on the Swiss agreements. In particular, and as set out in Section 2, market access and the associated obligations inherent in this alternative share features of the representative models quantified. Therefore, the economic impact of leaving the EU and moving to something like the Swiss alternative would likely lie between the EEA and negotiated bilateral agreement estimates presented.

A recent study by CEP[73] has quantified the impact of additional trade barriers that a Swiss-like arrangement for the UK would imply. They find the trade effect to be somewhat larger than in an EEA scenario. Other attempts to quantify the impact of leaving the EU, such as PwC's CBI analysis, have not quantified the impact of a bilateral deal similar to Switzerland.

Alternative 3: WTO

3.66 The impact of leaving the EU for the WTO alternative imples a loss ranging from 5.4% to 9.5% of GDP after 15 years:

- the lower end of the range introduces further caution to the assumptions on trade, FDI and productivity. **The lower end of the range implies that falling back on the WTO rules would reduce GDP by 5.4% after 15 years compared with remaining in the EU**
- the higher end of the range represents the case where the full modelled effects on trade and FDI are assumed to come through in 15 years and a higher estimate of the impact of trade on productivity is assumed. **The higher end of the range implies leaving the EU for the WTO would leave GDP 9.5% lower after 15 years compared with remaining in the EU**

3.67 **Translating these impacts into GDP per household equates to losing £5,200 every year (in 2015 terms) for the centre of the range.**

73 Dhingra et al (2016b).

Impact on public sector receipts

3.68 The negative impact on GDP would have significant implications for the public finances as set out in Table 3.E. Since GDP is lower under all the alternatives to EU membership, public sector receipts would be correspondingly lower. This would mean higher borrowing, higher taxation or lower public spending.

3.69 The minimum and maximum GDP losses under the alternative scenarios to EU membership are estimated to lie between 3.4% and 9.5% after 15 years. HM Treasury has analysed the implications of these losses of GDP for public sector receipts by calibrating to the receipts to GDP ratio assuming this is held constant as set out in Annex B.[74] For each percentage point reduction in long-term GDP, this would lead to a reduction in receipts of about £7 billion in 2015 terms. It is estimated that in the least worst case, leaving the EU would lead to a reduction in GDP of 3.4% in 15 years time, leading to a loss in public sector receipts of about £24 billion every year. Under the most pessimistic case of a long-term loss in GDP of 9.5%, the loss in receipts could be as high as £66 billion every year.

Table 3.E: Difference in annual public sector receipts relative to UK remaining inside the EU in 15 years (£ billion)

	EEA	Negotiated bilateral agreement	WTO
Receipts impact, central estimate	-27	-43	-52
Receipts impact, range	-24 to -30	-32 to -54	-38 to -66

Expressed in terms of 2015 GDP in 2015 prices rounded to the nearest £1 billion.
Receipts as a % of GDP in 15 years are assumed to be the same as at the end of the OBR's current five year forecast period in 2020-21.

3.70 The scale of the impact on receipts would depend on the extent to which the UK continued to make financial contributions to the EU and the degree to which it replicated the receipts it currently receives from the EU budget. Future contributions would depend on the alternative and are subject to a high degree of uncertainty. As set out in Section 2, the alternatives that involve most access to the EU Single Market require financial contributions to the EU. Should the UK leave the EU and seek continued access to its market, there would be a strong incentive for the remaining members to maximise the UK's contribution. As it is not possible to predict the outcome of this negotiation, the estimates in the model make a cautious assumption of a nil financial contribution to the EU under the alternative scenarios. As set out above, whether to replicate EU budget receipts would be a decision for the government at the time, and the analysis does not prejudge these decisions. For modelling purposes, it assumes that the level of receipts are replicated, but no assumptions are made about what they are spent on. In practice, it is highly unlikely that the UK would have exactly the same expenditure priorities as the EU.

3.71 The estimates in Table 3.F are based on assuming no contributions to the EU and current receipts are replicated in full. An offset of £7 billion has been made to the central estimate for the impact on public sector receipts set out in Table 3.E. This is explained in detail in Annex B. For the reasons set out above, a nil financial contribution to the EU is unrealistic for any alternative that provides the UK significant access to the EU Single Market, so in these cases the overall impact would be worse.

3.72 The analysis clearly shows that under any alternative to EU membership, any potential gain from reduced EU budget contributions from leaving the EU would be substantially outweighed by the negative impact on public sector receipts from the deterioration in the broader economic environment as represented by the lower level of GDP.

[74] Receipts as a % of GDP in 15 years are assumed to be the same as at the end of the OBR's current five year forecast period in 2020-21. This methodology is discussed in further detail in Annex B.

Table 3.F: Net impact of changes to annual public sector receipts and annual contributions to EU budget in 15 years (£ billion)

	EEA	Negotiated bilateral agreement	WTO
Net receipts impact	-20	-36	-45

Expressed in terms of 2015 GDP in 2015 prices rounded to the nearest £1 billion.

3.73 To put these numbers into context, the impact in the EEA alternative is greater than what is currently spent on the combined annual budgets of the departments responsible for policing and prisons;[75] in the negotiated bilateral agreement alternative the impact is more than a third of the entire NHS England budget;[76] while the impact in the WTO alternative is more than what is currently spent on the entire schools budget for England.[77]

3.74 Offsetting the net receipts impact under the EEA scenario would be equivalent to raising the basic rate of income tax by around 4p from 20p to 24p.[78] The impact in the negotiated bilateral agreement scenario is equivalent to raising the basic rate of income tax by around 8p from 20p to 28p. Offsetting the net receipts impact under the WTO scenario is equivalent to raising the basic rate of income tax by about 10p, from 20p to 30p.

Table 3.G: Illustrative equivalents of lower net public sector receipts

	EEA	Negotiated bilateral agreement	WTO
Net receipts impact (£ billion)	-20	-36	-45
Illustrative equivalent increase in basic rate of income tax	4p	8p	10p
Proportion of NHS England budget	19%	35%	44%
Proportion of schools budget for England	50%	91%	114%
Proportion of Home Office and Justice budget	109%	200%	249%

3.75 In terms of external studies, Oxford Economics (2016)[79] point out that the implications of leaving the EU for the fiscal position are broader than just the reduced contributions to the EU budget. Pain and Young (2004)[80] find that tax rates would need to rise to offset the reduction in tax revenues resulting from the permanent reduction in output from leaving the EU.

75 This is based on the sum of planned total DEL (the sum of resource DEL excluding depreciation and capital DEL) for 2015-16 for the Home Office and Justice. This was published in Table 2.4 and Table 2.4a in Budget 2016.

76 This is based on NHS England budget for 2015-16. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/486818/mndate-NHSE-15_16.pdf

77 This is based on the core schools resource budget in 2015-16. Dedicated Schools Grant and Pupil Premium allocations are available at: https://www.gov.uk/government/publications/dedicated-schools-grant-dsg-2015-to-2016 https://www.gov.uk/government/publications/pupil-premium-2015-to-2016-allocations

78 These figures are illustrative and been calculated by applying the government's ready reckoner on the direct effects of illustrative tax changes: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/508120/Mar16_Direct_effects_illustrative_tax_changes_bulletin_v5_final.pdf

79 Oxford Economics (2016).

80 *The macroeconomic impact of UK withdrawal from the EU*, Pain and Young (2004).

Part 3: Scenario for the Next Stage of the Single Market for the UK inside the EU

- A scenario for the implementation of the next stage of the Single Market for the UK inside the EU is presented.
- This scenario is based on the additional impact of reforms in 4 key areas: Single Market for services; Digital Single Market; single energy market; and external trade agreements.
- EU reform has the potential to go even further, including in areas such as better regulation and the Capital Markets Union, but these are not quantified.

3.76 The economic policy component of the UK's new settlement is discussed in Section 1 Part 4 in the context of wider EU economic reform. This part reviews the evidence on the impact of additional EU economic reform and assesses the potential effect that it would have on the UK if it remained inside the EU. Given the extended time horizons considered, the impact of the additional EU economic reforms are not likely to be included in most recent external forecasts of UK growth.[81]

3.77 In this scenario for the implementation of the next stage of the Single Market, an estimate of the impact of additional reform for the UK inside the EU is constructed and quantified around the best available evidence on 4 reform priorities:

- Single Market for services
- Digital Single Market
- single energy market
- external trade agreements (i.e. those with non-EU countries)

Single Market for services

3.78 As discussed in Section 1, the biggest potential benefits of EU reform come from deepening the Single Market for services. The existing level of implementation of the 2006 'Services Directive' has been beneficial and it is estimated to have already added 1.0% to UK GDP.[82] The scenario assumes further liberalisation of services with all remaining trade barriers in scope of the Services Directive removed[83] in line with the new initiatives set out in

81 Typically, independent forecasters (*Forecasts for the UK economy: a comparison of independent forecasts*, HM Treasury, (March 2016)) focus on relatively short time horizons and do not extend beyond a 5-year time horizon and so would not include the effects of these types of long-term reform. The OBR (*Briefing paper No. 6: Policy costings and our forecast*, OBR (2014)) use a top-down approach to estimating long-run effects on the supply potential, meaning that the sort of reforms set out in this scenario would be unlikely to be included in their 5-year forecasts (e.g. in their March 2016 *Economic and fiscal outlook*).

82 *The economic impact of the Services Directive: A first assessment following implementation*, Monteagudo et al, European Commission (2012). The study's UK-specific central estimate of the benefit derived from actually observed barrier reduction is used.

83 Directive 2006/123/EC.

the European Commission's Single Market strategy published in October 2015,[84] but not any further liberalisation beyond the implementation of the existing directive. Achieving this goal of successful, full and effective implementation of the remainder of the Services Directive in line with a recommendation made by the OECD[85] is estimated to add a further 2.0% to UK GDP.[86]

Digital Single Market

3.79 The scenario is based on those measures of the Digital Single Market strategy that are currently being developed, but are yet to be legislated. This includes measures to open up the e-commerce market, with estimates suggesting gains of 0.5% to EU GDP arising through lower prices for consumers.[87] Further action will be taken to ensure barriers in cloud computing, payments, postal and parcel delivery are reduced, which it has been estimated could add a further 0.4% to EU GDP.[88] For the UK, overall an expected addition of 0.9% of UK GDP is estimated, although the effect could be greater since the UK could benefit disproportionately as one of Europe's leading providers and users of e-commerce.[89]

Single energy market

3.80 The scenario includes the gains from significantly more integrated energy markets. By 2030, a fully-integrated electricity market could provide savings of between €12.5 billion and €40 billion a year across the EU – with a range of 0.1 to 0.3% of EU GDP.[90] There is no UK-specific estimate but, given the UK has a relatively efficient energy sector, the lower end

84 *Upgrading the Single Market: more opportunities for people and businesses*, European Commission (2015). For example, the 'services passport' will make it easier for key sectors such as construction and business services to undertake activity across borders in the EU by reducing the number of national regulators they need to comply with.

85 *OECD Economic Surveys: European Union*, OECD (2014).

86 *The economic impact of the Services Directive: A first assessment following implementation*, Monteagudo et al, European Commission (2012). This is based on utilising the study's estimate for the gain that arises through reducing barriers across the EU to the level of the top 5 performing member states for each sector in scope, beyond the study's central estimate. This estimate is in line with other studies; for example, *The EU Services Directive: Gains from Further Liberalization*, Corugedo and Ruiz, IMF (2015) suggests gains of 2.8% to GDP for France over 2 years.

87 *Consumer market study on the functioning of e-commerce and Internet marketing and selling techniques in the retail of goods*, Civic Consulting, report for the European Commission (2011). The estimate is based on the study's estimates for the gain from lower prices from a single EU consumer market in e-commerce in goods (under the assumption of a 15% share of internet retailing); the gain from increased choice is not included.

88 *The Cost of Non-Europe in the Single Market – III – Digital Single Market*, GHK, report for the European Parliament's European Added Value Unit (2014).

89 The UK is assumed to benefit equally to the EU average. Other studies of the EU have suggested larger gains. The European Parliament (*Mapping the Cost of Non-Europe, 2014-19*, European Added Value Unit, report for the European Parliament (2015) has estimated that the overall impact of a fully-functioning digital single market could be worth 3.0% to 3.6% to the EU economy; Copenhagen Economics (*The Economic Impact of a European Digital Single Market*, Report for the European Policy Centre, (2010)) has suggested EU GDP could increase by 4% over a 10-year period to 2020; and the European Commission (*The Economic Impact of Digital Structural Reforms*, Lorenzani and Varga, (2014)) has estimated a gain of 2.4% for UK GDP (and over 3% for EU GDP) over the long term from further reforms across spectrum, e-skills, e-commerce and broadband policies.

90 *Benefits of an Integrated European Energy Market*', Booz and Company, prepared for: Directorate-General Energy, European Commission (2013). The study also consider the benefits from an integrated gas market with gains of up to €30 billion per year for the EU or around 0.2% of EU GDP; however this has not been included here since the study's methodology uses UK gas border prices. Nonetheless, a more integrated gas market could benefit the UK through bigger and more liquid markets.

of the range has been used. In terms of the UK, the single energy market for electricity is expected to add around 0.1% to UK GDP.

External trade agreements (with non-EU countries)

3.81 Opening up EU markets to non-EU countries through the EU's trade agreements is complementary to increasing intra-EU trade in the Single Market. The scenario is based on the gains from the completion of major ongoing deals with the US, Japan, India and with the ASEAN and Mercosur countries, along with the implementation of the EU-Canada FTA. This is in line with the European Commission's trade strategy published in October 2015.[91] The implementation of these trade deals is estimated to add around 1.0% to UK GDP.[92] Further gains could be expected from the recent political commitments to negotiate trade and investment deals with China, Australia and New Zealand, but these are not included in the quantified estimates.

Additional EU economic reform

3.82 The estimates for the 4 major areas discussed above are based on a balanced evaluation of the external evidence. Further to the quantified benefits of EU reforms that are agreed or in the process of being implemented, there are other additional EU reforms that will bring benefits but are unquantified:

- the UK could benefit from reduced EU regulatory burdens.[93] As set out in Section 1, the UK has made minimising unnecessary regulatory burdens a policy priority in the EU, as well as domestically. The UK's new settlement includes a commitment to reduce the regulatory burden on businesses, particularly small and medium-sized businesses, with specific targets established in key sectors[94]
- the EU has also committed to deliver a Capital Markets Union to deepen and integrate the EU's capital markets. As described in Section 1 Box 1.N, in the longer term, a Capital Markets Union should help improve the EU's competitiveness and financial stability.[95] A Capital Markets Union will benefit all 28 member states and

91 *Trade for all – Towards a more responsible trade and investment policy*, European Commission (2015).

92 The estimates are based on impact assessments undertaken by the European Commission or external consultancies (including Copenhagen Economics and ECORYS). This includes the 2013 Department for Business, Innovation & Skills-commissioned study by CEPR (*Estimating the Economic Impact on the UK of a Transatlantic Trade and Investment Partnership (TTIP) Agreement between the European Union and the United States*), which estimates a gain of 0.35% to UK GDP for the most ambitious scenario. The EU estimates from CEPR are broadly in line with a more recent study that examines the Spanish economy (*The impact on the Spanish economy of the signature of the TTIP*, CEOE (2015)). For other countries, the trade scenarios used for the impact assessments have been picked to ensure consistency with the EU-US scenario from the CEPR study.

93 While it is difficult to quantify there have been some attempts: CPB (*Five Lisbon highlights: The economic impact of reaching these targets*, Gelauff and Lejour, (2006)) has estimated that a 25% reduction in administrative burdens could lead to an increase of 0.9% in UK GDP.

94 *European Council Declaration on Competitiveness*, Annex III to Conclusions of the February European Council (February 2016). Separately, this has been complemented with the creation of a new mechanism – as part of the sovereignty measures – to review existing EU laws to ensure they meet the EU's subsidiarity and proportionality principles.

95 *A European Capital Markets Union: implications for growth and stability*, Anderson et al, Bank of England (2015). *Capital Markets Union: a vision for the long term*, Verón and Wolff (2015).

there could be a particular benefit to the UK given its large and sophisticated financial sector[96]

The scenario for the next stage of the Single Market therefore includes the implementation of the 'Services Directive', but not any additional measures to complete the Single Market in services; deepening the Single Market in digital services and energy markets but not capital markets; the benefits of the major trade deals under negotiation, but not future trade and investment deals with China, Australia and New Zealand; and no gains from future reform to regulation. These cautious assumptions mean there is a potential upside to this scenario.

Estimates of overall benefits of reform

3.83 Successful EU-wide economic reform would make a substantial positive contribution to UK economic prospects. **Combining the 4 key areas of EU economic reform gives an estimate of the benefits of reform of up to 4% of UK GDP after 15 years. In 2015 terms, this would mean up to an extra £2,800 a year of GDP per household. This would imply an increase in public sector receipts of £28 billion which would significantly outweigh the cost of contributions to the EU.**[97] To realise these benefits, the recent increased momentum on reform – that the UK, working with its allies in the EU, has helped steer decisively – would need to be maintained.

3.84 These estimates are consistent with a range of external studies, which have considered the benefits of further EU economic reform. One study has suggested that further development of the broader Single Market and agreement to the EU-US trade deal could increase UK GDP by 2.8%.[98] Another study has suggested that future benefits from further reductions in non-tariff barriers across the EU's Single Market could increase UK GDP by between 1.3% and 2.6%.[99] A recent study by CEP finds that prices for UK consumers would fall by 0.6% through the agreement of EU FTAs with the US and Japan.[100]

3.85 There would be additional gains from future broader supply-side reforms in the EU. McKinsey has suggested that further European and national supply-side reform could secure a return to sustained EU GDP growth rates of 2% to 3% a year through to 2025.[101] The OECD expects a broad reform package to increase trade intensity within the EU by more than 10%;[102] this would be expected to boost both productivity and GDP. Further national product and labour market reforms are not included in the HM Treasury analysis but they could provide a further upside to EU growth. For example, the IMF estimates that such reforms could add 11% to the level of euro area GDP in the long term.[103] The spillovers to the UK from

96 Chart 1.G in Section 1 suggests that the EU and to a lesser extent the UK still have further to go to reach the level of financial market development of the US.

97 See Annex B for details.

98 *The impact of the UK being in the Single Market*, Centre for Economics and Business Research (2015).

99 *Should We Stay or Should We Go? The economic consequences of leaving the EU*, Dhingra et al (2015).

100 *How Have EU's Trade Agreements Impacted Consumers?*, Breinlich et al (2016).

101 *A window of opportunity for Europe*, McKinsey Global Institute (2015). Using the underlying analysis from Monteagudo et al, McKinsey find that implementation of the services directive to the level of the five best-performing countries per sector could add 0.14% to annual GDP growth between 2015 and 2025.

102 *Implicit Regulatory Barriers in the EU Single Market: New Empirical Evidence from Gravity Models*, Fournier et al, OECD (2015).

103 The IMF's approach is to assume that euro area countries halve the gap in labour and product market policies with 'frontier' countries in the OECD. See *Jobs and Growth: Supporting the European Recovery*, IMF (2014).

national reforms in the economies which are collectively the UK's biggest trading partner are likely to be material but more modest than the effects of EU-wide reforms.

3.86 The UK's new settlement has also achieved reforms to the EU's economic governance (see Section 1) that safeguard the interests of member states like the UK, which are outside the single currency but inside the Single Market. A stable, successful euro area is of vital importance to the UK's own economic security. The Five Presidents' Report proposed a number of measures that would move the euro area towards a closer economic union, financial union and fiscal union.[104] The Bank of England notes that: "For all economies to be permanently better off inside the euro area, further reforms are necessary to be able to spread the impact of shocks through both public and private risk-sharing" and that further financial and fiscal integration among the euro area's member states would "also contribute to the stability and dynamism of the rest of the EU, including the United Kingdom".[105]

3.87 Future reform in this area could represent an additional upside to the scenario presented. To give an idea of possible orders of magnitude, the IMF estimated that more favourable macroeconomic conditions and structural reforms could lead to euro area GDP being 1.4% higher in 2016.[106] No upside from this is assumed in the scenario presented here.

3.88 If the UK were to vote to leave the EU, the UK would lose access to a number of important Single Market safeguards as well as those protections secured in the UK's new settlement. The negative effects from a lack of influence outside the EU are clearly important but they are not possible to quantify and as a result they have not been included in the analysis.

Impact of completing the next stage of the Single Market

3.89 The analysis in Part 2 showed the cost of the alternative against a baseline that does not take into account the benefits of implementation of the next stage of the Single Market. The scenario above shows that if there is a realisation of reforms to deepen the Single Market in a number of key areas and complete EU trade deals with big UK trading partners, then there could be additional gains of up to 4% of GDP after 15 years. Based on the analysis in Sections 1 and 2 – and the UK's strong support for further liberalisation of the Single Market – the momentum on EU reform is judged to be more likely to be maintained if the UK were to remain an EU member.

3.90 Table 3.H shows the difference between remaining in the EU with the benefits of the implementation of the next stage of the Single Market realised and leaving the EU with the benefits not realised:

- if half of the benefits of the implementation of the next stage of the Single Market are realised this would imply an addition of 2% of GDP. This mid-point is used to construct the central estimates in Table 3.H. Combining this with the central estimate of the effect of leaving the EU in Table 3.D means that, for example, in the EEA case the central estimate would be a 5.8% loss of GDP
- the top of the range is constructed by combining the upper end of the range from Table 3.D with the upper end of the range for the benefits of economic reform as

104 *Completing Europe's Economic and Monetary Union*, EU Five Presidents' Report (2015).

105 Bank of England (2015).

106 *Euro Area Article IV Consultation*, IMF (2015).

given by the scenario for the implementation of the next stage of the Single Market of 4% of GDP. For example, in the EEA case this means a total loss of 8.3% of GDP

- the lower end of the range is constructed by combining the lower end of the range from Table 3.D with the lower end of the range for the benefits of economic reform as given by the baseline where no additional EU economic reform is realised. As the lower end of this range is zero, this means that in the example of the EEA case there remains a loss of 3.4% of GDP, the same as the bottom end of the range in Table 3.D

3.91 Even with no additional EU reform the analysis in Part 2 demonstrated that the UK would be permanently poorer in terms of lower productivity, GDP and living standards under any of the alternatives compared with remaining in the EU. Table 3.H shows the difference between remaining in the EU with the benefits of the implementation of the next stage of the Single Market realised and leaving the EU with the benefits not realised. It shows that taking account of the benefits of further reform inside the EU increases the costs of leaving the EU relative to the analysis in Part 2 which uses the cautious baseline of no additional EU reform.

Table 3.H: Difference between remaining in the EU with the benefits of the implementation of the next stage of the Single Market realised and leaving the EU with the benefits not realised

	EEA	Negotiated bilateral agreement	WTO
GDP (%) – central	-5.8	-8.2	-9.5
GDP (%)[a]	-3.4 to -8.3	-4.6 to -11.8	-5.4 to -13.5
GDP per household (£) – central	-£4,000	-£5,700	£6,500

[a] *The lower end of the range is based on the baseline used in Part 2 which assumes there is no additional EU economic reform.*

Annex A – Modelling openness

Introduction

A.1 This Annex sets out the modelling work that underlies the main document and especially the analysis in Section 3 of the main document. There are 4 parts to the Annex:

1 the impact of different EU relationships on UK trade

2 the impact of different EU relationships on UK foreign direct investment (FDI)

3 the impact of openness on productivity

4 modelling the overall macroeconomic impact of the UK leaving the EU

A.2 Parts 1 to 3 calibrate economic shocks that are combined to produce an aggregate macroeconomic impact of the UK leaving the EU. Part 4 describes how the economic shocks in parts 1 to 3 are combined within a global macroeconomic model to produce an assessment of the aggregate macroeconomic impact of the UK leaving the EU.

Openness, productivity and growth

A.3 There are various definitions for the openness of an economy. A basic definition would consider only trade as a share of GDP. Under a more refined definition, openness can be considered in terms of the ease with which goods, services, capital, labour and knowledge can flow between countries.

A.4 There are strong theoretical links between the openness of an economy, productivity and growth. Openness can not only increase capital and labour inputs, but it can also improve the efficiency with which these factors are combined via various channels:

- scale and specialisation – openness provides firms with access to larger markets which allows them to specialise in the production of goods and services in which they have a comparative advantage. As a result, firms can benefit from economies of scale and higher production, either by expanding their own trading operations or by investing in firms abroad
- competition, selection and innovation – as market size increases, firms face greater competition, which helps to drive productivity improvements among firms. Greater competition also tends to incentivise innovation – finding more productive ways to reduce production costs and remain competitive – thereby increasing the average level of productivity in the industry

- knowledge spillovers – the direct exchange of products provides an opportunity for domestic firms to learn by disseminating the embedded knowledge in intermediate products. In effect, this allows firms to update their own technology by importing the innovation that is captured within these products. Knowledge spillovers take place with the exchange of business practices – either learnt by domestic firms through trading relationships or cross-border investment and ownership (or the movement of workers with organisational know-how) – which increase the level of domestic productivity. FDI also enables foreign firms to tap into domestic technology networks and share successful technologies, creating additional knowledge spillover effects
- agglomeration effects – the development of small initial clusters can encourage more firms to invest in that area as firms seek to benefit from 'external' economies of scale. These can arise from locating closer to markets, suppliers or deep pools of skilled labour, for example in financial and technology centres. As a result, agglomeration effects can reinforce the first three channels and lead to improvements in productivity

Framework for modelling openness

A.5 Leaving the EU would have an impact on UK openness. The macroeconomic impact of this has been modelled via 3 main channels, shown in Figure A.1 below:

- there would be an impact on UK trade, directly affecting the demand side of the economy
- there would be an impact on inward foreign direct investment (FDI)
- the impact on trade and FDI would affect productivity (technological) growth

A.6 The economic shocks to UK trade and FDI in Parts 1 and 2 of this Annex are each calibrated to the three main alternatives to EU membership discussed in Section 2 of the main document:

- the European Economic Area (EEA) membership (e.g. Norway)
- a negotiated bilateral agreement (e.g. Switzerland, Turkey, Canada)
- WTO membership (the default relationship, e.g. Russia, Brazil)

A.7 The first step in modelling these effects is to consider how large each effect would be based on new HM Treasury empirical analysis. The advantage of an empirical approach is that the final assessment will be based primarily on economic data rather than theoretical assumptions. The second step is to calibrate the impact on productivity from the change in openness. The third step is to integrate these productivity shocks into a global macroeconomic model to produce an aggregate impact on UK GDP.

A.8 The first step in determining the impacts on UK trade and inward foreign investment is based on new HM Treasury analysis using gravity models. These models analyse the flows between countries as a function of economic variables, geographic variables such as the distance between countries and cultural variables such as whether countries share a common language.

A.9 These models have been econometrically estimated using panel data covering flows between countries over time. All of the estimates include country-pair fixed effects, which control for factors affecting flows between countries that do not vary over time. This approach

distinguishes the specific effect of EU membership and the alternatives from all the other influences that determine trade and FDI.

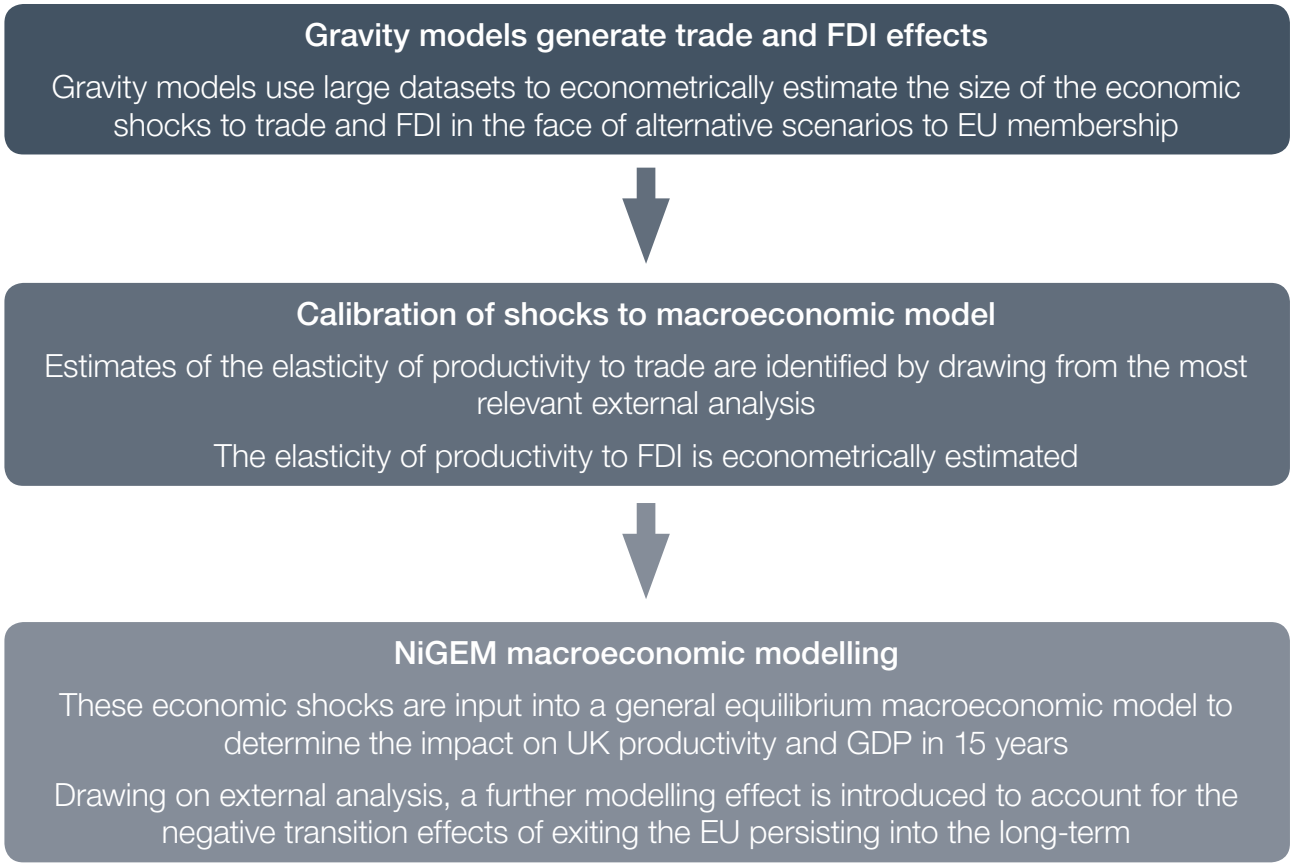
A.10 Having produced estimates for the reduction in trade and FDI that would occur under the 3 main alternatives to EU membership, the second step is to assess how both trade and inward FDI affect the level of UK productivity. This assessment is based on the most relevant external evidence on the impact of trade and HM Treasury modelling of FDI. From a survey of the empirical literature on the relationship between trade and productivity, a range for the elasticity has been selected. In the absence of estimates of the link between FDI and productivity at the whole economy level, an elasticity has been econometrically estimated by HM Treasury, based on a panel of UK industry sectors over time. Combining the trade and FDI effects with their relationships to UK productivity, the impact on UK productivity has been estimated.

A.11 To aggregate the openness shocks above into an impact on UK GDP, the National Institute of Economic and Social Research's (NIESR) NiGEM model is used, to differing degrees by over forty organisations including the IMF, OECD, Bank of England and ECB. NiGEM is a global macroeconomic model that includes 40 countries and country blocks modelled separately, including the UK. Each country, or country block, contains a supply side modelled by a production function, which is where the shocks to UK productivity are fed in. The trade shock is also fed into the demand side of the economy, which can lead to long-term impacts via persistent impacts on the UK's capital stock. Having taken account of modelling openness, a further modelling effect is introduced to account for the evidence that in the event of a vote to leave to EU, the ensuing period of uncertainty would affect economic activity. A proportion of this loss of output – consistent with a range of evidence – is persistent in the long-term. Full details of the effect of the increased uncertainty that would be generated by a decision to leave the EU will be provided in the forthcoming HM Government document.

A.12 As there is no precedent for an economy like the UK leaving the EU, any quantitative analysis is subject to uncertainty. This challenge is addressed by using a set of realistic assumptions, many of them cautious, alongside empirically-based estimates, to provide a rigorous and objective economic analysis of the long-term impact of remaining a member of EU compared to the alternatives. The estimates included in this section present an upper and a lower range for the effects of leaving the EU for each of the main alternatives. These allow the analysis to test the sensitivity to using different assumptions and the estimates at the lower end of the range introduce additional caution.

A.13 An overview of the modelling framework is illustrated in Figure A.1.

Figure A.1: Modelling framework



Alternative modelling frameworks

A.14 An alternative modelling approach to the use of a global macroeconomic model for analysis of the UK leaving the EU is to use a Computable General Equilibrium (CGE) model. CGE models simulate the core economic interactions in the economy. They use data on the structure of the economy, along with a set of equations based on economic theory, to estimate the effects of policy changes on the economy.

A.15 CGE models capture the inter-dependencies between the different product markets, factor markets, and public and private sectors in the economy, enabling analysis of how a policy change targeted at one part of the economy will affect the rest of the economy. CGE models can be used for a wide variety of purposes, and can be specifically adapted to simulate the impact of changes in trade policy.[1] For example, in PWC (2016),[2] quantitative assumptions about how changes in tariffs and non-tariff barriers affect export and import prices, are used as inputs in their CGE model to estimate the trade impact of leaving the EU.

A.16 Another potential approach is to use a Dynamic Stochastic General Equilibrium (DSGE) model. DSGE models are similar to CGE models in that both model classes are based on microeconomic foundations. The main difference between the two types of model is that DSGE models attempt to capture fluctuations in business cycles whereas CGE models tend to focus more on medium-term and long-term macroeconomic analysis. DSGE models also

1 *Brexit – The Economic Impact: A Meta-Analysis*, Cologne Institute for Economic Research (2016). The authors note that CGE models may fail to quantify the full effects of changes in trade policy when comparing the forecast trade increases from CGE models, predominantly used in ex-ante studies, with the trade effects found in ex-post analysis of trade agreements using gravity models.

2 *Leaving the EU: Implications for the UK economy*, PwC (2016).

tend to have less detailed representation of firms and households than CGE models. On the other hand, DSGE models allow for random variations to account for uncertainty whereas CGE models are deterministic, with agents facing no uncertainty about the future.

A.17 The global macroeconomic model NiGEM is used in the HM Treasury analysis because it allows spillovers from the external effects of policies in the UK to be taken into account. The model links countries through trade and competitiveness, financial markets and international stocks of assets. In addition, NiGEM includes a sophisticated treatment of the economy's supply-side, which is necessary in order to consider the important impacts of openness on productivity.

Part 1: The impact of different EU relationships on UK trade

A.18 This part sets out the modelling framework used for the analysis of trade. The first half discusses the existing analysis in this area and the modelling approach used. The second half presents the results of new HM Treasury estimations and explains how they have been used to calculate a total trade effect in the case of the UK leaving the EU. This provides the basis for the trade impact used in the quantitative analysis in Section 3 of the main document.

The modelling approach

The gravity model

A.19 Extensive economic research has been carried out by economists to establish the impact of different trade agreements on trade flows. A long-standing approach is to use the gravity model. It models trade flows between two countries as a function of economic variables such as GDP, geographic variables such as distance and cultural variables such as whether the two countries share a common language. Research has shown that countries which are high income, in close proximity to each other and share a common language, trade with each other more than a pair of countries where these key determinants are not as well matched.

Review of existing analysis

A.20 Gravity models for trade can be derived from a range of theoretical foundations following a tradition started by Anderson (1979).[3] In HM Government (2013),[4] gravity models were used to estimate the impact of a potential new international border (the 'border effect') on trade between Scotland and the rest of the UK.

A.21 The gravity model used in the context of the Scotland analysis was estimated using data from 2002 to 2011 and through pooled Ordinary Least Squares. The estimates from this model were used to provide an approximation of the counterfactual cross-border trade between the rest of the UK and Scotland, if Scotland were to become independent. The comparison of this counterfactual cross-border trade to actual cross-border trade suggested the creation of a border would reduce trade by around 80% relative to the counterfactual of Scotland remaining in the UK.

A.22 There are a number of papers that estimate the trade effects of Free Trade Agreements (FTAs) and EU membership, the majority of which only use goods data. OECD (2015)[5] use data from 1990 to 2011 for 65 countries and finds that EEA (the EU, Norway and Iceland) membership increases trade by approximately 60%. These results are considered a lower bound as they do not account for the time lag for the full trade gains from the Single Market access to materialise.

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3 *A theoretical foundation for the gravity equation*, Anderson (1979).

4 *Scotland analysis*, HM Government (2013).

5 *Implicit Regulatory Barriers in the EU Single Market: New Empirical Evidence from Gravity Models*, Domps, Fournier, Gorin, Guillet and Morchoisne, OECD (2015).

A.23 Magee (2008)[6] estimates a gravity model for bilateral trade, using bilateral trade data for 133 countries from 1980 to 1993. In the preferred model, which includes country-pair fixed effects, the paper's estimates suggest that the average FTA raises intra-bloc trade by 89% in the long-term. Baier et al (2008)[7] use data for 96 countries from 1960 to 2000 and find that EU membership increases intra-EU trade by 92% while FTA membership and EEA membership increase trade by 58% and 21% respectively. Hufbauer and Schott (2007)[8] use bilateral trade data from 1976 to 2005 to provide estimates of the trade effects of specific trade agreements by estimating a gravity model with fixed effects. They estimate EU membership increases trade by around 31% over the period, while European Free Trade Association (EFTA) membership has no effect on trade. Carrere (2006)[9] uses bilateral trade data for 130 countries from 1962 to 1996 to examine the ex-post impact of FTAs on trade flows using a gravity model. The country-pair fixed effects regressions in the paper suggest EU membership increases intra-EU trade by an average of 104% over the period.

A.24 Eicher and Henn (2011)[10] use bilateral trade data at 5-year intervals from 1950 to 2000 to estimate the disaggregated impact of FTAs on trade flows using a gravity model. In their preferred specification, which controls for country-pair fixed effects, they find EU membership increases bilateral imports by 37%, EEA membership increases it by 34% and that the coefficient on FTAs, other than those specifically disaggregated, is not significantly different from zero. Eicher et al (2012)[11] use a similar data set but starting from 1970, and additionally use Bayesian Model Averaging to account for model uncertainty to estimate a gravity model. In their regressions with country-pair fixed effects only, they find EU membership increases bilateral trade by 51%, and that the coefficients for EEA and EFTA membership are not significant. Head and Mayer (2013)[12] provide an overview of the gravity model literature.

Trade diversion

A.25 It has been suggested that free trade areas, and the EU specifically, result not just in trade creation between FTA members, but also trade diversion from non-members. Trade creation is the result of the lower cost of products from within the area, while trade diversion is caused by the increase in the relative price of products from outside the area. If trade diversion effects were powerful, it is possible that they could be larger than the trade creation effects and cause a country's total trade to fall. In order to capture any possible trade diversion effects resulting from EU membership, a dummy variable has been included in the estimated gravity model, consistent with the approach in external studies.

A.26 A shift in relative prices does not necessarily imply an absolute decrease in trade with third countries outside the free trade area, as the income-creation effects from the establishment of the area may be large enough to compensate for any change in relative

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6 *New measures of trade creation and trade diversion*, Magee (2008).

7 *Do economic integration agreements actually work? Issues in understanding the causes and consequences of the growth of regionalism*, Baier, Bergstrand, Egger and McLaughlin (2008).

8 *Fitting Asia-Pacific agreements into the WTO system*, Hufbauer and Schott (2007).

9 *Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model*, Carrere (2006).

10 *In search of WTO trade effects: Preferential trade agreements promote trade strongly, but unevenly*, Eicher and Henn (2011).

11 *Trade creation and diversion revisited: Accounting for model uncertainty and natural trading partner effects*, Eicher, Henn and Papageorgiou (2012).

12 *Gravity equations: Workhorse, toolkit, and cookbook*, Head and Mayer (2013).

prices. Furthermore, as pointed out by Bagwell, Bown and Staiger (2014),[13] countries may react to the conclusion of regional trade agreements by reducing their most-favoured nation (MFN) tariffs,[14] which could further mitigate any trade diversion effects.

A.27 The importance of trade diversion effects has been assessed in the empirical literature, which suggests that, where an effect is identified, the size of the effect is very small, and negligible in comparison to the trade creation effect. Bagwell, Bown and Staiger (2014) review the literature on this subject and conclude that while trade diversion is a possibility, it does not appear to be a consistent feature across regional trade agreements. Magee (2008) finds that FTAs are not trade diverting, and similarly Hufbauer and Schott (2007)[15] find that trade diversion from FTAs is not important for total trade flows with the exception of agriculture. The HM Treasury estimates of trade diversion presented in Tables A.1 and A.2 find no evidence of trade diversion.

The model

A.28 Based on the economic literature, particularly Head and Mayer (2013) and previous HM Treasury work, the basic specification of the gravity model is:

$$\begin{aligned}(\text{A.1}) \quad \ln(T_{ijt}) = {} & \alpha_{ij} + \gamma_t + \alpha_1 \ln(Y_{it} * Y_{jt}) + \alpha_2 \ln(POP_{it} * POP_{jt}) + \\ & \alpha_3 \ln(DIST_{ij}) + \alpha_4 COMLANG_{ij} + \alpha_5 COLONY_{ij} + \alpha_6 BORDER_{ij} + \varepsilon_{ijt} \\ = {} & \alpha_{ij} + \gamma_t + \alpha X_{ijt} + \varepsilon_{ijt}\end{aligned}$$

In these equations, the variables are defined as follows:

- T_{ijt} denotes trade flows between country i and country j at time t
- Y_{it} and Y_{jt} are the GDP of countries i and j at time t
- POP_{it} *and* POP_{jt} are the population of countries i and j at time t
- $DIST_{ij}$ is the distance between country i and country j
- $COMLANG_{ij}$ is a dummy variable which equals 1 if the origin and destination countries have a shared language and zero otherwise
- $COLONY_{ij}$ is a dummy variable which equals 1 if the origin and destination countries have historical colonies ties and zero otherwise
- $BORDER_{ij}$ is a dummy variable which equals 1 if the origin and destination countries share a common border and zero otherwise
- γ_t is a set of time dummies
- α_{ij} is the country-pair fixed effect

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13 *Is the WTO passé?*, Bagwell, Bown and Staiger (2014).

14 There are economic effects working in both directions. For instance, the formation of a customs union will result in an increase in market power for the customs union when compared to each individual member, and could therefore lead to increased protection. On the other hand, if the formation of an FTA leads to reduction in the size of an uncompetitive import-competing industry, it may weaken its capacity to lobby for continued protection and lead to reduced MFN tariffs.

15 *Fitting Asia-Pacific Agreements into the WTO system*, Hufbauer and Schott (2007).

A.29 Country-pair fixed effects capture the impacts of all time invariant characteristics. Therefore, all variables above which do not change over time (for example distance between countries) have been omitted and the following gravity model is estimated:

$$(\mathrm{A.2}) \quad \ln(T_{ijt}) = \alpha_{ij} + \gamma_t + \alpha_1 \ln(Y_{it} * Y_{jt}) + \alpha_2 \ln(POP_{it} * POP_{jt}) + \varepsilon_{ijt}$$
$$= \alpha_{ij} + \gamma_t + \alpha X_{ijt} + \varepsilon_{ijt}$$

A.30 The gravity model approach described is used to estimate the impact of different trade relationships with the EU on the UK's trade. Separate regressions have been estimated for goods and services and the results have been combined to obtain a total trade effect that can be compared with others in the literature. For goods data, average trade flows are used, which is the general approach used in the academic literature. Services data is less readily available and, reflecting that, the analysis uses unidirectional trade data to maximise the data available. Using these historic trade flows, an estimate of the impact on trade under different trade arrangements can be obtained.

Data

A.31 For goods data, Glick and Rose's database is used. The database[16] takes trade data from the IMF's Direction of Trade (DOTS) database and covers bilateral trade from 1948 to 2013 for over 200 countries. It is supplemented by IMF data for population. The services data used is the Trade in Services Database.[17] It is the most comprehensive bilateral services trade dataset available as it consolidates data from the OECD, Eurostat, UN, and IMF. It provides bilateral trade data covering 195 countries for the period 1981 to 2009, albeit with limited data for some countries.[18] Real GDP and population data comes from the World Development Indicators,[19] Penn World Tables[20] and the IMF's International Financial Statistics. The CIA's World Factbook provides latitude and longitude, land area, landlocked and island status, physically contiguous neighbours, language, colonizers and dates of independence, which are then used to create a number of controls.

Estimation techniques and econometric issues

A.32 This section discusses the econometric approach used and some of the econometric issues that can arise when estimating gravity models. These include the issues of multilateral trade resistance terms, omitted variables and endogeneity.

A.33 The most straightforward and widely used method to quantify the impact of EU membership is to incorporate a set of dummy variables. Equation A.3 below is an extension of equation A.2 above. It shows a very simple form where dummy variables are included to capture the impact of different trading relationships. For example, EU2 is a dummy variable which is equal to 1 if both countries are members of the EU and 0 otherwise. It is the key variable to capture the trade effects of EU membership. EU1 is a dummy which is 1 if one of

16 The data base is available on Andrew Rose's personal website.

17 *Consolidated Data on International Trade in Services,* Francois and Pindyuk (2013). The authors note that this services database does not include trade in all four WTO modes of services trade.

18 The importance of the sample of countries included was noted by Rose (2000). He noted that his estimation of currency union impacts on trade could not be applied to the EU countries as his data set was based on a set of countries that were mainly poor and small so quite different to the countries forming the euro area.

19 World Bank.

20 PWT version 7.1.

the bilateral pair is a member of the EU and the other is not, and 0 otherwise. These dummy variables provide a standard approach to estimating whether there is a trade diversion effect as a result of being inside the EU.

$$(\mathrm{A}.3) \quad \ln(T_{ijt}) = \alpha_{ij} + \alpha X_{ijt} + \beta_1 EU2_{ijt} + \beta_2 EU1_{ijt} + \beta_3 EEA_{ijt} + \beta_4 FTA_{ijt} + \varepsilon_{ijt}$$

A.34 This approach can be extended to estimate the effect of a wide range of other trade relationships and indicators. Examples in the literature include the effect of FTAs or of currency union membership. In the HM Treasury analysis the following dummy variables have been included:

- EU membership (where both trade partners are in the EU) – to capture the impact of EU membership on trade
- EU trade diversion (where only one trade partner is in the EU) – to capture any trade diverting effects from EU membership
- FTA membership (where both trade partners are in the FTA) – to capture the impact of FTA membership on trade
- EEA membership (where both trade partners are in the EEA, which includes all EU member states) – to capture the impact of EEA membership on trade

A.35 The econometric results are based on estimates by pooled OLS with country-pair fixed effects, reflecting strong theoretical reasons to prefer regressions with country-pair fixed effects to those without. This is due to the improved capacity of these estimation techniques to deal with the main econometric issues set out below.[21] Applying fixed effects at the country-pair level means that unobserved factors are controlled for at the country-pair level, which is more useful in the dataset of country-pair trade flows.[22]

A.36 An issue with the dummy variable approach outlined above is that it may be subject to omitted variable effects. This is because the estimate of the impact of EU membership on trade may include a wide range of other factors that occurred alongside EU membership, but are not explicitly controlled for by the model, such as trade promotion activities. Several studies account for these potential issues in results by using fixed effects estimation, which supports the preference for the results accounting for country-pair fixed effects.[23]

A.37 The fixed effects approach controls for the average differences across countries in both observable and unobservable factors. This removes the effect of time-invariant influences so that the net effect of the variables included in the model of trade can be isolated. For example, Head and Mayer (2013) note that country fixed effects can account for countries that consistently trade disproportionate amounts relative to their GDP. This is the case with Belgium and the Netherlands owing to the major ports at Antwerp and Rotterdam. Fixed effects

21 Random effects results are another option when using panel data but these are not reported as the assumptions required for them to apply are not expected to hold. Further, as noted by Baier et al (2008): "Recent econometric evaluations of the gravity equation with panel data have used the Hausman test to test for fixed versus random effects. For example, Egger (2000) finds overwhelming evidence for the rejection of a random-effects gravity model relative to a fixed effects gravity model, using either bilateral-pair or country-specific fixed effects."

22 This analysis did initially include random effects estimations however these were rejected by the results of the Hausman test.

23 This is noted by Glick and Rose (2001).

can help account for the 'Antwerp' and 'Rotterdam' effects by controlling for these types of influences on trade. The key assumption is that such factors do not change over time.

A.38 A particular type of omitted variable issue that gravity models need to account for are 'relative' trade barriers in trade flows. Fixed effects are a solution to this particular issue. Early studies using gravity models accounted for absolute trade barriers between countries, but not internal trade barriers, or bilateral barriers relative to all other trade partners. It is more attractive to trade with a country that has low trade costs relative to the average trade costs across all countries and internally. Rose and van Wincoop (2001) aligned gravity models with this economic theory by introducing a multilateral trade resistance term.

$$(A.4) \quad x_{ij} = \frac{y_i y_j}{y^w} \left(\frac{t_{ij}}{P_i P_j} \right)^{1-\sigma}$$

A.39 This equation gives exports from country *i* to *j*, (x_{ij}), as a function of the combined income of the two countries *($y_i y_j$)* relative to the rest of the world (y^w); bilateral trade barriers (t_{ij}) relative to the multilateral trade barrier of each country (*P*) and the elasticity of substitution between all goods ($\sigma > 1$). The elasticity is assumed to be greater than 1 so that an increase in bilateral trade costs has a negative effect on bilateral trade flows. In other words bilateral exports depend on the bilateral trade barrier relative to the average trade barrier with all trading partners.

A.40 The equation implies that trade barriers reduce size-adjusted trade between large countries more than between small countries and that trade barriers raise size-adjusted trade within small countries more than within large countries.

A.41 In order to estimate a model that accounts for multilateral trade resistance, Anderson and van Wincoop (2004)[24] suggest using country-pair fixed effects. This is supported by Head and Mayer (2013) who note that estimation of gravity models through econometric models with country fixed effects captures multilateral resistance terms and is therefore theory-consistent.

A.42 There is an endogeneity issue when assessing the impact of trade policy on trade flows. Trade agreements are more likely to be formed between countries that already trade extensively. Consequently it is not straightforward to establish the direction of causality, which can make it unclear whether FTAs increase trade or if countries that already trade extensively form FTAs. As noted by UNCTAD (2012)[25] in their guide to gravity models, finding a solution is not straightforward. However, there is increasing consensus in the literature that country-pair fixed effects address these endogeneity issues.

A.43 Endogeneity is an important concern when estimating the trade effects of FTAs, as highlighted in the literature. Country-pair fixed effects are the most promising means of addressing this issue. This is because country-pair fixed effects will capture any time-invariant characteristics, observable or unobservable, of a trade relationship that makes a country-pair have larger (or smaller) trade and therefore increases (or decreases) the incentives to agree

[24] *Trade Costs*, Anderson and van Wincoop (2004).

[25] *A practical guide to trade analysis. Chapter 3: Analysing bilateral trade using the gravity equation*, UNCTAD (2012).

an FTA.[26] This captures factors such as cultural openness to trade and a history of conflict between the country pair. If two countries have traditionally traded a lot, and then choose to form an FTA, the fact that they trade a lot through the period will be captured by the country-pair fixed effects and not by the FTA dummy. Only changes in trade before and after the formation of the FTA will be captured. An alternative approach to address endogeneity issues would be to use instrumental variables but, as Head and Mayer note, there is a lack of good instruments.[27]

Estimation results

A.44 This section sets out the estimation results which are used as the basis of the total trade impact under each scenario in Section 3 of the main document. The analysis for goods and services trade was carried out separately. As noted above, there are strong theoretical reasons for using country-pair fixed effects, which is the approach adopted for both goods and services analysis. For robustness, a fixed effects model was also specified but the results were dismissed given the improved performance of the country-pair fixed effects approach.

Goods analysis

A.45 The results of the dummy variable approach for goods are shown in Table A.1. Dummy variables are included for EU membership, trade diversion from EU membership, FTA membership, and EEA membership.

A.46 Given the small number of countries involved in the EEA EFTA group, obtaining an estimate for EEA membership is more challenging. The EEA membership approach follows the same analytical method used to obtain the EU and FTA trade estimates. However, the EEA group only includes Norway and Iceland (data is not available for Liechtenstein) which means the goods trade impact of joining the EEA is based on data for these two countries. In the EEA scenario, rules of origin would apply to UK trade with the EU. Box A.1 explains rules of origin and how they affect trade.

Table A.1: Results for goods analysis

Variable	Country-pair fixed effects
EU membership	0.766***
EU trade diversion	-0.035
FTA membership	0.219***
EEA membership	0.566***
GDP	1.085***
Population	-0.292***
Sample size	390,521

** Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level*

Source: HM Treasury calculations

GDP and population enter in logs, coefficients on time dummies and country-pair fixed effects are not reported

26 Estimation with country-pair fixed effects requires that the variable of interest varies not only across countries but also across time, as otherwise the effect of the variable of interest would be captured entirely by the fixed effects. EU membership varies across time in the sample period, and therefore its effect can be estimated with country-pair fixed effects.

27 It is difficult to think of a factor that would increase the likelihood of concluding an FTA but would not affect trade volumes except for its potential effect on FTAs.

Box A.1: Rules of origin – what are they and what impact do they have on trade?

In an FTA arrangement, rules of origin are put in place to ensure that only goods that have originated from the participating countries are eligible for preferential tariffs. The Review of the Balance of Competences for Trade and Investment (2013) explains how rules of origin affect the cost of business and act as restrictions on trade. Customs compliance checks, including at the border, add to an exporter's costs and so create trade barriers, particularly if suppliers in the importing country do not face such costs. Rules of origin specifically require exporters to obtain proof of origin certificates from their national customs authority to certify the domestic content of their exports. This is not necessary within a customs union such as the EU. However, rules of origin apply to countries exporting to the EU from outside the customs union such as Norway and Switzerland.

Estimating the impact of rules of origin on trade flows is complicated. Augier et al (2005) find that incompatible rules of origin systems can restrict trade flows by up to 50%, however the authors note that their findings should probably be considered an upper bound: there are likely to be omitted variables influencing trade flows, and the analysis has been conducted using aggregated trade data whereas the impact of rules of origin will be at the sector or product level.

There are several studies that estimate the impact of rules of origin on trade costs. As part of the Review of the Balance of Competences for Trade and Investment (2013), the Centre for Economic Policy Research (CEPR)[28] found that applying rules of origin increases trade costs by 4% to 15%. Francois et al (2005)[29] find that rules of origin represent a tariff equivalent of 4% to 4.5%. In studies of EFTA, both Herin (1986)[30] and Waer (1992)[31] found that rules of origin increased trade costs by 3%. A study on NAFTA by Carrere and de Melo (2004)[32] found that rules of origin increased trade costs by 4% to 6%.

A.47 The model is expressed in natural logarithms (logs) which means the output needs to be converted to obtain percentage effects. As an example, the country-pair fixed effects estimation gives an EU membership result of 0.766 which when converted into a percentage suggests that EU membership boosts intra-EU trade by 115% relative to a position of WTO membership. All of the coefficients show a positive and statistically significant impact on trade from joining a trade agreement (EU, FTA, or EEA). For this analysis it is the reversal of this effect that is of interest. The symmetric equivalent of a 115% increase in intra-EU trade from EU membership is a fall in trade of 53% from leaving the EU.

A.48 Both the EU membership and FTA dummy variables are positive indicating that the EU and FTAs are on average internally trade creating. The EU membership effect is larger than the FTA effect suggesting that the impact of the EU on trade creation is greater than other FTAs on average. If the UK were to leave the EU, this result implies that any increase in trade from forming an FTA with the EU, would not offset the loss in trade from leaving the EU. The results show that the same applies to EEA membership where the net effect of leaving the EU and joining the EEA is a fall in trade with the EU.

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28 *Review of the Balance of Competences for Trade and Investment*, The Centre for Economic Policy Research (2013).

29 *Preference Erosion and Multilateral Trade Liberalization*, Francois, Hoekman and Manchin (2006).

30 *Rules of Origin and Differences between Tariff Levels in EFTA and in the EC*, Herin (1986).

31 *European Community Rules of Origin*, Waer (1992).

32 *Are Different Rules of Origin Equally Costly? Estimates from NAFTA*, Carrere and de Melo (2004).

A.49 The results find no evidence for trade diversion. The coefficient on the trade diversion variable is not statistically different from zero.

Services analysis

A.50 The same dummy variable approach can be used to assess the impact of EU membership on services trade. Dummy variables are included for EU membership, trade diversion from EU membership, FTA membership, and EEA membership. The results of the services analysis are shown in Table A.2. This uses data for 195 countries and a shorter sample period (1981 to 2009) compared to the goods data (1948 to 2013).

Table A.2: Results for services analysis

Variable	Country-pair fixed effects
EU membership	0.216***
EU trade diversion	0.036
FTA membership	0.068**
EEA membership	-0.096
	(set equal to zero)
GDP	0.489***
Population	0.611**
Sample size	32,233

**Significant at the 10% level, **Significant at the 5% level, ***Significant at the 1% level*

Source: HM Treasury calculations

GDP and population enter in logs, coefficients on time dummies and country-pair fixed effects are not reported

A.51 As was the case for goods, EU membership has a positive impact on intra-EU trade although the magnitude is found to be smaller for services than goods. The FTA impact is positive but relatively small, which is consistent with the idea that FTAs in general do very little to remove barriers to services trade. The EEA impact is unexpectedly large and negative implying a fall in services trade with the EU of approximately 9%. However, the coefficient on EEA membership is not statistically significant, and a priori it seems unlikely that services trade would be so negatively affected by EEA membership. Furthermore, the fact that only two countries have joined the EEA and that the time span of available data is shorter means the sample size is smaller. As such, when calibrating the total trade impact that enters into the quantitative analysis in Section 3 of the main document, the EEA effect for services was set to zero.

A.52 The services results also find no evidence for trade diversion. The coefficient on the trade diversion variable is not statistically different from zero.

A.53 A number of robustness checks have been undertaken. Tests for a structural break confirm the differential impact of EU membership over time: the EU membership effect is found to be considerably more positive after implementing the 1987 Single Market Act than in the preceding years. For example, the impact of EU membership on goods trade post-1987 is approximately double that of the pre-1987 impact. This suggests the reported estimate is cautious as the positive impact of EU membership appears to have increased as the Single Market has deepened. Including a dummy variable to capture the impact of euro membership finds the euro to have had a statistically significant positive impact on trade between its members, but has little additional effect over and above the estimated impact of EU membership. Introducing lagged dummy variables for EU membership in the modelling also illustrates the evolving impact of the trade relationship. If the impact of EU membership was

a one-off increase in the level of trade, all the lagged coefficients would be zero. The lagged dummy variables are all positive which suggests that the trade benefits from EU membership increase over time, suggesting the estimates used may underestimate the overall impact of EU membership.

Range of coefficient results

A.54 Using single standard error values, a range has been constructed around the country-pair fixed effects coefficient results as shown in Table A.3. This range of coefficients has been used to construct the ranges for the total trade impacts for the alternative trade relationships described in Section 3 of the main document.

A.55 The results of the EU, FTA and EEA membership dummy variables suggest that the trade impact on goods is greater than the impact on services. This may reflect the fact that trade liberalisation in goods started at an earlier point compared to services so the effects of trade policies have had longer to take effect.

Table A.3: Range of estimates for coefficients

	Goods			Services		
Variable	**-1 se**	**Coefficient**	**+1 se**	**-1 se**	**Coefficient**	**+1 se**
EU membership	0.718	0.766	0.814	0.116	0.216	0.266
EU trade diversion	-0.057	-0.035	-0.013	0.000	0.036	0.072
FTA membership	0.191	0.219	0.248	0.039	0.068	0.098
EEA membership	0.475	0.566	0.656	-0.225	-0.096	-0.033

**Estimates constructed using the standard error (se)*

A.56 As noted above, HM Treasury estimates find no evidence of trade diversion. Following the findings in the external literature, the EU trade diversion effects have been set to zero when estimating the trade impacts of the different scenarios. The negative EEA impact on services appears implausible, and has also been set to zero when calculating the total trade effect.

A.57 The results shown in Table A.3 are in log format and refer to the separate impacts of the different trade agreements on goods and services trade. Weighting the separate coefficients by UK goods and services trade, and converting to percentage terms, gives an implied effect for each trade agreement as shown in Table A.4 that can be compared to the external literature. The percentage estimates for the implied impacts are based on combining the respective ranges from the goods and services results.

Table A.4: Range of estimates in percentage terms (combined goods and services estimates)

	Percentage range based on:		
Variable	**-1 se**	**Coefficient**	**+1 se**
EU membership	68%	76%	85%
FTA membership	14%	17%	21%
EEA membership	35%	44%	53%

Comparison of HM Treasury results with external estimates

A.58 Table A.5 compares the range of results from HM Treasury analysis with findings in the literature for the EU and FTA membership effects. As the estimates in the literature reported

here refer to total trade effects, the HM Treasury estimates for goods and services have been combined.

A.59 As mentioned previously, the EU membership effect refers to the trade boost from joining the EU from a situation of no previous trade agreement. Leaving the EU implies a reversal of this effect but this is not the same magnitude in percentage terms. For example, when reversed, a rise in trade of 50% equates to a fall in trade of 33%. Similarly, the FTA effect refers to the boost to trade with FTA members from joining the FTA from a situation of no previous trade agreement.

A.60 In an analysis of 9 different FTAs, Hufbauer and Schott (2007) find that EU membership increases goods trade by 31% and that EU-related FTAs increase trade by 9%. The most directly comparable paper to the analysis here is Baier et al (2008),[33] which provides similar estimates for the impact of EU membership and FTAs on trade flows. They find that that EU and FTA membership effects are 92% and 58% respectively, and that the EU effect is greater than the FTA effect. This study has been widely used in literature: Dinghra et al (2016)[34] and Crafts (2016)[35] both use the Baier et al (2008) results in order to estimate the impact on the UK of leaving the EU and joining the EEA.

Table A.5: External and HM Treasury estimate of EU and FTA membership effects

	EU membership effect	FTA membership effect
HM Treasury	68% / 76% / 85%	14% / 17% / 21%
OECD (2015)	60%	N/A
Baier, Bergstrand et al (2008)	92%	58%
Hufbauer and Schott (2007)	31%	27%
Carrere (2006)	104%	N/A
Eicher and Henn (2011)	37%	Insignificant
Eicher et al (2012)	51%	N/A

**The range of impacts for the HM Treasury results is based on using a +/- 1 standard error range*

A.61 When combined with the EU dummy variable, the EEA dummy variable provides an estimate for the impact on trade with the EU of joining the EEA. The EEA result is the impact of EEA membership on trade with the EU from a situation of no previous trade agreement. The OECD[36] find that EEA (the EU, Norway and Iceland) membership increases trade by approximately 60%. The OECD consider these results a lower bound as they do not account for the time lag for the full trade gains from Single Market access to materialise.

33 *Do Economic Integration Agreements Actually Work? Issues in Understanding the Causes and Consequences of the Growth of Regionalism*, Baier, Bergstrand, Egger and McLaughlin (2008).

34 *The Consequences of Brexit for UK trade and living standards.* Dhingra, Ottaviano, Sampson and Van Reenen (2016).

35 *The Growth Effects of EU Membership for the UK: a Review of the Evidence,* Crafts (2016).

36 *Implicit Regulatory Barriers in the EU Single Market: New Empirical Evidence from Gravity Models*, Domps, Fournier, Gorin, Guillet and Morchoisne, OECD (2015).

Box A.2: Alternative estimation techniques – direct estimation of tariff and non-tariff barriers

The dummy variable approach does not allow a decomposition of the trade impact of EU membership into separate trade barriers, notably tariffs and non-tariff barriers (NTBs). This can be done by including explicit variables for tariffs and NTBs in the model instead of the EU dummy variables. In that case, the specification of the gravity model would become:

$$\ln(T_{ijt}) = \alpha X_{ijt} + \beta_1 NTB_{ijt} + \beta_2 Tariff_{ijt} + \varepsilon_{ijt}$$

Where NTB_{ijt} is a measure of NTBs in countries *i* and *j* in period t and $Tariff_{ijt}$ is the tariff between them.

Unlike tariffs, NTBs are not directly observable or measurable which means estimating NTBs for cross country comparisons is difficult. There are a limited set of NTB data options. For the goods analysis, the OECD's 'Barriers to trade and investment' index (OBTI) is used. This captures both tariffs and non-tariff barriers. For the services analysis, the OECD's 'Barriers in services sector (BSS)' index is used. This only covers NTBs as there are no tariffs applied to services flows. Compared with the dummy variable approach both the time period and the number of countries included is smaller. Data has been collected every 5 years for the period 1998 to 2013 for a group of approximately 50 countries.[37]

The econometric results suggest that the impact of both tariffs and NTBs on trade is negative, with NTBs having a greater impact. Without having reliable estimates for any future change in NTBs and tariffs it is difficult to quantify the overall trade impact. However, this alternative approach demonstrates that even if tariffs between the UK and EU are not introduced, trade would still be affected as a result of any increase in NTBs between the two trade partners. The literature suggests this is likely: Dinghra et al (2016) assume that the UK would face a rise in NTBs with the EU equal to between 1 and 3 quarters of the levels faced by the US. Given that the EU plays a leading role in setting global trade standards, it is feasible that leaving the EU would increase NTBs between the UK and the rest of the world as well. This suggests that if the UK left the EU, trade with both the EU and the rest of the world would fall due to the rise in NTBs alone. This supports the findings of the dummy variable approach used, namely that the overall impact on trade from leaving the EU is negative.

Total UK trade effect and modelling input

A.62 In order to arrive at the total trade effect under each scenario, shown in Table A.6, the goods and services coefficients reported in Table A.3 have been applied as follows:

- the coefficient results have been converted from log format to percentage format
- the goods and services results have been applied to ONS goods[38] and services data by partner country
- different dummy variables have been combined to estimate the total effects in each trade scenario

37 The 50 countries includes the developed (OECD) countries but also some of the larger middle income and developing countries such as China, India and Brazil.

38 *United Kingdom Balance of Payment – The Pink Book,* ONS (2015). Using trade data for 2014.

- UK trade with non-EU countries is not affected under the different trade scenarios, consistent with the findings for the trade diversion variables

Table A.6: Total trade impacts under different trade relation scenarios

	Range of estimates based on:		
Scenario	**-1 se**	**Coefficient**	**+1 se**
EEA	-10%	-9%	-8%
FTA	-19%	-18%	-18%
WTO	-25%	-24%	-22%

A.63 The results in Table A.6 are comparable to external estimates for the impact on UK total trade of the UK leaving the EU. Dinghra et al (2016) use Baier et al's (2008)[39] results for the impact of EFTA membership on trade and suggest that if the UK left the EU and joined EFTA, the UK's trade with the world would fall by 12.6% (comparable to the EEA estimate above). Following a similar approach, Crafts (2016) finds that EU membership has increased total UK trade relative to a position of EFTA membership by 21%. This suggests that re-joining EFTA from a position of EU membership would result in a fall in UK total trade. This is supported by analysis from Straathof et al (2008)[40] who find that the impacts of EFTA membership on trade are much smaller[41] than the Single Market effects on trade.

A.64 The results in Table A.6 show that in each trade relationship considered, total UK trade falls. This suggests that total UK trade falls by:

- 8% to 10% under the EEA scenario
- 18% to 19% under the negotiated bilateral agreement scenario
- 22% to 25% under the WTO scenario

A.65 The final trade inputs used in the macroeconomic modelling are shown in Table A.7 as a range. To allow for additional caution in the lower end of the range, the analysis assumes that only half of the trade effect of going from the EEA to the negotiated bilateral agreement or the WTO rules comes through within 15 years. This effectively implies a slower degree of regulatory divergence. It is cautious because even in these cases some trade barriers, such as the loss of the financial services passport or the effect of new tariffs, would come through quickly. In the EEA case, the full impact of reintroducing a customs border would be felt immediately and so no reduction in the full estimated trade impact is assumed.

Table A.7: Trade inputs for macroeconomic modelling

Scenario	Lower end of the range	Upper end of the range
EEA	-9%	-9%
Negotiated bilateral agreement (FTA)	-14%	-19%
WTO	-17%	-24%

39 *Do economic integration agreements actually work? Issues in understanding the causes and consequences of the growth of regionalism*, Baier, Bergstrand, Egger and McLaughlin (2008).

40 *The Internal Market and the Dutch Economy Implications for trade and economic growth*, Straathof, Linders and Lejour (2008).

41 The EFTA trade effects are approximately 15% but are not statistically significant.

Part 2: Estimating the impact of different EU relationships on UK foreign direct investment

A.66 This part sets out the modelling framework used for the analysis of inward foreign direct investment (FDI). The first half discusses the existing analysis in this area and the modelling approach used. The second half presents the results of new HM Treasury estimations and explains how they have been used to calculate a total FDI effect in the case of the UK leaving the EU. This provides the basis for the FDI impact used in the quantitative analysis in Section 3 of the main document.

The modelling approach

The gravity model

A.67 Similar to the trade literature, there is a growing empirical literature that uses the gravity equation to study the determinants of FDI, as noted in Fournier (2015).[42]

Review of existing analysis

A.68 HM Government (2013) looked at the issue of FDI in the context of the Scottish independence referendum. It outlined the factors that contribute to the UK's attractiveness as a destination for FDI and the role that the UK plays in promoting these factors, including the role that UK Trade and Investment (UKTI) plays in attracting FDI to Scotland. The work concluded that some of the key factors that attract foreign investors to the UK are: access to a large domestic market; availability of skilled labour; easy access to foreign markets; international influence; and a stable and respected business environment.

A.69 While there is a degree of consensus in the empirical literature that, subject to certain qualifications,[43] international integration has had a positive impact on FDI, the literature has taken a number of different empirical approaches, and has looked at a number of different types of FDI (e.g. stocks versus flows and inward versus outward). These studies have tended to adopt one of two approaches. One set of studies have employed gravity model specifications including dummy variables of interest, while the second set of studies have adopted specifications suggested by the knowledge-capital model of the multinational enterprise.[44, 45]

A.70 Using panel data analysis with regional integration dummy variables and a specification loosely based on the gravity model, Daude et al (2003)[46] find evidence that FDI within a Regional Integration Agreement (RIA) increases by around 27%, although only the countries

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42 *The negative effect of regulatory divergence on foreign direct investment*, Fournier (2015).

43 Whether the agreement is comprehensive enough, and the position of the country within the regional agreement.

44 *A unified treatment of horizontal direct investment, vertical direct investment, and the pattern of trade in goods and services*, Markusen, Venables, Konan and Zhang (1996).

45 *Estimating the knowledge-capital model of the multinational enterprise*, Carr, Markusen and Maskus (2001).

46 *Regional Integration and the Location of FDI*, Daude, Levy-Yeyati and Stein (2003).

in the RIA that offer a more attractive overall investment environment are likely to receive this increase.

A.71 Studies that have employed different specifications have found similar results. Bezemer and Velde (2004)[47] find evidence that membership of a regional agreement can have a positive effect on external FDI, but only when deep integration takes place between countries. The authors' results also support the idea that countries within the region can be impacted in different ways, with larger economies and economies located closer to the centre more likely to attract FDI. Medvedev (2006)[48] looks at the impact of regionalism on total FDI inflows, while controlling for global, local, and institutional effects that could influence the decision to invest. He finds that regionalism does increase FDI inflows, although this is largely driven by increases in FDI flows from the developed to developing world.

A.72 The focus of the literature on the impact that EU membership has had on FDI, examines the impact of EU membership, or significant announcements regarding EU membership, for the Central and Eastern Europe economies (CEE). Two examples of this are Clausing and Dorobantu (2005)[49] and Beven and Estrin (2004),[50] which both find evidence that key announcements around EU accession had a positive impact on FDI in applicant countries. Moreover, Clausing and Dorobantu (2005) also find support for the argument that EU members receive more FDI all other things being equal. Looking at a different question, Brouwer, Paap and Viaene (2007)[51] examined the potential impact of an enlargement of the EMU on FDI and find a positive statistical relationship between EU, and EMU membership, and FDI for the 2004 accession countries.

A.73 Going further back in the literature, Pain and Young (2004)[52] suggest the impact of UK withdrawal from the EU would adversely affect the UK, largely due to a decline in the level of technical efficiency resulting from a lower future level of inward FDI. While Barrell and Pain (1998)[53] suggests that the Single Market Programme increased the level of intra-EU FDI significantly.

The model

A.74 Based on the external FDI literature (e.g. Clausing and Dorobantu (2005); Daude et al (2003); Brenton et al (1998)), the HM Treasury analysis below uses a gravity model specification with country-pair fixed effects, recognising that more recent empirical studies have included other explanatory variables (such as skill level differentials and varying trade costs). Specifically, the analysis is based on the following specification of a gravity model to examine the impact of EU membership on FDI inflows:

47 *Regional Integration and Foreign Direct Investment In Developing Countries*, Bezemer and Velde (2004).

48 *Beyond Trade: The Impact Of Preferential Trade Agreements On Foreign Direct Investment Inflows*, Medvedev (2006).

49 *Re-entering Europe: Does European Union candidacy boost foreign direct investment?*, Clausing and Dorobantu (2005).

50 *The determinants of foreign direct investment into European transition economies*, Bevan and Estrin (2004).

51 *The Trade and FDI Effects of EMU Enlargement*, Brouwer, Paap and Viaene (2007).

52 *The macroeconomic impact of UK withdrawal from the EU*, Pain and Young (2004).

53 *Real Exchange Rates, Agglomerations, and Irreversibilities: Macroeconomic Policy and FDI in EMU*, Barrell and Pain (1998).

$$(A.5)\quad \ln(IFDI_{ijt}) = \alpha_{ij} + \alpha_1 \ln(Y_{it}) + \alpha_2 \ln(Y_{jt}) + \alpha_3 \ln(DIST_{ij}) + \alpha_4 POP_{it} + \alpha_5 POP_{jt} + \alpha_6 COMLANG_{ij} + \alpha_7 COLONY_{ij} + \alpha_8 BORDER_{ij} + \alpha_9 EMU2_{ijt} + \alpha_{10} EMU1_{ijt} + \varepsilon_{ijt}$$
$$= \alpha_{ij} + \alpha X_{ijt} + \varepsilon_{ijt}$$

In these equations, the variables are defined as follows:

- $IFDI_{ijt}$ denotes FDI flows from country i to country j at time t
- Y_{it} and Y_{jt} denote the GDP of countries i and j at time t
- $DIST_{ij}$ denotes the distance between country i and country j
- POP_{it} and POP_{jt} denotes the population of countries i and j at time t
- $COMLANG_{ij}$ is a dummy variable which equals 1 if the origin and destination countries have a shared language and zero otherwise
- $COLONY_{ij}$ is a dummy variable which equals 1 if the origin and destination countries have historical colonies ties and zero otherwise
- $BORDER_{ij}$ is a dummy variable which equals 1 if the origin and destination countries share a common border and zero otherwise
- $EMU2_{ijt}$ is a dummy variable which equals 1 if both the origin and destination countries are members of the euro area at time t and zero otherwise
- $EMU1_{ijt}$ is a dummy variable which equals 1 if only one country is a member of the euro area at time t and zero otherwise
- α_{ij} is the country-pair fixed effect

A.75 Country-pair fixed effects capture the impacts of all time invariant characteristics. Therefore, all variables above which do not change over time (for example distance between countries) have been omitted and the following equation is estimated:

$$(A.6)\quad \ln(IFDI_{ijt}) = \alpha_{ij} + \alpha_1 \ln(Y_{jt}) + \alpha_2 \ln(Y_{it}) + \alpha_3 POP_{it} + \alpha_4 POP_{jt} + \alpha_5 EMU2_{ijt} + \alpha_6 EMU1_{ijt} + \varepsilon_{ijt}$$
$$= \alpha_{ij} + \alpha X_{ijt} + \varepsilon_{ijt}$$

A.76 The analysis follows the same dummy variable approach as set out in the trade analysis and so many of the same econometric and estimation issues apply. The equation that the analysis estimates is:

$$(A.7)\quad \ln(IFDI_{ijt}) = \alpha_{ij} + \alpha X_{ijt} + \beta_1 EU2_{ijt} + \beta_2 EUm_{ijt} + \beta_3 FTA_t + \varepsilon_{ijt}$$

In this equation, the variables are defined as follows:

- $EU2_{ijt}$ is a dummy variable which equals 1 if both the origin and destination countries are members of the EU at time t and zero otherwise
- EUm_{ijt} is a dummy variable which equals 1 if the destination country is a member of the EU at time t, but the origin country is not and zero otherwise
- FTA_t is a dummy variable which equals 1 if both the origin and destination countries are members of the same FTA (other than the EU) at time t and zero otherwise

A.77 Given the methodological approach selected (the use of a dummy variable with country-pair fixed effects), it was not possible to produce a statistical estimate for the impact on EEA membership on FDI inflows. This is because in the timescale of the dataset, there were no observations of countries joining or leaving the EEA.

Data

A.78 To estimate the model, a panel dataset has been constructed which spans 40 countries over the period 2000 to 2012. The data is sourced from a variety of international organisations: the bilateral FDI data was compiled by combining the OECD's bilateral FDI database with UNCTAD's new bilateral FDI statistics.

A.79 Although this is the most appropriate dataset to use for the estimation of FDI effects, there are two key concerns with the FDI data. The first is the short length of the time period for the complete dataset. The second is that, as noted in a recent OECD paper,[54] some multinationals use complex ownership structures to manage their global operations and their finances. These structures can have a distortionary impact on FDI data so that, for example, particular countries might appear more important as a geographic counterpart of FDI than they are in an underlying economic sense. The analysis included some estimates which excluded outliers to test for the robustness of the results to this sort of concern.

Estimation results

FDI analysis

A.80 Given the specification of the regression equation it is possible to estimate the EU's impact on FDI flows between EU member states, and on FDI flows from non-EU countries to EU member states separately. The analysis also provides evidence on the impact of non-EU FTAs on FDI inflows.

A.81 The results for the dummy variable approach for FDI flows are shown in Table A.8. The dummy variables are presented at the start of this table.

Table A.8: Results for FDI analysis

Variable	Country-pair fixed effects
Origin and destination EU members	0.298**
Origin non-EU member and destination EU member	-0.115
Shared FTA	0.069
Origin GDP	0.963***
Destination GDP	0.557***
Origin population	0.910
Destination population	-1.357
Origin and destination in EMU	0.368**
One country in EMU	-0.001
Sample size	6,821

** Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level*

Source: HM Treasury calculations

GDP, population and distance all enter in logs

54 *FDI Statistics by the Ultimate Investing Country*, OECD (2015).

A.82 The dummy variable for origin and destination countries being EU members is positive and statistically significant. This suggests that, on average, EU membership increases FDI flows between EU members. The dummy variable for the origin country as a non-EU member and destination country as an EU member,[55] and the dummy variable for countries which share an FTA, are statistically insignificant. As dummy variables are in semi-log format, a calculation is required to recover the effect in percentage terms. As an example, in Table A.8, the coefficient on the dummy variable, 0.298, suggests that EU membership boosts intra-EU investment flows by 35%. A number of additional tests were carried out to ensure that these results are robust, such as dropping potential outlier countries and dropping the EMU variables. In each case, the dummy variable for origin and destination countries as EU members was statistically significant.

Range of coefficient results

A.83 A 1 standard error range for the country-pair fixed effects coefficient estimates is shown in Table A.9.

Table A.9: Range of estimates for coefficients

Variable	-1 se	Coefficient	+1 se
Origin and Destination EU members	0.179	0.298	0.417
Origin non-EU member and Destination EU member		statistically insignificant	
Shared FTA		statistically insignificant	

**Estimates constructed using the standard error (se)*

Comparison of HM Treasury results with external estimates

A.84 As set out in the literature review above, there is a general consensus that certain types of regional integration increase FDI. Table A.10 shows how the estimates presented above compare to external estimates of the impact of the EU on FDI flows and stocks. The HM Treasury estimate for the impact on FDI is in line with the implied results of these previous studies.

Table A.10: Estimates in external literature of impact of EU membership on FDI flows and stocks

Paper	Coefficient	Implied impact of joining the EU	Implied impact of leaving the EU on FDI
HM Treasury – Intra-EU flows	0.298	35%	-26%
Clausing and Dorobantu (2005)[56]	0.415	51%	-34%
Brouwer, Paap and Viaene (2007)[57]	0.237	27%	-21%
Nicoletti et al (2003)[58]	0.366	44%	-31%

55 This dummy variable is slightly different to the EU1 dummy that is used in the trade analysis, as it only captures FDI flows one way, as the analysis does not seek to quantify the impact of the EU on flows from the EU to non-EU states.

56 FDI stock.

57 Outward stock of FDI.

58 *The Influence of Policies on Trade and Foreign Direct Investment*, Golub, Hajkova, Mirza, Nicoletti and Yo (2003). In contrast to the other papers that provide estimates for EU membership on FDI, this paper looks at the impact of FTA membership on FDI.

Total FDI effect and modelling input

A.85 This section presents the final FDI impact used as modelling input for Section 3 of the main document.

A.86 The previous section outlined the challenge in finding a statistically significant impact of FTA membership on FDI inflows. It is therefore necessary to scale the result linking EU membership to higher FDI flows, in order to produce estimates for the FDI impact under the three counterfactual trade scenarios. Table A.11 below shows a range of estimates for the impact of leaving the EU on intra-EU FDI flows. These are calculated by using the standard error of the dummy coefficient for origin and destination countries as EU members, with the effect converted into percentage terms.

Table A.11: Range of total FDI impacts using coefficient estimate for "Origin and destination EU members"

	Percentage range based on:		
Approach	**-1 se**	**Coefficient**	**+1 se**
Estimate for the impact on intra-EU FDI flows of EU exit	-16%	-26%	-34%

A.87 The results from Table A.11 are first scaled by the trade shock, producing estimates for each of the WTO, EEA and negotiated bilateral agreement scenarios. The estimates above directly provide the estimated impact on FDI for the WTO scenario and then, in line with the trade impacts discussed in Part 1 of this Annex, the impact in the FTA scenario is assumed to be 78% of the WTO impact and the impact in the EEA scenario is assumed to be 38% of the WTO scenario.

A.88 Evidence suggests that non-EU investment into the UK would be affected if the UK left the EU. Studies of export platform FDI[59] – where a foreign company invests in a country as a base to service other markets – underscore the point that foreign companies take a country's access to third country markets into account when deciding on where to invest. Survey evidence regularly demonstrates the weight that firms place on the UK's access to the Single Market when they are considering where to invest. According to one survey,[60] 72% of investors cite access to the EU Single Market as important to the UK's attractiveness as a destination for investment. Recent empirical evidence from the LSE's Centre for Economic Performance (CEP) (2016)[61] also finds that EU membership has a significant impact on both EU and non-EU FDI flows.

A.89 Daude et al (2003) find evidence to suggest that regional integration has a larger impact on FDI into those countries in the region that are relatively more attractive.

A.90 These factors are significant, as the combination of the country-pair fixed effects model – which helps overcome the issue of omitted variables – with FDI data limitations means that the results are driven by what happened to FDI inflows for countries that joined the EU between 2000 and 2012. As one of the most attractive destinations for FDI in the world, and the most attractive in the EU, EU membership is likely to have a larger impact on UK FDI than countries which are historically less attractive FDI destinations.

A.91 HM Treasury analysis did not produce a statistically significant effect on FDI from non EU countries, but this is likely to reflect data limitations. Given the weight of the evidence, a

59 *Export-Platform Foreign Direct Investment,* Ekholm, Forslid and Markusen (2003).

60 *UK attractiveness survey,* Ernst and Young (2015).

61 *How will Brexit affect UK living standards through lower Foreign Investment?* Centre for Economic Performance (2016).

modelling assumption of an effect on non-EU FDI flows has been made to ensure the impact on total FDI inflows into the UK is captured as a result of leaving the EU in the WTO case. In terms of modelling, the analysis uses the best available estimate for the impact of EU membership on non-EU FDI flows, which means that EU membership affects EU FDI flows, and non-EU FDI flows, to the same extent. Making this assumption brings the analysis in line with the CEP who have – using analysis in Bruno et al (2016)[62] – estimated that total FDI flows into the UK (from both EU and non-EU countries) would be about 22% lower if the UK left the EU.

A.92 The final estimated impact on total FDI inflows into the UK from EU and non-EU countries under different counterfactuals is shown in Table A.12. These results have been used as inputs into modelling the overall macroeconomic impact of leaving the EU in Section 3 of the main document.

Table A.12: FDI inputs for macroeconomic modelling

	Lower end of the range	Upper end of the range
EEA	-10%	-10%
Negotiated bilateral agreement (FTA)	-15%	-20%
WTO	-18%	-26%

62 *Gravitating Towards Europe: An Econometric Analysis of the FDI Effects of EU Membership*, Bruno, Campos, Estrin, and Tain (2016).

Part 3: Estimating the impact of openness on productivity

A.93 This part sets out the modelling framework used to assess the impact of openness on total factor productivity (TFP), and ultimately economic growth. The first half discusses the existing analysis in this area and the modelling approach used. The second half presents the results of HM Treasury estimations and explains how they have been used to calculate a total productivity effect in the case of the UK leaving the EU. This provides the basis for the productivity impact used in the quantitative analysis in Section 3 of the main document.

The modelling approach

Review of existing analysis

A.94 The literature is in broad agreement about the direct impact of increased openness on productivity. A review by Cline (2004)[63] concludes: "the uniformly positive estimates suggest that the relevant terms of the debate by now should be about the size of the positive influence of openness on growth, and probably also about how trade policy is related to observed openness, rather than about whether increased levels of trade relative to GDP have a positive effect on productivity and growth".

Trade and growth

A.95 A large body of early work has focussed on establishing the link between trade and growth, at times relying on simple regressions or employing more sophisticated gravity models to account for other factors such as distances. However these face a potential issue of reverse causality, due to the possibility that changes in productivity drive changes in trade rather than the other way round. Frankel and Rose (2000)[64] address this issue by constructing an exogenous instrument for trade flows, based on country specific factors such as distance, common language, and common borders. They estimate coefficients ranging from 0.17 to 0.33, suggesting a 1 percentage point increase in openness (the trade to GDP ratio) increases GDP per capita by 0.17% to 0.33%.

A.96 Feyrer (2009)[65] argues that trade acts as a proxy for many different elements of economic integration. The study finds that differences in predicted trade growth can explain roughly 17% of the variation in cross-country income growth between 1960 and 1995. Using the relative cost of transporting goods via air following changes in transportation technology as an instrument for trade, Feyrer estimates sizeable trade elasticities of 0.5 to 0.75. This implies that a 1% increase in the growth rate of exports is associated with a 0.5% to 0.75% increase in the growth rate of GDP per capita. However, as the author notes, the reduced travel time between countries as a result of improvements in aviation technology may increase a number of bilateral transactions such as FDI, and knowledge transfer or trade in services through easier movement of people.

63 *Trade Policy and Global Poverty*, Cline (2004).

64 *Estimating the effect of currency unions on trade and output*, Frankel and Rose (2000).

65 *Trade and Income: Exploiting time series in geography*, Feyrer (2009).

A.97 Dinghra et al (2016)[66] use this elasticity to calculate the impact on the UK of leaving the EU and joining EFTA. Based on gravity modelling by Baier et al (2008),[67] the authors assume leaving the EU and joining the EFTA will reduce the UK's trade with the EU by 25%. As the EU accounts for around half of overall UK trade, this will reduce overall UK trade by over 12%. Using an elasticity of between 0.5 and 0.75, the authors estimate the impact of the UK leaving the EU and joining the EFTA would be to reduce UK income by between 6.3% and 9.5% respectively. However, the authors highlight that these elasticities may be capturing both direct trade and indirect non-trade channels such as FDI and knowledge diffusion.

A.98 Recent analysis by Feyrer (2011)[68] uses a methodology more likely to isolate the link between trade and productivity. It is based on a natural experiment, estimating the impact of an exogenous shock to world trade, the closure of the Suez Canal, on income. Using the subsequent change in shipping distance for identification, Feyrer (2011) estimates trade elasticities of between 0.15 and 0.25. This is likely to capture only the impact on income through trade in goods and not more widely via trade in services or technology transfer. The author notes that this elasticity is almost half that identified in earlier estimates, suggesting that half of the impact of globalisation can be attributed to "other aspects of increased integration, such as FDI or technology transfers" or trade in services.

A.99 Using a more cautious range of estimates towards the lower end of the spectrum of elasticities in the external analysis helps to ensure that this elasticity captures the impact on productivity directly from trade rather than other aspects such as FDI and wider global integration. The macroeconomic modelling underpinning Section 3 of the main document has used the elasticity range of 0.2 to 0.3.

Firm-level estimates: trade and productivity

A.100 Micro-founded trade models attempt to quantify the impact of individual channels through which trade can affect productivity as discussed in the previous section, and in doing so overcome some of the limitations of the previous studies.

A.101 Firm-level studies have found evidence that the most productive firms are those that export. Baldwin et al (2001)[69] and Baldwin and Gu (2004)[70] find that exporting firms invest more in R&D, training and more advanced manufacturing technologies compared to non-exporting firms. There remains debate as to whether exporting increases productivity or whether there is a selection effect into exporting, such that only the most productive firms are able to cover the fixed costs of exporting. In either case, firms benefit from trade: if there is a selection effect, openness gives more productive firms greater opportunity to export; if exporting increases productivity, openness will lead to more highly productive firms.

A.102 Using US firm-level data, Bernard and Jensen (2004)[71] find that while exporters are more productive, the productivity difference pre-dates any entry into exporting, and is usually

66 *The consequences of Brexit for UK trade and living standards*, Dhingra, Ottaviano, Sampson and Van Reenen (2016).

67 *Do Economic Integration Agreements Actually Work? Issues in Understanding the Causes and Consequences of the Growth of Regionalism*, Baier, Bergstrand, Egger and McLaughlin (2008).

68 *Distance, Trade, and Income - The 1967 to 1975 Closing of the Suez Canal as a Natural Experiment*, Feyrer (2011).

69 *Changes in Diversification of Canadian Manufacturing Firms and Plants (1973–1997): A Move to Specialization*, Baldwin, Beckstead and Caves (2001).

70 *Innovation, Survival and Performance of Canadian Manufacturing Plants*, Baldwin and Gu (2004).

71 *Exporting and Productivity in the USA*, Bernard and Jensen (2004).

in the year before or on entry into exporting. However, Harris and Li (2007)[72] find that UK firms that are new to exporting see a 34% increase in TFP in the year after starting to export, with a small effect of around 5% in the subsequent year.

A.103 Perhaps the most comprehensive firm-level study is by Melitz and Trefler (2012).[73] It provides an aggregate impact of the 1989 Canada-US free trade agreement on labour productivity in the manufacturing sector, which comprises of:

- selection and re-allocation effects – a composition effect, whereby competition increases the average level of industry productivity by shifting the composition of the industry from low productivity non-exporters to high productivity exporters
- within-plant growth – access to a larger market encourages more firms to export and benefit from economies of scale, whilst also making it more profitable for existing firms to invest in raising productivity. Firms are also likely to benefit from better access to imported intermediate goods. Lileeva and Trefler (2010)[74] find that the elasticity of labour productivity with respect to exports for new exporters is 0.01 and 0.33 for existing exporters

A.104 Melitz and Trefler emphasise that the effect on existing exporters is likely to capture the integration of operations with North American multinationals, and so there is likely to be significant overlap of this effect with any FDI channel. Moreover, the authors find that improved access to intermediate goods does not affect the elasticities, but it affects productivity through increased trade flows. The overall impact was estimated to have been a 13.8% increase in Canadian manufacturing productivity between 1988 and 1996.

Firm-level estimates: FDI and productivity

A.105 In addition to exporting, firm-level studies also find a positive impact of inward FDI on productivity. Helpman et al (2004)[75] estimate that exporting firms have on average 40% higher labour productivity than firms that do not export. Moreover, exporting firms that are multinationals engaging in FDI have an additional 15% higher labour productivity.

A.106 Navaretti and Venables (2004)[76] have suggested that FDI can increase local productivity through composition and spillover effects (horizontal and vertical), where either the presence of a higher productivity multi-national entity (MNE) increases average industry productivity, or the MNE is not able to fully internalise the value of the benefits it generates.

A.107 The empirical literature finds evidence to suggest MNEs are more productive than domestic firms. Helpman et al (2004) identify a 15% labour productivity advantage for MNEs over domestic firms, while Griffith et al (2004)[77] suggest the advantage is even higher for services firms, at 25%.

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72 *Learning-by-Exporting? Firm-Level Evidence for UK Manufacturing and Services Sectors*, Harris and Li (2007).

73 *Gains from trade when firms matter*, Melitz and Trefler (2012).

74 *Improved access to foreign markets raises plant-level productivity… for some plants*, Lileeva and Trefler (2010).

75 *Export Versus FDI with Heterogeneous Firms*, Helpman, Melitz and Yeaple (2004).

76 *Multinational Firms in the World Economy*, Navaretti and Venables (2004).

77 *Foreign Ownership and Productivity: New Evidence from the Service Sector and the R&D Lab*, Griffith, Redding and Simpson (2004).

A.108 There is also evidence of spillovers from MNEs to the domestic economy. Keller and Yeaple (2009)[78] estimate that 14% of TFP growth in the US between 1987 and 1996 is from FDI spillovers. More recently, Moren and Oldenski (2013)[79] find that a 1 percentage point increase in the share of total employees within an industry that work for foreign owned firms in the US increases the TFP of all firms in that industry by 0.8% after the first year, and 2.75% after the second year on average.

A.109 These positive spillover effects also appear in the UK evidence. For example Haskel et al (2002)[80] estimate that a 1% increase in MNE presence (share of MNEs in total employment) in manufacturing increased TFP of the industry by 0.05%. However, in attempting to extend this to the whole economy, using a large panel of 30 European countries, Fons-Rosen et al (2013)[81] find doubling of foreign ownership share only increases TFP by 0.01%.

A.110 Studies have also expanded this analysis to assess the role of absorptive capacity. Griffith et al (2003)[82] suggest that failing to account for absorptive capacity, proxied by the initial skill level in the local population, may result in underestimates for the returns to technological progress.

A.111 Barrell and Pain (1997)[83] provide a framework for assessing the productivity impacts of FDI. They assume a form of labour augmenting technical progress, which is unobservable but is a function of time and the stock of FDI, and so increases as the stock of FDI increases. This captures the impact of foreign companies on UK productivity, both due to composition effects (as multinational firms have higher productivity than domestic firms), and because of spillovers to domestic firms (from working practice and technological knowledge sharing).

A.112 Using firm-level data from the manufacturing sector, Barrel and Pain find that a 1% increase in the stock of inward FDI in UK manufacturing boosts technology in the sector by 0.27%. Pain and Young (2004)[84] also find significant and positive effects of the stock of inward FDI on the level of technical progress, even after accounting for domestic R&D expenditure; a 1% change in the stock of manufacturing FDI is estimated to increase the level of labour augmenting technical progress in the manufacturing sector by 0.32%, and by 0.135% for distribution and financial services sectors.

The model

A.113 Given the limitations in the empirical literature of establishing a whole economy FDI-technology link for the UK, HMT analysis seeks to add new UK-specific estimates for the impact of inward FDI on UK technology levels.

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78 *Multinational Enterprises, International Trade, and Productivity Growth: Firm-Level Evidence from the United States*, Keller and Yeaple (2009).

79 *Foreign Direct Investment in the United States: Benefits, Suspicions, and Risks with Special Attention to FDI from China*, Moran and Oldenski (2013).

80 *Does Inward Foreign Direct Investment Boost the Productivity of Domestic Firms?*, Haskel, Pereira and Slaughter (2002).

81 *Quantifying Productivity Gains from Foreign Investment*, Fons-Rosen, Kalemli-Ozcan, Sørensen, Villegas-Sanchez and Volosovych (2013).

82 *R&D and Absorptive Capacity: Theory and Empirical Evidence,* Griffith, Redding and Van Reenen (2003).

83 *Foreign Direct Investment, Technological Change and Economic Growth Within Europe*, Barrell and Pain (1997).

84 *The macroeconomic impact of UK withdrawal from the EU,* Pain and Young (2004).

A.114 There are a number of different approaches that could be taken to try to estimate the impact of inward FDI on technology. Existing studies, discussed above, have tended to focus on the link between technology and FDI for selected industrial sectors, often only manufacturing, using either microeconomic firm-level data or time series data. This creates an issue for translating the results to the whole economy.

A.115 To overcome this, it is possible either to follow a time series approach or to construct a panel (by disaggregating data by countries or by sectors of the UK economy). For data reasons, there are insufficient observations for a time series approach so the approach pursued here is to estimate the FDI-technology link using a comprehensive panel of all UK industry sectors. The data is based on annual observations for 15 years (over the period 1998-2012) split by 8 industry groups, comprising of 120 observations in total.

A.116 Technology is not directly observed, so is estimated rather than measured directly. There are a number of approaches to this estimation, but the most common is to derive the implied level of technology from a production function, which is the approach followed here.

A.117 NIESR's NiGEM model is used to assess the overall macroeconomic impact of the UK leaving the EU. In order to derive a technology estimate that is fully consistent with NiGEM, the same functional form for the production function as NiGEM is used. This is a Constant Elasticity of Substitution (CES) production function with labour-augmenting technology. Using data for output, labour input and capital stock, this allows the following technology measure to be derived:

$$(A.8) \quad Y_{i,t} = \left(\alpha(AL)_{i,t}^{\rho} + (1-\alpha)K_{i,t}^{\rho}\right)^{1/\rho} \rightarrow \widehat{A_{i,t}} = \left(\frac{Y_{i,t}^{\rho} - (1-\alpha)K_{i,t}^{\rho}}{\alpha L_{i,t}^{\rho}}\right)^{1/\rho}$$

Where Y is output (GVA), L is labour, K is capital and A is labour-augmenting technology. The subscripts i and t represent industry sectors and time respectively. The elasticity of substitution is assumed to be 0.5, in line with the production function in NiGEM.

A.118 Having derived an estimate of technology, it has to be considered how technology would be expected to move over time. In line with models such as the Solow growth model, it is assumed that technology follows a simple exogenous process that is trend stationary, but with a different time trend for each sector:

$$(A.9) \quad lnA_{i,t} = \boldsymbol{\delta} t + \mu_i + \varepsilon_{i,t}$$

Where δ represents a vector of coefficients allowing a different time trend for each sector and μ represents a fixed effect for each sector.

A.119 Adding a measure of the stock of inward FDI gives us the following equation, which forms the basis of the empirical results:

$$(A.10) \quad lnA_{i,t} = \boldsymbol{\delta} t + \beta_1 lnFDIstock_{i,t} + \mu_i + \varepsilon_{i,t}$$

Data

A.120 The analysis uses annual rather than quarterly data as both FDI and capital stocks by industry are only available on an annual basis. Moreover, changes to the Standard Industrial Classification (SIC) system from SIC03 to SIC07 create an inconsistent mapping between pre and post-2008 data. To overcome this issue, the industry breakdown has been aggregated

up to a level which ensures consistency. This effectively reduces the number of industries that can be used to 8, as shown in Table A.13 below.

Table A.13: Industry Breakdown

Industry	SIC07 Code
1. Agriculture	A
2. Mining & Quarrying, Electricity & Gas, Waste & Disposal	B, D, E
3. Manufacturing	C
4. Construction	F
5. Retail & Wholesale Trade, Repair of Motor Vehicles	G
6. Transportation, Storage & Communication	H, J
7. Financial Services	K
8. Professional, Scientific, Administration & Support Services	M, N

Estimation results

A.121 Variants of equation A.11 above are estimated, with results shown in Table A.14 showing an FDI-technology elasticity that is of realistic magnitude, ranging from 0.03 to 0.08, and these estimates are statistically significantly different from zero in three of the four specifications at the 10% level of significance. Random effects estimates of comparable magnitude were also estimated but were rejected by Hausman Tests so have not been reported here.

Table A.14: Fixed and random effects estimates of FDI-technology link

	Specification			
	Fixed Effects 1	Fixed Effects 2	GVA-weighted Fixed Effects 3	IWLS Fixed Effects 4
Foreign direct investment	0.082***	0.044**	0.038*	0.027
	(3.51)	(2.05)	(1.75)	(1.58)
Industry time trends	No	Yes	Yes	Yes

** Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level*

Absolute t-statistics in parenthesis. The sample size is 120 throughout

The dependent variable is the log of the level of technology in sector i at time t. The level of foreign direct investment is in logs

IWLS is iteratively weighted least squares

A.122 Industry time trends are jointly significant and materially increased measures of goodness of fit, suggesting that it is important to include them.

A.123 A range of tests for robustness are conducted. Weighting is applied to the estimation in order to give a weight to each observation in line with the sector's share of GVA. This will make the results more comparable to aggregate macroeconomic UK data and ensure that the significant coefficients in Table A.14 are not driven by strong FDI-technology links in small sectors. The result of this GVA-weighting is that the coefficient is relatively little changed from the version estimated without weighting, with a spot estimate of 0.038 with GVA-weighting compared to 0.044 without. The coefficient continues to be statistically significant, but now at the 10% level of significance rather than 5%.

A.124 Using Iteratively Weighted Least Squares (IWLS), which gives a low weight to observations that generate high residuals, the resulting IWLS coefficient estimate is lower than in the other specifications, but still of a similar order of magnitude. The coefficient estimate under IWLS only narrowly misses out on being statistically significant at the 10% level. This suggests the results are not driven by outliers.

A.125 Given the relative inefficiency of IWLS and the importance of time trends, our preferred estimate for the FDI-technology elasticity is 0.04, consistent with both specifications 2 and 3. This suggests that a 1% increase in the UK's stock of inward FDI is associated with a 0.04% increase in the level of UK technology.

A.126 Following this approach, HM Treasury analysis is able to identify UK-specific elasticities on the impact of FDI flows on whole-economy UK productivity. Moreover, this has the added benefit of exploiting the latest available data, from 1998 to 2012. This captures more accurately the relation between FDI and knowledge transfer in the present day, taking account of the emergence of alternative channels of technology transfer such as the Internet and the digital transmission of knowledge across borders. These estimates are smaller than those identified by Barrell and Pain (1997) and Pain and Young (2004) for the manufacturing sector. However, some sectors such as manufacturing are expected to benefit more from technology transfer, and so the whole economy impact may in fact be smaller than earlier estimates suggest.

Total productivity effect and modelling input

A.127 Based on the review of external analysis, a range of 0.2 to 0.3 has been chosen for the elasticity of productivity to trade. The bottom of the range reflects the mid-point of the Feyrer (2011) estimate which is considered to be the most relevant estimate available. The top of the range sits within Frankel and Rose's range of estimates, but consistent with a cautious approach it sits well below the Feyrer (2009) estimates of 0.5 to 0.75 which have been used in Dhingra et al (2016).

A.128 Based on the econometric results above on the link between FDI and technology, an elasticity of 0.04 has been chosen. This is based on the preferred specification and was found to be robust to sensitivity checks.

Part 4: Modelling the overall macroeconomic impact of the UK leaving the EU

A.129 This part sets out the modelling approach for estimating the overall macroeconomic impact of the UK leaving the EU, combining the outputs of Parts 1 to 3 of this Annex into an aggregate impact.

A.130 The macoeconomic model which is adopted needs to be able to incorporate estimates of the effects of the alternatives to EU membership, the time period over which the effects are estimated and whether to include effects from technological progress and productivity. Some models make use of estimated relationships based on historic data while other models are based on economic theory and agents having rational expectations. Different models will be better suited to certain types of analysis than others and thus the choice of model may affect the results obtained.

A.131 General equilibrium models, in contrast with partial equilibrium models, seek to model the various interactions between demand, supply and prices in different markets in the economy as completely as possible. This means that feedback effects and spillovers between different markets are taken into account. As a result, such models are well suited to quantifying the aggregate impact of an important macroeconomic policy change. CGE models are static and will usually assess policies by comparing the model's solution after feeding in a shock to the baseline equilibrium.

A.132 As set out in the introduction to this Annex, the analysis uses NiGEM;[85] a global macroeconomic model developed and maintained by NIESR. It is used to differing degrees by over forty organisations including the IMF, OECD, Bank of England and ECB. The model includes over 40 countries and country blocks modelled separately. Each country, or country block, model is structured around a constant elasticity of substitution production function with constant returns to scale and labour-augmenting technical progress, which determines output in the long-term. The production function governs the demand for the factors of production (capital, labour and energy) and feeds into the price system to bring demand in line with supply.

A.133 With demand for labour and capital determined by the profit maximisation of firms, output growth in the long-term depends on real wage costs, the real user cost of capital and the rate of technical progress.

A.134 NiGEM is estimated using historical data with equations set up as error-correction relationships, which allows the model to adjust gradually towards equilibrium in response to a shock. This feature of the model may be understood as striking a balance between economic theory and historical data, and allows the model to be used for forecasting or scenario analysis. The process of adjustment to the new equilibrium will depend on expectations, macroeconomic policy reactions as well as distance from equilibrium.

A.135 The model is very flexible, allowing changes to agents' behavioural assumptions and the introduction of a wide range of shocks to simulate the response of other variables. The version of NiGEM used in HM Treasury analysis is v4.15b.

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85 For more information on NiGEM, please refer to the NiGEM Technical Documentation, available from NIESR.

Long-term scenarios

A.136 It is necessary to distinguish between short-term and long-term analysis. In the short-term, impacts are likely to impact predominantly on the demand-side, while over the long-term, impacts on the supply-side are more important.

A.137 To construct the scenarios, it must be determined which variables need to be shocked; the magnitude of each shock and the period over which it applies; whether agents are assumed to be forward or backward-looking; and the expected monetary and fiscal policy reactions to a shock.

A.138 All scenarios are run with most of the NiGEM default assumptions for agents' expectations and monetary policy.[86]

A.139 By default, NiGEM imposes a fiscal constraint, limiting budget deficits to stay within bounds through a targeted adjustment of income tax rates. For the purposes of the scenarios below, this feedback rule is switched off. This is done in order to avoid offsetting or reinforcing fiscal policy effects. In addition, UK government consumption, government investment and the government deflator are exogenised over the first five years of the simulation to proxy for departmental spending (current and capital) being fixed in nominal terms until 2020-21 at the levels set out in HM Treasury's Budget 2016.

A.140 The long-term scenarios are concerned with identifying the macroeconomic impact on the UK of leaving the EU and establishing an alternative relationship with the EU. The impacts are modelled over a period of 15 years, which is considered to be a sufficient time horizon for the UK economy to have adjusted to a new 'steady-state' outside of the EU.

A.141 A separate scenario is constructed for each alternative relationship discussed in Section 2 of the main document. Each scenario is based on the key drivers of openness: trade, foreign direct investment and productivity. The individual elements of the scenario are discussed in more detail below.

Trade impacts

A.142 In line with other macroeconomic models, exports and imports are modelled in NiGEM as standard demand equations, which are a function of income and relative prices. In the case of exports, 'income' is the external demand for a country's exports. This is measured by export market size, a market share weighted sum of partner countries' imports. A unit elasticity is imposed on this variable, which implies that the global trade share for each country is a function of its competitiveness. The relative prices are the prices of exports relative to competitors' prices (also termed the 'relative competitiveness' of exporters).

A.143 Import volumes are modelled as functions of the domestic demand for imports and import prices relative to domestic prices. The domestic demand for imports is proxied by total final expenditure, which includes exports. A country will have a higher import intensity of the expenditure components the more open the economy is to trade and the more supply chains are integrated with other countries. Import prices are modelled as a weighted average of export prices in the rest of the world in order to ensure consistency at the global level between export and import prices.

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[86] Instead of the default 1 quarter forward-look, it is assumed that interest rates target inflation 8 quarters ahead, which is more in line with flexible inflation targeting of the kind followed by the Bank of England's Monetary Policy Committee.

A.144 Given the equations for exports and imports described above, where exports depend on the demand for imports, both will tend to rise together in NiGEM. It is worth noting that it is not possible to analyse bilateral trade flows in NiGEM as the variables to identify bilateral trade flows do not exist.

A.145 The increase in trade protectionism if the UK were to leave the EU and subsequent fall in total trade volumes is modelled as a shock to the demand for UK exports via the export market size variable. This approach was also used by the Dutch Bureau for Economic Policy Analysis (2014)[87] in constructing European scenarios.

FDI impacts

A.146 It is assumed that the decline in FDI inflows will gradually feed through and reduce the UK's stock of inward FDI by the same amount over the 15 year modelling horizon. The reduction in the stock of FDI from Part 2 of this Annex is combined with the HM Treasury estimates discussed in part 3 of this Annex in order to obtain the shock to productivity that is included in NiGEM.

Persistence impacts

A.147 As discussed in Section 3 of the main document, in the event of a vote to leave the EU, the ensuing period of uncertainty and the dampening effect that this has on economic activity is likely to lead to an additional long-term impact on productivity.

A.148 According to analysis by the Bank of England,[88] in 2013 Q4 the shortfall in UK labour productivity relative to its pre-crisis trend was between 12% and 16%. Of that shortfall, the Bank's analysis attributes 3 to 4 percentage points to reduced investment in physical and intangible capital, i.e. between a fifth and a third of the short-term shock on the economy has a persistent impact.

A.149 The persistence effect is estimated to be 1% of GDP under all the alternatives and is included as a shock to productivity in the long-term scenarios.

Productivity impacts

A.150 The model for the UK economy in NiGEM is based on a constant returns to scale CES production function with labour-augmenting technological progress. Technological progress is modelled in NiGEM as a gradual approach towards an expanding global technology frontier.

A.151 The degree of complementarity between capital and labour is determined by the elasticity of substitution. For high complementarity between capital and labour, the elasticity of substitution is low and an increase in capital per worker boosts the amount of output that can be produced by an additional worker.

A.152 All else equal, the effect of an increase in labour-augmenting technological progress on labour demand is positive if the elasticity of substitution is greater than 1 and negative if it is smaller than 1. In NiGEM, the elasticity of substitution is assumed to be 0.5. As a result, labour-augmenting technological progress will reduce the demand for labour. Aside from determining the demand for factor inputs, the production function also determines the economy's 'capacity output', which is understood as the amount of output produced by

87 *Three scenarios for European economic recovery – CPB Background Document,* Veneendaal (2014).

88 *The UK productivity puzzle*, Bank of England Quarterly Bulletin (2014).

the economy when it is in equilibrium or 'on trend'. If output is above capacity, this creates pressure on prices. In NiGEM, this leads directly to an increase in producer prices.

A.153 A shock to productivity will have a direct impact on GDP as well as an indirect impact via the associated changes to the degree of capacity utilisation, the capital stock and other factors of production.

A.154 The impacts of trade, FDI and persistence effects are modelled in NiGEM via a change in technological progress, which is maintained as a permanent level shift until the end of the simulation. This shock temporarily reduces the growth rate of output of the UK economy. Table A.15 presents a summary of the impact on the level of productivity of reduced openness to trade and FDI in the different alternatives. The modelling does not include any allowance for the potential negative impact of the UK leaving the EU on productivity in the rest of the EU from the reduced trade and FDI between the UK and the rest of the EU.

Table A.15: Summary of the modelling inputs for the effect on the level of productivity of reduced openness

	Lower end of the range	Upper end of the range
EEA	-2.0%	-2.8%
Negotiated bilateral agreement (FTA)	-3.0%	-6.0%
WTO	-3.7%	-7.7%

Final modelling results

A.155 The modelling inputs are implemented as shocks in NiGEM, as set out above. The final modelling results showing the range of GDP impacts for each of the scenarios are summarised in Table A.16. The results show that:

- the EEA scenario would leave UK GDP 3.4% to 4.3% lower after 15 years. In 2015 terms, the long-term GDP impact of leaving the EU for the EEA would equate to a loss of £2,400 to £2,900 a year for each household in the UK
- the FTA scenario would leave UK GDP 4.6% to 7.8% lower after 15 years compared with remaining in the EU. In 2015 terms, leaving the EU for an FTA would imply a long-term loss of GDP of £3,200 to £5,400 a year for each household in the UK
- relying solely on the WTO would result in UK GDP 5.4% to 9.5% lower after 15 years compared with remaining in the EU. In 2015 terms, leaving the EU and relying on the WTO rules would mean a long-term loss of GDP of £3,700 to £6,600 a year for each household in the UK

Table A.16: Annual impact of leaving the EU on the UK (difference from being in the EU after 15 years)

	EEA	Negotiated bilateral agreement	WTO
GDP level (%) – central	-3.8	-6.2	-7.5
GDP level (%)	-3.4 to -4.3	-4.6 to -7.8	-5.4 to -9.5
GDP per capita – central[a]	-£1,100	-£1,800	-£2,100
GDP per capita[a]	-£1,000 to -£1,200	-£1,300 to -£2,200	-£1,500 to -£2,700
GDP per household – central[a]	-£2,600	-£4,300	-£5,200
GDP per household[a]	-£2,400 to -£2,900	-£3,200 to -£5,400	-£3,700 to -£6,600

[a] *Expressed in terms of 2015 GDP in 2015 prices, rounded to the nearest £100.*

Annex B – Modelling public sector receipts and UK contributions to the EU budget

Introduction

B.1 This annex sets out analysis that underlies Section 3. The analysis is focused on the long-term picture – a horizon of 15 years – rather than the impacts in the short term which will be the focus of a future government document. It sets out the basis for the net receipt figures presented in the main document:

- Modelling the impact on public sector receipts of the UK leaving the EU
- The direct fiscal costs of the EU budget over the long-term

B.2 It also sets out the basis for the figures for the UK's contribution to the EU budget presented in Section 1.

Modelling the impact on public sector receipts of the UK leaving the EU

B.3 Lower Gross Domestic Product (GDP) will affect not just living standards through lowering levels of national income, but will also lead to a reduction in public sector receipts.

B.4 The precise composition as well as level of GDP in the long-term will determine exactly how public sector receipts are affected, but lower GDP will lead to lower tax receipts for a given tax regime. Lower growth in key sectors of the economy will for example lower wages, consumption and profits, reducing the base for direct and indirect taxes.

B.5 An estimate for the impact of lower GDP on the public finances can be produced in a straightforward way. If receipts as a share of GDP do not change significantly over the 15 year horizon, the lower GDP levels estimated by the economic modelling detailed in Annex A can be used to estimate a proportionately lower level of public sector receipts.

B.6 It is a realistic assumption that public sector current receipts (PSCR) as a % of GDP will remain broadly unchanged. Whilst any long-term economic projection is subject to uncertainty, historical data show that the PSCR to GDP ratio has remained fairly stable in recent years. For example, whilst there are fluctuations, receipts have remained between 35.6% to 37.7% of GDP over the last 15 years, and are forecast to remain within this range in the next five years.

B.7 It is assumed that receipts as a share of GDP at the end of the 15 year period are the same as at the end of the Office for Budget Responsibility's (OBR) Budget 2016 five year forecast period in 2020-21 (37.4% of GDP). Receipts at this share of national income are consistent with the recent historical range.

B.8 Applying this share of public sector receipts to the estimates of GDP levels after 15 years under alternative scenarios to EU membership yields an estimate of impacts on receipts. The nominal value of public sector receipts is calculated by applying the receipts share of national income to the adjusted level of nominal GDP (in 2015 terms) under each alternative scenario. These estimates are presented in Table 3.E in Section 3.

B.9 Using a similar approach, if the economic benefits of the next stage of development of the Single Market are realised, there will be a corresponding increase in public sector receipts.

B.10 There will be other factors that affect public sector receipts in the long-term; for example, changes to the tax base such as revenues from North Sea oil and vehicle excise duty. However, as the analysis looks at *changes* to receipts relative to the baseline level of growth, these factors will only be significant if they are affected by changes to EU membership.

B.11 As shown in Table 3.F in Section 3, the negative effect on public sector receipts is only partially offset by reducing the UK's contribution to the EU budget. Any alternative scenario therefore implies a significant negative net impact on receipts.

B.12 The net effect of changes to public sector receipts and direct costs of the EU budget are summations of the two impacts under each scenario.

B.13 This methodology does not look at all aspects of the public finances – only receipts in the long-term and contributions to the EU budget. The impact of leaving the EU may

have broader consequences on the public finances, including from the short-run economic impacts and their effect on the public sector debt position and subsequent debt interest consequentials. A full assessment of the short-term implications of leaving the EU will be published in a further government document.

Projecting the direct costs of the EU budget over the long-term

B.14 This section estimates the potential savings in the long-term from reduced financial contributions to the EU under alternative scenarios to EU membership. It extrapolates future UK contributions largely from the assumptions made by the OBR at Budget 2016, and compares these to potential ongoing costs under alternative scenarios. The figures are expressed as a proportion of UK GDP.

B.15 First, the modelling extrapolates from current data the size of the EU budget in the future as a share of EU GDP.[1] To enable this, it takes an average of the size of the EU budget over the last three agreed seven-year budgetary frameworks (covering the years 2000 to 2020). For the years 2000 to 2014, the data used are the implemented budgets, as published by the European Commission. For 2015 to 2020, the OBR's latest forecast for the size of the implemented budgets has been used. This does not represent a forecast or policy assumption.

B.16 The modelling extrapolates UK contributions by taking this assumed size of the overall EU budget and estimating the proportion of this budget that the UK would pay under existing financing arrangements. This does not represent a forecast.

B.17 This part of the model replicates the assumptions and methodology used by the OBR to forecast UK contributions. Instead of estimating UK contributions for individual years, however, the model takes an average of all of the determinants over the seven-year budget period (2014-20) to calculate a single projected UK contribution.

B.18 The data inputs for this part of the model for 2014, and 2015 where they are available, are outturns, and for future years are the same assumptions that were used to produce the OBR's Budget 2016 forecast.

B.19 The model is based on average data for the 2014-20 budget period as this is the most indicative of potential future trends. There are no data to suggest the trajectory of these variables beyond 2020, so the model assumes that these variables remain fixed at their 2014-20 level.

B.20 Taking all of this together, the model gives projections for the payments to the EU with ongoing EU membership, shown in Table B.1. These figures are broadly in line with the UK's current contribution to the budget, as set out in Section 1 of the main document.

Table B.1: Projected UK contributions under ongoing EU membership based on existing arrangements

% of UK GDP per annum	
Gross contribution (post-rebate)	0.7
UK receipts	-0.3
Net contribution	0.4

B.21 As set out in Section 3, whether to replicate EU budget funding would be a decision for the government at the time, and the analysis does not prejudge these decisions. For the modelling, a simple assumption is made that the UK would replicate from domestic expenditure EU funds currently paid to UK recipients.

[1] The model uses European Commission estimates and forecasts for EU nominal GDP for the years 2000 to 2017. For the years 2018 to 2020, the model has estimated EU nominal GDP based on IMF forecasts for real GDP growth and GDP deflators.

B.22 In addition, the UK has an obligation to spend 0.7% of its gross national income as Official Development Assistance (ODA). This is independent of EU membership. The UK's share of the EU budget's ODA-attributed spending counts towards the UK's commitment. The modelling assumes that if the UK left the EU, the UK would increase domestic spending by an equivalent amount to continue to meet its ODA obligation.

B.23 Under the assumptions set out above and that the UK makes a nil financial contribution to the EU budget, the maximum possible gain that the UK could make by no longer contributing to the EU budget would be £7 billion (in 2015 GDP terms). This is reached by taking the saving from no longer paying the projected gross contribution to the budget and subtracting the additional domestic expenditure required to replicate projected funding from the EU and ODA-attributed spending.

B.24 The estimates for the net receipts impact of leaving the EU in Section 3 of the main document assume that, in all scenarios, no ongoing contributions to the budget would be required, meaning that the full potential saving of around £7 billion would be realised.

B.25 A nil financial contribution to the EU is unrealistic for an alternative that provides the UK significant access to the Single Market, so in these scenarios the fiscal saving would be lower.

Current UK contributions to the EU budget

B.26 The UK contributes to the European Union budget. The UK also receives funds from that budget. The UK's net contribution to the EU is therefore determined by its gross (post-rebate) contribution minus funds received from the EU Budget.

B.27 Details of the UK's annual contributions to the EU are provided annually in the HM Treasury publication series *European Union Finances.* The most recent publication is *European Union Finances 2015.*[2]

The UK's gross contribution

B.28 The UK's gross contribution (before receipts) to the EU budget is determined by its share of customs duties, a hypothetical VAT-based measure and its share of EU Gross National Income (*European Union Finances 2015,* paragraph 3.11). The UK's gross contribution is also reduced by the UK rebate. The rebate is a permanent correction to the system of EU funding, meaning that it can only be changed by unanimous agreement of all 28 EU member states. The UK's gross payments are automatically corrected to account for the rebate, meaning the UK only pays over the gross post-rebate amount. However, HM Treasury publishes details of both the UK's actual post-rebate contributions and what its contribution would have been without the rebate.

The UK's net contribution

B.29 The post-rebate gross contribution does not give a complete picture, since the UK also receives funds from the EU. Funds are administered in two different ways. Some are administered by the UK government and devolved administration bodies (these include CAP payments to farmers and Structural Fund receipts for regional spending). Others are paid directly by the European Commission to beneficiaries (such as awards to universities for research, or to small businesses). This distinction concerns who administers funds rather than the ultimate destination.

B.30 Details of contributions and all funds received can be found in Table 3.B of *European Union Finances 2015,* based on outturn data collected by the European Commission (2014 is the most recent year). This table shows both the UK's post-rebate payments into the EU, and all of the receipts from the EU, thus giving the fullest picture of the UK's overall contribution to the EU. The UK's net contribution can fluctuate quite substantially from one year to the next. This fluctuation is due to a number of technical factors, including exchange rate movements, the timing of payments, and the way in which the rebate is calculated (see Annex B, *European Union Finances 2015* for more details). However, over the most recent five years for which there is data (2010-14), the average net contribution has been approximately £7.1 billion. As a percentage of PSCR,[3] this is 1.16%. That means for every £1 paid in tax, a little over 1p goes to the EU.

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2 *European Union Finances 2015: statement on the 2015 EU Budget and measures to counter fraud and financial mismanagement,* HM Treasury (2015).

3 PSCR is the most commonly used measure of revenues. The ONS provides alternative calendar year outturns for revenues, which exclude some other receipts that are included in PSCR but include other sources of revenues that are not in PSCR, such as customs duties. PSCR is available at: https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/publicsectorfinance/datasets/publicsectorfinancesborrowingbysubsector.

Table B.2: UK net contributions as share of UK Public Sector Current Receipts (PSCR)

	2010	2011	2012	2013	2014	Average
PSCR (£bn)	567.52	598.10	605.60	625.89	646.34	608.69
UK net contribution (£bn)	6.79	6.30	7.50	9.13	5.71	7.08
UK net contribution as a share of PSCR	1.20%	1.05%	1.24%	1.46%	0.88%	1.16%

Source: European Union Finances 2015, HM Treasury; Public Sector Finances borrowing by sub sector, Office for National Statistics (ONS).

B.31 The OBR also produces a forecast for the UK's contributions to the EU. The most recent forecast can be found in the *Economic and Fiscal Outlook, March 2016.* The OBR forecasts a gross (pre- and post-rebate) contribution and a net contribution.[4] However, the net contribution forecast by the OBR only includes transactions administered by domestic government bodies, and excludes funds administered directly by the European Commission. This is because the OBR forecast only covers the effects of transactions on the public sector finances, reflecting definitions that are set out in the National Accounts, under the European System of Accounts 2010 (see paragraph 4.129 of *Economic and Fiscal Outlook, March 2016,* OBR).

B.32 HM Treasury also provides outturn data on the same basis as the OBR – using government administrative data, and therefore excluding receipts from funds that the government does not directly administer.[5] The ONS relies on the same administrative data, provided by HM Treasury, for the purposes of producing statistics on government transactions with the EU in the 'Pink Book'. These statistics, similar to the HM Treasury outturn data on which they are based, only include receipts administered by government bodies, in accordance with European System of Accounts 2010 definitions.[6]

B.33 The exclusion of directly administered receipts from the OBR's forecast and HM Treasury outturn data means that the UK's receipts will appear lower, and its net contribution will appear higher, than is actually the case.

4 The OBR forecasts two figures for gross expenditure transfers to the EU. The forecast in the main body of the *Economic and Fiscal Outlook* is for Annually Managed Expenditure (AME). This differs from the gross contribution forecast that can be found in the *Supplementary Fiscal Tables.* The difference between the two is primarily that the Annually Managed Expenditure excludes 'Traditional Own Resources' (customs duties).

5 Receipts excluded from OBR forecasts and HM Treasury outturn data are often called 'private sector receipts' to distinguish them from receipts that go through the public sector. This distinction is a convenient shorthand, but inaccurate: for example, CAP receipts are administered by the public sector, but ultimately go to farmers, who are in the private sector, while funds for research often go to public bodies.

6 Since ONS Pink Book statistics are based on HM Treasury outturn data, they are very similar. However, in order to comply with definitions under the European System of Accounts, a number of small adjustments are made to the HM Treasury outturn data (primarily with regard to the timing of payments, for example recording payments on an accruals rather than cash basis), which can lead to Pink Book data differing from HM Treasury outturn data in individual years. ONS data can be found in *United Kingdom Balance of Payments – The Pink Book: 2015,* ONS (2015).

B.34 The exclusion of directly administered receipts is the primary cause of difference between net contribution figures compiled on the basis of European Commission outturn data and those compiled on the basis of HM Treasury's administrative data, but there are some additional differences. Differences in exchange rates, and in practices over the timing of recording of payments and accruals can also lead to differences between individual years. A fuller explanation can be found in Annex B, *European Union Finances 2015,* with a worked example for 2013. However, since these other differences are largely caused by the precise timing of certain payments, their effect on the calculation of the UK's net contribution is minimal when an average is taken over a longer period.

Glossary of key terms

Terms	Definitions
Association Agreements	Association Agreements are bilateral agreements between the EU and third countries. They normally provide for closer trade relations, for example through establishing a Free Trade Area or customs union with the EU, and typically pledge the parties to work towards closer political and economic cooperation.
Banking Union	The Banking Union is an EU-level supervision and resolution system for the banking sector in the euro area, and participating member states. It aims to ensure that banks in the euro area are safe and reliable and that non-viable banks are resolved without recourse to taxpayers' money and with minimal impact on the real economy.
Common Agricultural Policy (CAP)	The Common Agricultural Policy (CAP) is the agricultural policy of the European Union. It implements a system of agricultural support through direct income payments to farmers and guaranteed prices.
Common External Tariff	A common external tariff must be introduced when a group of countries forms a customs union. The same customs duties, import quotas, preferences or other non-tariff barriers to trade apply to all goods entering the area, regardless of which country within the area they are entering.
Common External Trade Policy	The EU's common commercial or trade policy is one of the linchpins of its relations with the rest of the world (Article 207 of the Treaty on the Functioning of the European Union - TFEU), as well as an exclusive EU competence (Article 3 of the TFEU). The Lisbon Treaty extended this competence to cover foreign direct investment, as well as making the European Parliament a co-legislator alongside the Council on trade matters. On behalf of all EU countries, the European Commission handles trade issues, such as negotiating trade agreements with non-EU countries. These are concluded by qualified majority except in the case of agreements on trade in services, intellectual property, direct foreign investments, audiovisual and cultural services, and social, educational and health services, when Council adoption must be unanimous.
Common Travel Area	A travel zone comprising Ireland and the UK. It allows for nationals of both countries to travel and live in each country without immigration controls.
Council of the European Union (also known as Council of Ministers)	The Council of the EU brings together the representatives of EU member states' governments. It is the EU's main decision-making body and agrees EU laws, usually together with the European Parliament.
Customs union	An area consisting of two or more individual economies or customs territories which remove all tariffs and sometimes broader trade impediments between them. The members making up the area then apply a common external tariff to goods coming from third countries.
Directive	A legislative act of the EU which requires member states to achieve a particular result without dictating the means of achieving that result. EU Directives must be transposed into national law using domestic legislation, in contrast to EU Regulations, which are enforceable as law in their own right.

Terms	Definitions
European Central Bank (ECB)	The European Central Bank (ECB) is the central bank of the 19 European Union countries that have adopted the euro. Its main function is to safeguard the value of the euro and maintain price stability.
European Commission (the Commission)	The European Commission is responsible for proposing draft legislation, implementing decisions, upholding the EU Treaties and managing the day-to-day business of the EU.
European Council	The European Council is the body in which the heads of state or government of the EU's 28 member states, together with an appointed President and the President of the European Commission, take strategic decisions about the direction of the EU.
European Court of Justice (ECJ)	The European Court of Justice (ECJ) is a supranational court based in Luxembourg and made up of one judge from each of the EU member states. The Court deals with cases concerning the interpretation and application of the EU Treaties.
European Economic Area (EEA)	The EEA, established on 1 January 1994, comprises the 28 Member States of the EU and Norway, Iceland and Liechtenstein in a Single Market area, but not a customs union. The agreement establishing the EEA covers the free movement of persons, goods, services and capital (although agriculture and fisheries are covered in a more limited way) as well as other EU policies including inter alia social policy, consumer protection and environment. Generally Members of the EEA must adopt the acquis communautaire in the areas covered by the EEA agreement.
EEA Joint Committee	An institution of the European Economic Area (EEA), in which decisions are taken by consensus to incorporate EU legislation into the EEA Agreement.
European Free Trade Association (EFTA)	The European Free Trade Association (EFTA) has 4 members: the 3 non-EU EEA member states – Norway, Iceland and Liechtenstein – plus Switzerland. It has the right to conclude Free Trade Agreements with the rest of the world on behalf of its four members.
EFTA Court	The EFTA (European Free Trade Association) Court is a supranational judicial body that deals with cases concerning the interpretation and application of the EEA Agreement. It is essentially the equivalent of the ECJ for the EFTA countries that are also members of the EEA (Norway, Liechtenstein and Iceland).
European Parliament	The European Parliament was established in 1979 in order to represent the views of citizens directly in EU decision-making. It shares responsibility with the Council for passing EU laws and for agreeing the EU's budget, although the Council enjoys broader decision-making powers.
European Union (EU)	The European Union is an international organisation made up of 28 European countries, including the UK. The EU has its origins in the European Coal and Steel Community, founded by 6 European states after the Second World War. However, its remit has evolved and is much broader today. The EU facilitates cooperation between its member states on a wide range of objectives, from facilitating trade to protecting the environment, and security and development overseas. The EU has created the Single Market, enabling the free movement of goods, services, capital and people.
European Union Treaties	The European Union is based on the rule of law. This means that every action taken by the EU is founded on Treaties that have been approved voluntarily and democratically by all EU Member States. If a policy area is not cited in a Treaty, the Commission cannot propose a law in that area. There are eight main Treaties.
Foreign Direct Investment	Foreign Direct Investment (FDI) refers to investment that adds to, deducts from or acquires a lasting interest in an enterprise operating in an economy other than that of the investor where the investor's purpose is to have an effective voice in the management of the enterprise. For the purposes of FDI statistics, an effective voice is taken as equivalent to holding 10% or more of the equity share capital in the direct investment enterprise. Other investments, in which the investor does not have an effective voice in the management of the enterprise, are mainly portfolio investments and these are not covered in this release.

Terms	Definitions
Free Trade Agreement (FTA)	A Free Trade Agreement (FTA) is a treaty between two or more countries or trading blocs that reduces, but does not eliminate, barriers to trade and investment. WTO rules allow its member states to sign FTAs granting each other preferential market access, subject to certain conditions. FTAs usually cover agreements to reduce tariffs and other restrictions to trade on goods and, to a lesser extent, services.
G7	The Group of Seven (G7) is a forum for international economic cooperation and decision-making. It comprises 7 of the world's leading economies: Canada, France, Germany, Italy, Japan, the UK and the US.
General Agreement on Tariffs and Trade (GATT)	The General Agreement on Tariffs and Trade (GATT) is a multilateral agreement, originally negotiated in 1947 in Geneva among 23 countries, to reduce tariffs and other trade barriers. It provides a framework for periodic multilateral negotiations on trade liberalisation. The most recent round of such negotiations was the Uruguay Round. Part of the final agreement of the Uruguay Round, concluded in December 1993, led to the establishment of the World Trade Organization to replace the GATT; it commenced operation on 1 January 1995.
Harmonisation	Harmonisation is the introduction of common regulations across the EU.
International Monetary Fund (IMF)	The International Monetary Fund (IMF) is an international organisation of 188 countries. It works to foster global monetary cooperation, secure financial stability, facilitate international trade, promote high employment and sustainable economic growth, and reduce poverty around the world. The UK is a member.
Most Favoured Nation (MFN)	MFN is the rule, usually established through a trade agreement, that a country gives each of its trading partners with which it has concluded relevant agreements the best treatment it gives to any of them in a given product or service. The fundamental point of MFN therefore is equality of treatment of other countries.
Mutual recognition	Mutual recognition is the principle of European Union law whereby once a product meets the requirements in one member state, it can be supplied across the Single Market.
Non-tariff barriers	Non-tariff barriers refers to all barriers to trade that are not tariffs. Examples of these include countervailing and anti-dumping duties, "voluntary" export restraints, subsidies which sustain in operation loss making enterprises, technical barriers to trade, and obstacles to the establishment and provision of services.
Passporting	The EU's financial services passport or passporting regime are shorthand terms for the collection of measures in EU secondary law, which specify how the EU fundamental freedoms operate in the context of financial services. These measures have been extended to the European Economic Area (EEA). Passporting entitles a financial services firm authorised in a EEA state to carry on permitted activities in any other EEA state by either exercising the right of establishment (i.e. setting up a branch and/or agents), or providing cross-border services. These rights are subject to the fulfilment of conditions under the relevant Single Market directive.
Preferential market access	A country or trading bloc grants preferential market access to another when it grants it better terms of trade than as standard, for instance by reducing tariffs or providing access to public tenders. The WTO sets a number of rules about how countries and blocs can grant each other preferential access. Between developed economies this is usually granted through Free Trade Agreements, through which each side agrees to reduce trade barriers.
Proportionality	Proportionality is one of the key principles that guide EU law. Proportionality means that action undertaken by the EU is no more than necessary to attain the agreed objectives.
Qualified Majority Voting (QMV)	Qualified Majority Voting is the principal method of reaching decisions in the Council of Ministers. It allocates votes to the different Member States according to an agreed formula, based partly on population size. Under Lisbon Treaty rules, a decision or law is passed by qualified majority when 55% of Member States vote in favour (in practice this means 16 out of 28) and the Member States supporting represent at least 65% of the total EU population.
Quota	A tariff quota is a quantitative threshold (quota) on imports above which a higher tariff is applied. The lower tariff rate applies to imports within the quota.

Terms	Definitions
Regulation	A legislative act of the EU which is directly applicable in member states without the need for national implementing legislation. (as opposed to a Directive, which must be transposed into national law by member states using domestic legislation)
Rules of origin	Laws, regulations and administrative procedures which determine a product's country of origin. A decision by a customs authority on origin can determine whether a shipment falls within a quota limitation, qualifies for a tariff preference or is affected by an anti-dumping duty. These rules can vary from country to country.
Schengen border free area	The Schengen border-free area comprises the 26 countries (22 EU member states and 4 others) that have abolished passport and any other type of controls at their common borders. It also has a common visa policy. The UK has chosen not to participate in the Schengen border-free zone, thereby retaining its own border.
Single Market	The Single Market gives the UK access to the EU and facilitates access to wider markets, and works by treating the EU's member states as a single economic area. It is founded on the 'four freedoms': the free movement of goods, services, capital and people. These are enshrined in the EU's founding Treaties and the Single Market has developed progressively over the past half a century. The Single Market provides access to EU markets through three broad elements. First, it removes tariffs and quotas on goods trade within the EU. Second, it creates a customs union within the EU. Third, it creates a level playing field by reducing non-tariff and other barriers to trade within the EU.
State aid	State aid is any advantage granted by public authorities through state resources on a selective basis to any organisations that could potentially distort competition and affect trade, which is incompatible with the Single Market. The EU's rules on state aid are a subset of the competition rules, aimed at preventing market distortions as a result of government support. They can apply to a range of polices, for example, grants, loans, tax breaks or financial assistance.
Subsidiarity	Subsidiarity is one of the key principles that guide EU law. Subsidiarity means that the EU may legislate only where the objective of the action cannot be sufficiently achieved at the member state level.
Tariffs	A tariff is a tax or duty imposed on a particular class of imports or exports.
UK's new settlement	Following months of negotiations, at the 18-19 February European Council the Government secured a new settlement for the UK in a reformed EU. This settlement secures all the UK's objectives, set out by the Prime Minister, and gives the UK a special status within the European Union, as well as setting the EU as a whole on a path of long-term reform.
United Nations (UN)	The United Nations (UN) is an international organisation formed in 1945 to increase international cooperation and uphold peace and security. It has 193 members.
World Trade Organization (WTO)	The WTO was established on 1 January 1995 as the successor to the GATT. The WTO is an Organization for the discussion, negotiation and resolution of trade issues covering goods, services and intellectual property. Its essential functions are administering and implementing the multilateral (GATT, GATS and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)) and plurilateral trade agreements that constitute it, acting as a forum for multilateral trade negotiations, seeking to resolve trade disputes and cooperating with other international institutions involved in global economic policy-making. The WTO currently has 162 members including the EU and all its Member States.

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