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The end of the beginning

Assessing the potential economic
implications of prolonged UK–EU
trade policy uncertainty

Charles P. Ries, Marco Hafner,
Clement Fays and Erez Yerushalmi



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Preface

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For more information please contact:

RAND Europe
Westbrook Centre
Milton Road
Cambridge CB4 1YG
United Kingdom
+44 (1223) 353329

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Summary

The past three years of Brexit developments have been only the start of a new chapter between Britain and its European Union neighbours. Since the United Kingdom (UK) voted to leave the European Union (EU), both sides have entered a sequential negotiation process. The first phase of this process was aimed at defining a Withdrawal Agreement (WA) to set out the terms of the UK's departure from the EU. The WA covers only a small set of issues, including the UK's financial settlement, a solution to the Irish border, citizens' rights, and the role of the European Court of Justice.¹ But controversy over its desired terms, the possible effects of withdrawal on peace in Northern Ireland, and even the possible future of the UK itself, caused a year-long political crisis in the UK that has only recently been resolved by the General Election of 12 December 2019. The British electorate voted for a government committed to "get Brexit done". Now armed with a strong majority, the government of Prime Minister Boris Johnson intends to put the WA (and Political Declaration) and accompanying implementing legislation through Parliament by the end of January 2020, in order to leave the EU as provided for on 31 January 2020.

With the UK's departure from the EU set for the end of January, detailed negotiations about the future relationship can only then begin. While there has been extensive focus on whether and when the UK would formally leave the European Union, there has been little analysis of what happens the day after it has done so, and of the likely ramifications of the uncertainty that will likely prevail until new arrangements are negotiated, ratified and implemented. This study looks beyond recent Brexit debates related to the first phases of the negotiation process and aims to assess some of the potential economic implications to the UK of prolonged uncertainty about a final destination for the UK–EU trading relationship.

There is mounting evidence that the UK's decision to leave the EU may already have had negative consequences for the UK economy. Before the EU referendum in June 2016, Her Majesty's Treasury predicted that a win by the Leave campaign would lead to an immediate economic recession in the aftermath of a vote to leave the European Union. A similar prediction was made by the Bank of England. But the UK economy continued to grow after June 2016, albeit at a slower pace. The Treasury and Bank of England forecasts were criticised at the time, and since,

1 Accompanying the WA negotiated between the UK and the EU is a Political Declaration (PD) setting out the broad parameters for the future relationship. The PD is not legally binding and sets out both parties' objectives for aspects of the desired future economic and security relationship between the UK and the EU, including a deep and comprehensive free trade agreement.

for exaggerating the economic consequences from the referendum and were termed as ‘*Project Fear*’ by prominent advocates for Brexit.² As Tetlow and Stojanovic (2018) point out, Her Majesty’s Treasury’s forecast of an immediate recession was inherently wrong as it assumed a series of factors that did not happen, including that (1) households and businesses would immediately drop their spending; (2) the Bank of England would not cut interest rates; and (3) the Chancellor would immediately raise taxes and cut public spending.³

The evidence reviewed in Chapter 2 suggests that even though the UK remained a member of the EU (and will do so until the end of January 2020) without any changes in its terms of trade with the other 27 EU member states, the UK experienced negative economic consequences due to the referendum decision. Different mechanisms – including trade policy uncertainty influencing foreign trade and investment flows – affected the UK’s overall economic performance.

Chapter 3 seeks to quantify some of the macroeconomic implications of *prolonged* trade policy uncertainty during the UK–EU renegotiation period, which – given the difficulties of negotiating such a new permanent relationship with the EU – is expected to be lengthy. The non-binding Political Declaration (PD) that accompanies the soon-to-be ratified EU–UK Withdrawal Agreement (WA) is not very specific on many key aspects of the future partnership. To assess the potential economic implications of further and prolonged trade policy uncertainty during the course of the renegotiation period that lies ahead, this study uses a macroeconomic model to estimate the economic effects of changes in trade and FDI associated with trade policy uncertainty.

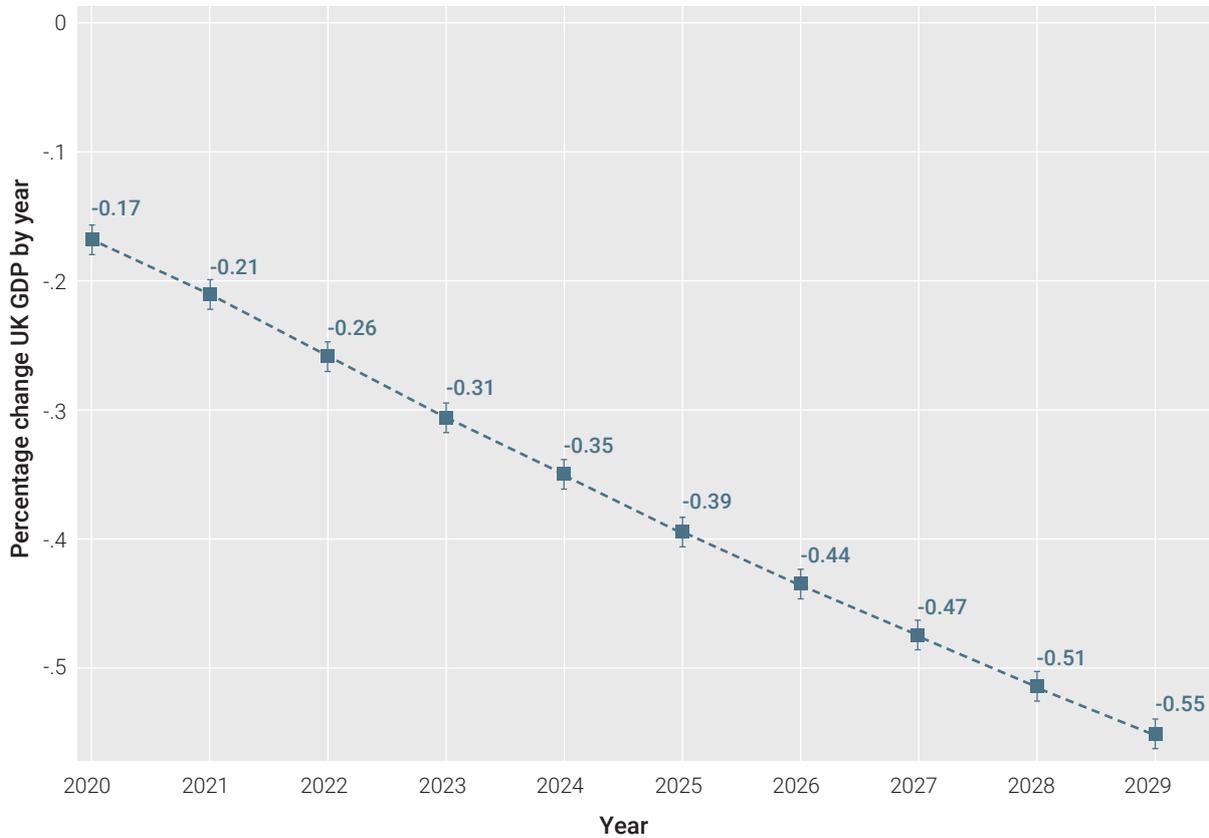
Figure S.1 provides a summary of how potential trade policy uncertainty during a prolonged renegotiation period may affect UK GDP, based on changes in trade and FDI combined. Our estimates are based on previous assessments of how trade policy uncertainty may have affected trade and FDI since the UK voted to leave the EU. For example, our estimates for trade are based on studies that have measured that UK exports to the EU and the rest of the world are about 13 per cent lower compared to a hypothetical world where the UK had voted to stay in the EU. As illustrated in Figure S.1, we assess that the economic effects of trade policy uncertainty associated with changes in trade and FDI are tangible. For instance, we estimate that by the end of the initially planned transition period in 2020, UK GDP could be 0.17 percentage points lower compared to the baseline where the UK is not in a renegotiation period about its future trading relations with the EU. This is the equivalent of a GDP loss of about \$5.5bn. If the renegotiation period lasts longer, by 2025 the estimated effect is a 0.39 percentage point lower UK GDP compared to the baseline (about \$13.8bn). The effect would increase over time and by 2029, it is estimated to be minus 0.55 percentage points (about \$20bn in foregone GDP) compared to the baseline. Using estimates from HM Treasury that 1 per cent of foregone GDP is associated with £7.6bn (\$9.5bn) of extra borrowing annually, the associated cost to the UK public finances by 2021 would be almost \$2bn, increasing to almost \$3.8bn by 2025.

We estimate that EU economies would also experience some economic implications, though considerably smaller than in the UK. These effects are presented in Appendix B.

2 Maidment (2019).

3 Tetlow & Stojanovic (2018).

Figure S.1: Summary of UK GDP effects of changes in trade and FDI related to trade policy uncertainty during the UK–EU renegotiation period



NOTE: This figure reports the estimates for the effects on UK GDP by year from a reduction in trade and changes to FDI associated with increased trade policy uncertainty during the potential length of the renegotiation period between the UK and the EU. The percentage change needs to be read in comparison to the baseline economic projection for the UK. In both scenarios – the baseline and the counterfactual – it is assumed that the UK will experience economic growth, but under the counterfactual scenario with changes in trade and FDI due to trade policy uncertainty, UK growth would be smaller compared to baseline. The figures reflect the 95% confidence interval, reflecting that in 95 of 100 model runs, the estimate falls within this range.

The implications of this analysis are that in the upcoming phase of the negotiations with the EU, the UK will need to weigh up the potential short-term economic implications of prolonged trade policy uncertainty if negotiations last beyond December 31 2020, versus the potential negative long-term economic implications of an agreement that is made quickly but lacks the comprehensiveness required for a broad and deep future UK-EU trading relationship. Britain's allies, especially the United States, will also be concerned by any prolonged period of uncertainty about the UK's security and defence relationships with its neighbours.

In all these senses, 31 January 2020 is just the end of the beginning.

Acknowledgements

This study has benefited from, and extends, the analysis presented in three previous RAND Europe studies related to Brexit: *Defence and security after Brexit* (Black et al. 2017); *What sort of Brexit do the British people want?* (Grant et al. 2017); and *After Brexit – Alternate forms of Brexit and their implications for the United Kingdom, the European Union and the United States* (Ries et al. 2017).

The study team especially thanks the reviewers for our study, Dr Christian van Stolk, Executive Vice President of RAND Europe and Charlene Rohr, Senior Research Leader at RAND Europe. Their thoughtful comments helped sharpen our analysis and pointed us to lacunae in our thinking. The authors of course assume full responsibility for the study's findings.

The quality of the prose benefited enormously from the careful copy-editing of Richard Gilbert.

Abbreviations

CER	Centre for Economic Reform
CGE	Computable general equilibrium
CU	Customs union
EC	European Community
ECJ	European Court of Justice
EEA	European Economic Area
EEC	European Economic Community
EU	European Union
FDI	Foreign direct investment
FTA	Free trade agreement
GDP	Gross Domestic Product
GTAP	Global Trade Analysis Project
MFN	Most favoured nation
NAFTA	North American Free Trade Agreement
NTB	Non-tariff barrier
OECD	Organisation for Economic Cooperation and Development
PTA	Preferential trade agreement
PD	Political Declaration
SCM	Synthetic control methods
TEU	Treaty on European Union
TTIP	Transatlantic Trade and Investment Partnership
UK	United Kingdom
WTO	World Trade Organization
WA	Withdrawal Agreement

1 Introduction

In a referendum in June 2016 the electorate of the United Kingdom (UK) voted to leave the European Union (EU). Thereafter, the UK filed a notification to the European Union on 31 March 2017 under the Treaty of European Union's Article 50 formally stating its intention to withdraw. The Article 50 notification began a two-year negotiation process to determine the terms of departure and, thereafter, the broad parameters of the UK's subsequent economic and political relationship with the EU.

The terms of departure were to be set out in the Withdrawal Agreement (WA), including such matters as settlement of financial obligations, rights of citizens, principles for such matters as treatment of the border between Northern Ireland and the Republic of Ireland, and the role of the European Court of Justice. The aim of UK and EU negotiators was to set the terms of the Withdrawal Agreement and a more general, non-binding 'Political Declaration' by the end of the two-year period provided for by the Article 50 process. To ensure no sharp changes in trade barriers and other trading conditions would take place at the end of the Article 50 period (when the UK would cease to be a member of the EU), the December 2018 draft WA⁴ also provided for a 21-month 'transition period' until 31 December 2020, during which the UK would remain within the EU Single Market.

In the event, Prime Minister Theresa May's government was unable to achieve parliamentary assent for its draft WA, despite three attempts in early 2019. To avoid sharp changes in trading conditions, the Article 50 deadline was extended several times to allow for its terms to be agreed in the WA. The most recent – and currently applicable – deadline agreed by the EU is 31 January 2020.

Theresa May was forced to resign her position as prime minister and was followed in July 2019 by Boris Johnson. The Johnson government succeeded in renegotiating the Withdrawal Agreement with the EU to change its terms relating to Northern Ireland, keeping NI within the EU Single Market regulatory zone but within the UK's customs area. This solution will require some customs checks (exact details to be worked out) on goods crossing the Irish Sea. The Johnson government won preliminary parliamentary approval for its WA and called a General Election for 12 December 2019. The Tory Party won a decisive – and historic – victory in the election on a

manifesto featuring a commitment to 'get Brexit done'. It is expected that legislative steps will be taken in the UK to allow the British exit to officially occur on 31 January 2020.

The UK government's current ambition is to sign a trade agreement with the EU by the end of 2020 in order to avoid having to ask the EU to extend the transition period. Press reports suggest that the UK will place a limitation in the implementing legislation that prevents the UK requesting an extension of the transition period beyond the end of 2020, even if a permanent trade and economic agreement is not reached by then. However, given the size of the government's majority, such a restriction could likely be overcome by subsequent legislation.⁵

As previous impact assessments of future UK–EU relationship scenarios have emphasised, it is in the UK's economic interest to negotiate a deep and comprehensive free trade agreement with the EU, with the economic cost of leaving the EU increasing the less comprehensive the agreement is.⁶ However, the more comprehensive the agreement, the longer the likely period of negotiating and implementing it. Given the scope and many details that will have to be negotiated in the second phase, many observers conclude that much larger Brexit negotiation tasks lie ahead, giving rise to another potential 'No Deal' cliff edge at the end of 2020.⁷ Even in the event it falls over such a cliff, the UK would want to negotiate the terms of its future economic and security arrangements with the EU.

There is mounting evidence that uncertainty associated with a lack of clarity about the future UK–EU economic relationship since the UK's referendum choice to leave the EU has already had negative consequences for the UK economy.⁸ Among many factors contributing to a weaker economic performance, such as lower levels of consumption, there is evidence that, since the vote to leave the EU, the UK experienced lower trade and foreign direct investment flows than it would have in the absence of the Brexit referendum, even though any new trade barriers have not yet been introduced.⁹ That is, the UK and the EU are currently in what the trade literature calls a 'renegotiation period', which emerged after the vote to leave. Even though no formal barriers to trade in the economic relationship between the UK and the EU have been imposed (e.g. the UK is still a member of the Single Market and Customs Union), the likely prospect of an increase in future trade barriers (e.g. tariff and/or non-tariff) may have already led firms to alter their trade and investment decisions. There is evidence that among countries that already have a free trading relationship characterised by relatively low trade barriers, a renegotiation period creates a level of uncertainty about the level of future trade costs.¹⁰ For instance, the case of Brexit is in line with recent renegotiations of trade agreements such as the US–Korea FTA and NAFTA, which began from the position that trade costs could rise to levels above the current levels, potentially deterring firms'

5 George Parker et al. (2019).

6 For instance, Her Majesty's Government (2018a) Brexit impact assessment suggests that a closer alignment to the EU, for instance through a Customs Union or a comprehensive free trade agreement, is associated with lower economic cost compared to a UK departure on WTO rules. A similar conclusion was reached by a RAND study assessing the economic implications of alternate Brexit scenarios (Ries et al. 2017).

7 Durrant et al. (2019).

8 Springford (2019).

9 For instance, see Born et al. (2019) or Serwicka & Tamberi (2018).

10 Crowley et al. (2018).

decisions to enter export markets.¹¹ That is, trade policy uncertainty has a trade-deterring effect akin to a non-tariff barrier, with negative economic consequences.¹²

This report examines the potential economic ramifications for the UK of a further and likely longer-lasting period of renegotiation of the terms of the future economic relationship between the UK and the EU. Our analysis focuses on the potential negative consequences of the uncertainty around future UK–EU trade policies, and related foreign direct investment (FDI) flows. Our analytical approach draws on parameter estimates from existing literature on the changes in UK trade and FDI flows since the vote to leave, and applies them in a macroeconomic model to estimate how continuing trade policy uncertainty during the renegotiation period could affect the UK's overall economy, measured as gross domestic product (GDP). While the main focus is on the UK, we also provide (in Appendix B) some equivalent estimates for the EU.

In Chapter 2 we discuss the emerging evidence on how the UK economy has performed since the vote to leave the EU. In Chapter 3 we discuss in more detail how trade policy uncertainty can have negative effects on trade and FDI, and the potential economic implications for the UK associated with a renegotiation period until the new UK–EU trading relationship is established. Chapter 4 presents conclusions and policy implications. Appendix A also provides methodological notes on the macroeconomic model and sources of data used in the analysis.

11 See Graziano et al. (2018).

12 Osnago et al. (2015).

2 The UK since the vote to leave the EU

The UK was due to leave the EU at the end of March 2019, pursuant to the UK filing in March 2017 of its intent to leave under Article 50 of the Treaty of European Union, which started a two-year clock. However, then-Prime Minister Theresa May was not, in three attempts, able to secure approval of the negotiated WA from the House of Commons. To provide more time to agree a mutually acceptable solution, the European Council extended (unanimously) the Article 50 deadline three times, the last of which set a date of 31 January 2020. In order to find a compromise, Theresa May reached out to opposition parties, but cross-party talks with the Labour party failed to find agreement on a path forward and May was forced to resign. Boris Johnson was elected by members of the Conservative party as the new Conservative Party Leader, and became prime minister on 22 July 2019. Prime Minister Johnson renegotiated May's WA with EU leaders to remove provisions that would have kept Northern Ireland in the Single Market for an indeterminate future, to prevent a hard border being established between UK and EU customs territories in Ireland after Brexit (provisions known collectively as the 'backstop'). During the negotiation of the WA, Johnson stated that he would be willing to take the UK out of the EU without a ratified WA if necessary, which he phrased as leaving the EU by the end of October '*do or die*'.¹³ This commitment was made despite evidence that a no-deal Brexit – a scenario where the UK crashes out of the EU without a ratified WA – would have a detrimental long-term impact on the UK economy, with UK government estimates suggesting a loss in GDP of between 6.3 to 9 per cent over 15 years.¹⁴ A previous analysis by RAND estimated a potential loss in GDP of 4.9 per cent over ten years under a no-deal scenario.¹⁵ After calling a general election for 12 December 2019, Johnson secured a comfortable majority and the government is expected to secure approval for the WA in Parliament, resulting in the UK formally leaving the EU by the end of January 2020. This will set in motion the negotiation of the future economic and security relationship between the UK and the EU, which will occur during a transition period that is currently set to end by December 2020. The current position of the UK government is to negotiate and ratify a free trade agreement by the end of 2020.

13 BBC (2019).

14 Her Majesty's Government (2016). A previous analysis by RAND estimated a potential loss in GDP of 4.9 per cent over ten years (Ries et al. 2017).

15 Ries et al. (2017).

While the long-term economic implications of Brexit will depend on the specifics of any agreement that may be reached between the UK and the EU, there is mounting evidence that the UK's decision to leave the EU may already have had negative consequences for the UK economy. Before the EU referendum in June 2016, Her Majesty's Treasury under then-Chancellor George Osborne predicted that a win by the Leave campaign would lead to an immediate economic recession in the aftermath of a vote to leave the European Union.¹⁶ A similar prediction was made by the Bank of England at the time. Neither forecast materialised and the UK economy continued to grow after June 2016, albeit at a slower pace.¹⁷ The Treasury and Bank of England forecasts were criticised at the time, and since, for exaggerating the economic consequences from the referendum, and were termed as '*Project Fear*' by prominent members of the Leave side.¹⁸ As Tetlow and Stojanovic (2018) point out, Her Majesty's Treasury forecast of an immediate recession was inherently wrong as it assumed a series of factors that did not happen, including that (1) households and businesses would immediately drop their spending; (2) the Bank of England would not cut interest rates; and (3) the Chancellor would immediately raise taxes and cut public spending.¹⁹

Nevertheless, even though the UK has not yet technically left the European Union – so has full access to the EU Single Market and tariff-free access to countries with which the EU has free trade agreements (FTAs) – there is emerging evidence that the UK's decision to leave the EU has adversely affected its economy.

The UK's economic performance and living standards since the vote to leave the EU

The Centre for European Reform (CER) estimates that at the end of the second quarter of 2019, the UK economy was 2.9 per cent smaller than it would have been if the UK had voted to remain in the European Union.²⁰ Furthermore, the CER assessed that the negative GDP effect of the Brexit vote seems to be increasing over time.²¹ The authors highlighted that higher levels of inflation and lower business investment due to the UK's decision to leave the EU accounted for the detrimental impact on economic growth.

In a 2019 study, Born et al. came to a similar conclusion by considering the unexpected outcome of the Brexit vote as a natural experiment, and calculating the associated UK output loss. Similar to the CER estimates, the authors found that the Brexit vote caused a cumulative UK GDP loss of about 1.7 to 2.5 percentage points by the end of 2018.²² Born et al. identified a reduction in private consumption and a reduction in total investment as important drivers for the estimated GDP gap between the actual UK and a counterfactual or 'doppelganger' version in which the UK

16 Her Majesty's Treasury (2016).

17 Such as predicted pre-referendum by the International Monetary Fund (IMF), the National Institute of Economic and Social Research (NIESR) and the Organization for Economic Cooperation and Development (OECD).

18 Maidment (2019).

19 Tetlow & Stojanovic (2018).

20 Springford (2019a).

21 Previous estimates by CER for the fourth quarter in 2018 showed that the GDP effect was 2.5 per cent.

22 Born et al. (2019).

had not voted to leave the EU.²³ Generally, the decline in investment is considered to be a sign that the uncertainty around the Brexit process is a potential driver of relatively sluggish UK economic growth.²⁴ A survey among UK businesses suggests that Brexit created a large and persistent uncertainty shock for firms, with about 40 per cent of businesses stating that Brexit is a top source of uncertainty, especially driven by the uncertain timing of any transition arrangements and the future UK–EU economic relationship.²⁵ However, overall it is not clear whether the reason for the decline in overall GDP is purely driven by uncertainty around Brexit, or driven by the anticipation of lower future living standards after Brexit, leading economic agents (e.g. consumers and businesses) to adjust their behaviour under the expectation that the UK would be permanently economically poorer. Born et al. (2019) estimate that uncertainty explains about 20 per cent of the overall decline in GDP for the actual UK compared to its ‘doppelgänger’.

Furthermore, private consumption may have been adversely affected by the substantial depreciation of the pound, which induced consumer prices to rise during the course of 2017. The inflation induced by a steep fall in sterling directly after the referendum may have had a detrimental impact on UK living standards. As Breinlich et al. (2017) highlight, UK inflation rose sharply following the EU referendum, and the annual consumer price index (CPI) increased from 0.4 per cent in June 2016 to 3 per cent in September 2017.²⁶ The fall in the pound led to an increase in the local currency cost of imports, both in final and intermediate goods. Firms are passing-through at least some of these costs to consumers, increasing the cost of living. Inflation rates have since reverted to an annual average of about 1.8 per cent, but remain at a significantly higher level than before the referendum.²⁷

UK's foreign trade and investment performance since the referendum

There is a growing literature suggesting that trade policy uncertainty may represent a substantial barrier to trade. Exporting firms have to make decisions in conditions of uncertainty, and assess the risk associated with potential (future) increases in barriers to trade in destination markets when deciding to export. Exporters may delay export investment decisions if the risks are evaluated to be too high.²⁸ Uncertainty with regard to the trade environment – for example changes

23 Note that many studies in this area use the synthetic control method (SCM). The idea behind SCM is to construct a ‘synthetic’ or ‘doppelgänger’ UK as a weighted average of other similar countries that have not been affected by the policy change (in this case the UK’s vote to leave the EU). The weights are calculated using information on variables that predict the outcome variable of interest (e.g. GDP) in the pre-treatment or intervention period from a donor pool of non-affected countries. Specifically, the method algorithm derives a series of weights for each country in the donor pool and, assuming that these weights do not change, they are applied to compute the counterfactual country. Beside pure empirical studies based on SCM, some recent research has applied structural economic models to assess the economic implications of Brexit, such as Faccini & Palombo (2019). They predict similar GDP effects of a cumulative decline in UK GDP of over 2 percentage points through the end of 2018.

24 Reid (2019).

25 Bloom et al. (2019).

26 Breinlich et al. (2017).

27 Office for National Statistics (2019).

28 For instance, Handley (2014) finds that uncertainty over future trade conditions induced Australian firms to delay entering new export markets.

in trade policy or protectionist remedies against imports²⁹ – has been shown to have adverse economic effects, increasing the fixed costs of entering an export market and potentially having a negative effect on the number of firms active in trading (extensive margin), or the number of products or services traded in terms of volumes (intensive margin).³⁰ That is, entering trade agreements could have an uncertainty-reducing motive and the reduction of the risk of future trade-policy reversals could have a positive impact on trade.³¹ Furthermore, there is evidence that trade policy uncertainty can affect FDI flows. When countries already highly economically integrated through deep trade agreements and highly interlinked cross-border supply chains enter a period of trade policy uncertainty due to a renegotiation period, the incentives for foreign investments are deterred.³²

While most studies have examined the effect of *decreases* in trade policy uncertainty, Brexit represents an example where trade policy uncertainty is *increasing*. A new future trade arrangement to be negotiated between the UK and the EU would likely create new barriers to trade between the UK and the EU, which currently is almost frictionless. In what follows we describe the existing evidence on the effects of trade policy uncertainty due to Brexit in the UK in relation to trade and FDI.

Trade

A future new trade arrangement between the UK and the EU would likely place new barriers to trade between the UK and the EU, which is currently barrier-free. Evidence suggests that such uncertainty about the future UK-EU trading relationship has adversely affected UK trade. Crowley et al. find that the UK's decision to leave the EU created substantial uncertainty for UK firms deciding whether to enter EU export markets.³³ Using detailed data at the firm- and product-level, the authors find that the vote to leave induced almost 4,000 firms to exit from exporting products to the EU, and by the end of year 2016, entry of firms into EU export markets would have been 5.1 per cent higher if UK exporters had not faced increased policy uncertainty after the Brexit referendum. This corresponds to a value of lost trade of about £3.9 billion. Born et al. investigate the effects of the Brexit referendum on total UK imports and exports (not distinguished by region).³⁴

29 Examples include, among others: (a) ending an existing agreement (e.g. Brexit); (b) renegotiating an agreement (e.g. NAFTA); or (c) starting a trade war (e.g. China–United States).

30 One way countries have historically reduced uncertainty about international economic policies is to form or join international associations and agreements such as the World Trade Organisation (WTO), or preferential trade agreements (PTAs). At the WTO, member countries commit not to raise tariffs above levels 'bound' by commitments they make to each other. Reciprocal bindings and other rules are set in periodic multilateral negotiations and adopted by consensus. WTO membership imposes trade policy discipline by having such commitments and rules to resolve disagreements about their application (Osnago et al. 2015).

31 Limao & Maggi (2015). For instance, Handley and Limao (2015) showed that Portugal's accession to the European Community (EC) in 1986 led to an increase of Portuguese firms entering the export market, even in sectors where tariffs had already been low between Portugal and the EC. The study assessed that before accession to the EC, Portuguese exporters believed that there was a positive probability of losing pre-existing preferences in the EC and Spanish markets. The accession to the EC eliminated this uncertainty and as a result, exports increased at the extensive and the intensive margin.

32 For instance, Cebros et al. (2019) show a negative effect on FDI inflows to Mexico during the NAFTA renegotiation period.

33 Crowley et al. (2018).

34 Born et al. (2019).

They observe an increasing gap between the actual UK and its synthetic ‘doppelganger’ version, which they mainly attribute to the depreciation of the pound in the aftermath of the referendum. The same study suggests that there is also some empirical evidence that the export gap between the actual UK and its ‘doppelganger’ is widening, suggesting that the UK export performance may have not been as strong as it could have been if the vote to leave the EU had not occurred.

Studies by Crowley et al. (2018), Born et al. (2019) and Douch et al. (2018a)³⁵ all treat the unexpected vote to Leave the EU in the referendum of June 2016 as a case of a renegotiation period for trade agreements where although no formal barriers of trade have been imposed, trade is affected by trade policy uncertainty. Douch et al. (2018a) analyse UK–EU and UK–Non-EU bilateral trade values (exports and imports) in goods and how they performed before and after the vote for Brexit. Even after taking into account the exchange rate changes, actual UK exports to the EU were about 13 per cent lower compared to its synthetic ‘doppelganger’ no-Brexit vote version, and the magnitude of the trade gap effect appears to be stable over time. One could argue this is just a ‘Global Britain’ effect where the UK focuses more on global export markets in light of its departure from the EU. However, exports to non-EU countries were also lower than one would have expected if the UK had not voted to leave the EU, namely by about 13 per cent, suggesting that trade policy uncertainty, where firms alter their exporting investment decisions accordingly, is associated with underperforming UK trade.

Furthermore, Douch et al. (2018b)³⁶ assess the impact of the referendum on UK trade in services. Similar to trade in goods, the authors find that the actual UK export performance in the service sector has been below its no-Brexit ‘doppelganger’ by about 7 per cent. The authors conclude that trade policy uncertainty is affecting UK exports in sectors that are not even subject to tariffs, highlighting the importance of non-tariff barriers when assessing a change in future trade cost associated with a renegotiation period of an existing trade or economic integration agreement.

Foreign Direct Investment

The UK is one of the largest global recipients of FDI. Japanese carmakers such as Nissan and Honda are among high-profile foreign investors in the UK. Since the Brexit referendum, both Nissan and Honda announced decisions to reduce or close UK facilities and switch production to Japan.³⁷ There is evidence that uncertainty about future tariff arrangements may not only have affected current stocks of FDI, but has also led to a downward trend in FDI inflows, with Germany and France overtaking the UK as the largest European FDI recipients since 2017.³⁸ According to a Financial Times analysis, in the three years since the referendum, the number of jobs created by greenfield investments³⁹ dropped by about 19 per cent, and the value of foreign capital in

35 Douch et al. (2018a).

36 Douch et al. (2018b).

37 Jack (2019). However, it is important to stress that amid the EU–Japan free trade agreement, Brexit uncertainty may have not been the sole reason for Nissan and Honda’s decisions to cease UK production, as the trade agreement allows Japanese carmakers tariff-free access to the EU market.

38 Serwicka & Tamberi (2018).

39 Representing foreign investment inflows into new production facilities or extensions of existing facilities.

greenfield investments into the UK dropped by nearly 30 per cent.⁴⁰ Serwicka and Tamberi (2018) examined the inflows of FDI into the UK since the referendum.⁴¹ These authors highlight that there are a variety of reasons why the UK is an attractive destination for FDI.⁴² But, following the 2016 Brexit referendum vote, conditions for access to the EU Single Market became uncertain over the longer term. They estimated that potential uncertainty around future border or tariff arrangements could have led to a reduction in UK inward FDI projects by about 16 to 20 per cent, compared to a hypothetical situation in which the UK had not voted to leave the EU. The decline in inward FDI flows seems to be mainly affecting services, while there is little evidence to suggest that manufacturing has been adversely affected by uncertainty.⁴³ Specifically, the slowdown in inward FDI flows was especially observed in service sectors such as ‘software publishers’, ‘investment management’ and ‘retail banking’.

Breinlich et al. (2019) investigated the impact of Brexit on UK outward foreign investments.⁴⁴ The authors found that the UK’s vote to leave led to a 17 per cent increase in the number of UK outward investment transactions into the EU-27 member states. The increase was also found to be mainly driven in the service sector, corresponding to outward investments of about £21.2bn by March 2019. The authors stress that these additional investments mostly occurred at the expense of UK operations.⁴⁵ There is also evidence that the negative effect on FDI outflows was more pronounced among greenfield investments (increase in UK–EU outflows of about 27 per cent) compared to merger and acquisition transactions (increase in UK–EU outflows of about 13 per cent).⁴⁶ Furthermore, there was no evidence that this trend was an effect of a more global and outward-looking UK. The authors found UK outward investments in non-EU OECD countries did not evolve differently to what would have been expected had the UK not voted to leave the EU. And, much as Serwicka and Tamberi (2018) found, Breinlich et al. (2019) also found a reduction in UK FDI inflows – specifically inflows from European firms to the UK – of about 9 per cent or £13.1bn since the referendum.

40 Romei (2019).

41 Serwicka & Tamberi (2018).

42 The authors cite the following factors: (a) English as an official language makes communication with investment partners easier, especially with the United States; (b) a business friendly environment and generally a culture that promotes free trade; and (c) easy access to the EU Single Market, which offers businesses almost free access to a market of 500 million consumers.

43 Note that Serwicka & Tamberi (2018) find that for both the actual UK and its doppelganger version FDI inflows into manufacturing are declining, suggesting that the trend is related to a more pronounced global slowdown rather than being specifically Brexit related. The authors argue that manufacturing firms rely heavily on a broader network of suppliers and relatively larger capital investments, making it difficult to make swift adjustments to production processes. In contrast, service providers rely relatively less on heavy machinery, making them more mobile in the short run.

44 Breinlich et al. (2019).

45 Reflecting investments by UK firms that would otherwise have invested domestically, rather than abroad.

46 Greenfield investments refer to FDI where, for instance, a firm sets up operations in a foreign country and establishes new facilities, such as offices, manufacturing facilities, among others. Mergers and acquisitions represent an acquisition of a foreign company that is already established.

Implications

The evidence reviewed in this chapter suggests that even though the UK remains closely aligned to the EU rulebook until (at least) the end of December 2020 – with no official change in its economic relationship with the other 27 EU member states – the UK has already experienced some negative economic consequences of the referendum decision to leave the EU. While there are different mechanisms at work that also negatively affect the UK's overall economic performance, two factors directly associated with trade policy uncertainty have been negatively affected, namely trade and foreign direct investment. That is, until the future UK–EU economic relationship is determined, both parties remain in a renegotiation period in which there is a non-zero probability that future trade costs (e.g. tariffs or non-tariffs barriers) will be higher than under current commitments. The political declaration (PD) is vague about the nature of the future UK–EU trading relationship, and while the PD envisaged a comprehensive free trade agreement with special arrangements for Ireland, most details were left to be negotiated during the planned transition period. At some point during 2020, the UK may decide whether to extend the transition period in order to secure a comprehensive free trade agreement with the EU. In the meantime, the UK must be negotiating new agreements with countries with which it currently benefits from free trade agreements through EU membership, and completely new agreements with other partners such as the United States.

In the next chapter we examine the potential economic implications going forward for the UK and the EU with regards to trade policy uncertainty during the prolonged renegotiation period.

3 Estimating the macroeconomic implications of trade policy uncertainty related to the ongoing UK–EU renegotiation period

Our approach for estimating the potential macroeconomic implications of a prolonged renegotiation period between the UK and EU centres on the effects of trade policy uncertainty. Our analysis focuses on two factors:

Trade: during the period in which an existing trading arrangement is renegotiated, uncertainty about the future effective trade cost can have a negative effect on the extensive (e.g. number of firms or products participating in trade) and intensive (e.g. export per firm or product) margin of trade.

Foreign investment: uncertainty about future trading arrangements can influence foreign investment decisions. The UK is an attractive destination for foreign investments for several reasons, one of which is that it currently benefits from barrier-free entry into the EU Single Market. An increase in barriers to trade and investment between the UK and EU may deter foreign investors, with potentially negative effects on FDI inflows. Simultaneously, if UK firms want to keep operating in the EU, they may have to set up subsidiaries in the EU, potentially increasing UK FDI outflows.

To examine the potential effects of the trade policy uncertainty associated with the renegotiation period of the UK–EU future trading relationship, we draw on a macroeconomic model to estimate the potential changes in UK GDP in relation to trade and FDI.⁴⁷ The modelling approach starts with a computation of the economic projection for the economy using the current underlying economic situation in conjunction with how the future population (including the labour supply) might evolve over the next ten years. This is the so-called ‘status quo’ or ‘baseline scenario’, and is subsequently compared against a ‘what-if’ scenario in which various parameters are changed and their effects are analysed. In the analysis, the baseline scenario represents a hypothetical world in which the UK does not experience a renegotiation period with the EU.⁴⁸

47 The macroeconomic model is a computational general equilibrium (CGE) model, similar in nature to the economic trade model applied by the Her Majesty’s Government (2018a) analysis to assess the economic implications of the Withdrawal Agreement versus other potential Brexit scenarios, such as a modelled ‘No Deal’.

48 E.g. either a situation in which the UK has not voted to leave the EU, or a UK that has negotiated its future economic and trading relationship before exiting the EU.

For the purpose of this analysis we focus on changes in trade and FDI associated with potential trade policy uncertainty during a prolonged renegotiation period. The analysis draws on information from existing studies on how trade and FDI may have already changed since the vote to leave the EU, and examines the effects on UK GDP if these existing trends continue. It is important to highlight that the analysis does not represent an economic forecast of the economy as it only considers the potential effects associated with the trade policy uncertainty during a prolonged renegotiation period, all else equal. In reality there are many other factors that would influence the economy's performance (e.g. technological developments or fiscal and monetary policies). Hence the estimates presented in this report show the relative effects between the baseline without trade policy uncertainty and a scenario in which trade policy uncertainty is present, but in all scenarios the economy is expected to grow.⁴⁹ All values reported are in 2019 \$ and are discounted to reflect the net-present value.⁵⁰

Figure 3.1 and Table 3.1 provide a summary of how the potential trade policy uncertainty during a prolonged renegotiation period may affect UK GDP, based on changes in trade and FDI combined.

Our estimates are based on previous assessments of how trade policy uncertainty may have affected trade and FDI since the 2016 UK vote to leave the EU. For example, our estimates for trade are based on studies that have measured that UK exports (at the extensive and intensive margin) to the EU and the rest of the world are about 13 per cent lower compared to a hypothetical world where the UK voted to stay in the EU.⁵¹ The estimates for FDI inflows and outflows are based on studies by Breinlich et al.⁵² and Serwicka & Tamberi.⁵³ As there is a large degree of uncertainty inherent to any modelling exercise for each of these parameters we follow a Monte-Carlo approach and draw random parameters around these estimates from the literature. That is, for each parameter one thousand samples are taken and separately modelled.⁵⁴

As illustrated in Figure 3.1 and Table 3.1, we estimate that the economic effects of trade policy uncertainty associated with changes in trade and FDI are tangible.

For instance, we estimate that by the end of the initially planned transition period in 2020, based on trade policy uncertainty affecting trade and FDI, the UK GDP would be 0.17 percentage points lower compared to the baseline. This corresponds to about \$5.5bn by the end of 2020. If the renegotiation period was to last longer, by 2025 the estimated effect is a 0.39 percentage point lower UK GDP compared to the baseline. The effect is increasing over time and by 2029, it is estimated to be minus 0.55 percentage points. Using estimates from HM Treasury that 1 per cent of

49 Appendix A describes the economic modelling approach and the associated data sources in more detail.

50 Using a discount rate of 5 per cent.

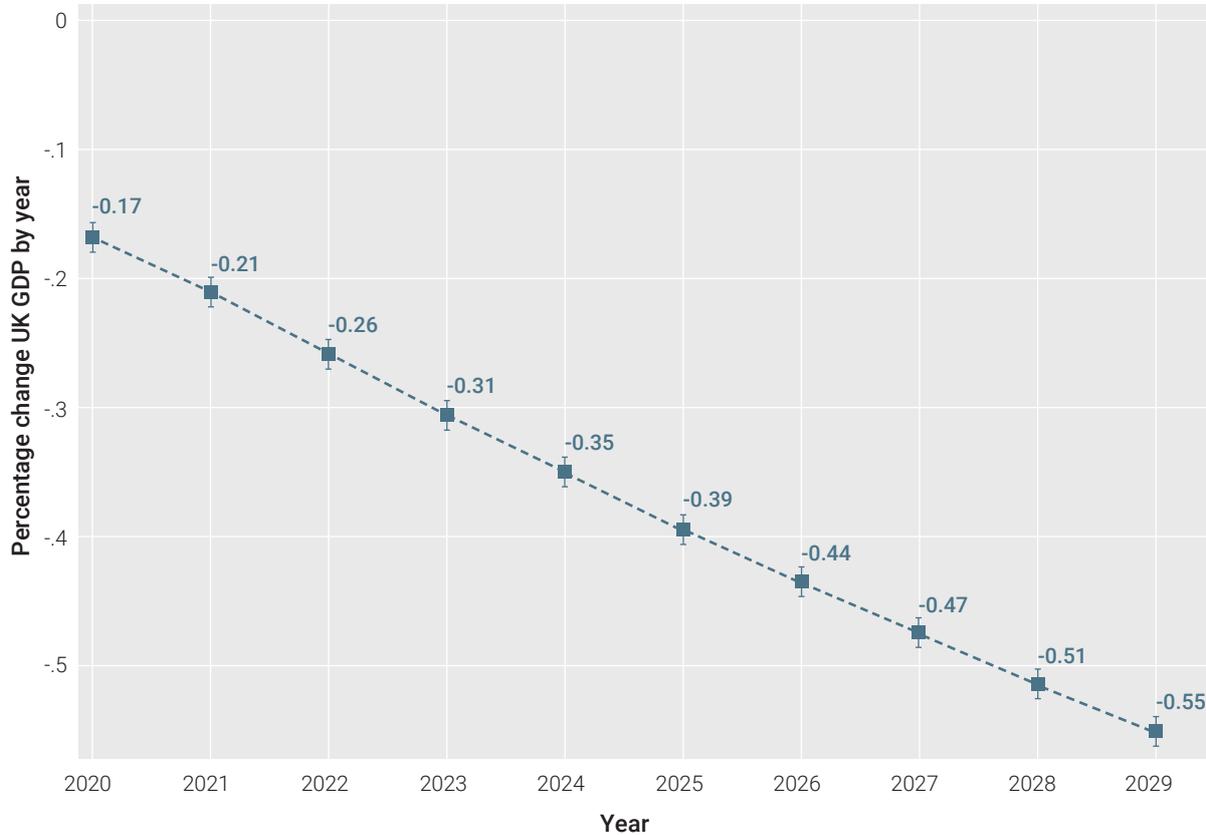
51 Douch et al. (2018a).

52 Breinlich et al. (2019).

53 Serwicka & Tamberi (2018).

54 That leads to a range of estimates and we provide the 95 percent probability that the estimated value lies within the range. Parameters are drawn from a uniform distribution, with thousand draws taken for each parameter. The specific sections below on trade and FDI provide more detail.

Figure 3.1: Summary of estimated UK GDP effects of changes in trade and FDI related to trade policy uncertainty during the UK–EU renegotiation period



NOTE: This figure reports the estimates for the effects on UK GDP by year from a reduction in trade and changes to FDI associated with increased trade policy uncertainty during the potential duration of the renegotiation period between the UK and the EU. The percentage change needs to be read in comparison to the baseline economic projection of the UK. In both scenarios – the baseline and the counterfactual – it is assumed that the UK experiences economic growth, but under the counterfactual scenario with changes in trade and FDI due to trade policy uncertainty, UK growth would be smaller compared to baseline. The figures reflect the 95% confidence interval, reflecting that in 95 of 100 model runs, the estimate falls within this range.

foregone GDP is associated with £7.6bn (\$9.5bn) of extra borrowing annually, then the cost to the UK public finances by 2020 would be about \$1.6bn, increasing to almost \$3.8bn by 2025.⁵⁵

In what follows we describe separately for trade and FDI the assumptions behind analysis and their separate effects on UK and EU GDP and UK public finances.

55

Her Majesty's Government (2016). The same calculation has been conducted by Springford (2019b). We used a UK Pound Sterling to US Dollar exchange rate of 1.25.

Table 3.1: Annual UK GDP and public finances effects of changes in trade and FDI

Year	UK Real GDP						UK Public Finances		
	%	LB	UB	\$ Billion	LB	UB	\$ Billion	LB	UB
2020	-0.17	-0.18	-0.16	-5.49	-5.81	-5.19	-1.60	-1.70	-1.49
2021	-0.21	-0.22	-0.20	-7.06	-7.37	-6.74	-2.00	-2.11	-1.89
2022	-0.26	-0.27	-0.25	-8.72	-9.05	-8.38	-2.46	-2.57	-2.36
2023	-0.31	-0.32	-0.29	-10.67	-11.00	-9.91	-2.91	-3.01	-2.80
2024	-0.35	-0.36	-0.34	-12.06	-12.40	-11.72	-3.32	-3.43	-3.22
2025	-0.39	-0.41	-0.38	-13.86	-14.20	-13.51	-3.75	-3.85	-3.64
2026	-0.44	-0.45	-0.42	-15.48	-15.83	-15.14	-4.13	-4.24	-4.03
2027	-0.47	-0.49	-0.46	-17.02	-17.37	-16.66	-4.51	-4.61	-4.40
2028	-0.51	-0.53	-0.50	-18.56	-18.93	-18.21	-4.89	-4.99	-4.78
2029	-0.55	-0.56	-0.54	-20.32	-20.69	-19.97	-5.24	-5.34	-5.13

NOTE: Entries report the annual GDP effects and effects on public finances (net-borrowing) for the UK associated with changes in UK goods trade and FDI. LB and UB represent the lower and upper bounds of the parameter estimate (95% confidence interval). The values are reported as percentage points difference to the baseline and as \$ values (2019, US Dollar).

Trade

As noted in Chapter 2, UK goods exports (and potentially service exports) to the EU have been smaller in the period 2016 to 2018 compared to a hypothetical world where the UK did not decide to leave the EU. This is despite the fact that the UK had not left the EU's Single Market or Customs Union, and UK goods exporters therefore did not experience any real tariff or non-tariff constraints in exporting to other EU member states.

With regards to the effects on trade, we draw on the findings by Douch et al. that trade policy uncertainty due to the renegotiation period between the UK and the EU has led to reduced trade

at the extensive and the intensive margin.⁵⁶ For instance, UK goods exports to the EU have decreased by about 13 per cent, and goods exports to the rest of the world have also fallen by about 13 per cent since the Brexit vote. The study also finds that the gap between the actual UK export performance and its ‘doppelganger’ version is relatively stable over time. That is, trade policy uncertainty de facto may have acted as a non-tariff barrier to trade and has led to lower UK exports overall.⁵⁷ Note that Douch et al. (2018b) also find a negative effect of the Brexit referendum on the UK’s service exports, not only on its goods trade, showing that not only does the risk of future tariff increases matter, but also the threat of an increase in non-tariff barriers, as there are de-facto no tariffs on services. However, as there is simultaneous evidence that the UK experienced an FDI outflow to the EU mainly in the service sector and hence at least in part, the reduction in UK service exports may have been due to UK firms directly setting up facilities in the EU to circumvent potential future trade barriers and hence by taking into account trade in services and FDI (see next section). In order to be cautious and not double-count some of the effects, we therefore focus mainly on trade in goods and not services. Due to the inherent uncertainty about the trade estimates drawn from the literature, we use the 13 per cent reduction in trade as an upper-bound estimate, and draw related random model parameters for the potential trade effect from a uniform distribution.⁵⁸

In order to examine the corresponding economic effects of changes in trade in the macroeconomic model, we have to transform the percentage changes in terms of trade into an ‘ad-valorem-equivalent’ (AVE), which represents the equivalent of imposing a tariff. In order to translate the trade effect into an AVE we follow the standard technique to estimate changes in non-tariff barriers based on trade effects, by using the percentage change in trade and dividing it by the estimated elasticity of substitution by sector.⁵⁹

Table 3.2 reports the annual estimated changes in GDP and corresponding changes in UK public finance. By the end of 2020 we estimate that UK GDP would be 0.11 percentage points, or about \$3.6bn, lower due to reductions in trade in goods compared to the UK GDP in the baseline scenario. The estimated reduction in GDP could be associated with \$1.04bn extra borrowing by the end of 2020. If the renegotiation period between the UK and EU was to last longer than the initially planned transition period, by 2025 the estimated effect on GDP is minus 0.33 percentage points, or about \$11.6bn. The estimated effect from a reduction in trade increases further, and is minus 0.48 percentage points (\$17.7bn) by 2029.⁶⁰

56 Douch et al. (2018a).

57 See the study by Osnago et al. (2015).

58 With a corresponding range from 0 to 13 per cent.

59 Yotov et al. (2016). Note that the elasticity of substitution by sector represents how domestic consumers substitute between domestic and foreign goods in light of trade cost changes. The elasticities by sector are provided by the GTAP 10 database.

60 We also examined the potential effects on EU-27 GDP of changes in UK exports associated with trade policy uncertainty. The estimates reported in Appendix Table B.1 suggest that the potential losses for the EU, both in relative and absolute terms are much smaller – both in relative and absolute terms – than for the UK.

Table 3.2: Annual UK GDP and public finances effects of changes in trade

Year	UK Real GDP						UK Public Finances		
	%	LB	UB	\$ Billion	LB	UB	\$ Billion	LB	UB
2020	-0.11	-0.12	-0.10	-3.59	-3.89	-3.30	-1.04	-1.13	-0.96
2021	-0.15	-0.16	-0.14	-5.03	-5.32	-4.73	-1.44	-1.52	-1.35
2022	-0.20	-0.21	-0.19	-6.73	-7.03	-6.42	-1.90	-1.98	-1.81
2023	-0.24	-0.25	-0.24	-8.37	-8.67	-8.06	-2.32	-2.41	-2.24
2024	-0.29	-0.30	-0.28	-9.99	-10.30	-9.68	-2.74	-2.82	-2.65
2025	-0.33	-0.34	-0.32	-11.60	-11.91	-11.28	-3.14	-3.22	-3.05
2026	-0.37	-0.38	-0.36	-13.16	-13.48	-12.85	-3.52	-3.61	-3.44
2027	-0.41	-0.42	-0.40	-14.70	-15.02	-14.38	-3.89	-3.97	-3.80
2028	-0.45	-0.46	-0.44	-16.24	-16.57	-15.92	-4.25	-4.33	-4.16
2029	-0.48	-0.49	-0.47	-17.70	-18.03	-17.38	-4.58	-4.67	-4.50

NOTE: Entries report the annual GDP effects and effects on public finances (net-borrowing) for the UK associated with a reduction in UK goods trade. LB and UB represent the lower and upper bounds of the parameter estimate (95% confidence interval). The values are reported as percentage points difference to the baseline and as \$ values (2019, US Dollar).

FDI

As reported in Chapter 2, trade policy uncertainty about the future trade and border arrangements with the EU may have also affected foreign investment decisions by firms, with consequences for UK FDI flows.

With regard to FDI, we apply the estimated parameters on how FDI has changed since the vote to leave the EU based on the studies by Breinlich et al.⁶¹ and Serwicka & Tamberi.⁶² In the model, FDI flows represent changes in the foreign share of capital, altering the overall level of capital

61 Breinlich et al. (2019).

62 Serwicka & Tamberi (2018).

available in the economy. To that end we apply the inward FDI parameter estimates by Serwicka & Tamberi (2018) and outward FDI parameters by Breinlich et al. (2019) with regards to greenfield investments. Serwicka & Tamberi (2018) estimate that UK greenfield inward investments have decreased by about 16 per cent (equivalent of about \$5.3bn). According to Breinlich et al. (2019), UK outward greenfield investments to the EU have increased by about 27 per cent. As it is not fully certain that all FDI greenfield investments by UK firms in the EU would have otherwise been made in the UK, we assume that the increase in UK FDI outflows to the EU was 13.5 per cent,⁶³ with the equivalent value of about \$6bn.⁶⁴ That is, uncertainty around future trade arrangements might be leading to a net-reduction of UK productive capital.⁶⁵ Note that we mainly focus on greenfield investment as it tends to be a true addition to a country's capital stock, whereas mergers and acquisitions often represent only a change in ownership. There is also evidence suggesting that greenfield investments tend to have a more direct growth-enhancing effect, whereas mergers and acquisitions may lead to a productivity increase in the longer term.⁶⁶ In this analysis we only focus on the net-change in UK capital associated with changes in greenfield FDI investments, and do not explicitly take into account any potential effects on (total factor) productivity.

Due to the inherent uncertainty about the FDI estimates drawn from the literature we use the percentage reductions in FDI inflows and outflows as an upper bound estimate, and draw related random model parameters for the potential FDI effect from a uniform distribution.⁶⁷

The annual GDP effects associated with the changes in FDI for the UK are reported in Table 3.3. By the end of 2020 we estimate that UK GDP would be 0.06 percentage points lower compared to the UK GDP in the baseline scenario, corresponding to about \$1.9bn and associated with about \$0.55bn extra borrowing. By 2025 the absolute reduction in UK GDP is estimated to be about \$2.2bn, which corresponds to about \$0.61bn of extra borrowing. Should the renegotiation period last until 2029, it is estimated that UK GDP would be lower by about \$2.5bn, corresponding to about \$0.65bn in extra borrowing.⁶⁸

63 Half of the 27 per cent estimated by Breinlich et al. (2019).

64 Using average greenfield investment project annual transactions and corresponding value per transaction from 2010 to 2019, based on information provided in Breinlich et al. (2019).

65 Note that within the macroeconomic model, capital invested abroad creates capital income through the foreign rent of capital. That is, a net-reduction of UK capital investment due to the increased outflow of UK capital means the capital is not invested in the UK, but yields a return in the form of rental payments.

66 See for instance Harms & Meon (2018). The DCGE model applied for the modelling has no endogenous link between FDI and total factor productivity, and hence we do not take into account the potential positive effect on GDP due to improved productivity. That is, the effects presented in this section are likely an underestimate of the effects of FDI.

67 With a corresponding range from 0 to 16 per cent for FDI inflows and 0 to 13.5 per cent for FDI outflows to the EU.

68 We also examined the potential effects on the GDP of changes in UK FDI flows with respect to the EU. The estimates reported in Appendix Table B.2 suggest that due to some increased UK FDI outflows, the EU would experience an increase in UK capital, but the overall effects on EU-27 GDP are negligible (e.g. increase of 0.007 percentage points compared to baseline by 2025).

Table 3.3: Annual UK GDP and public finances effects of changes in FDI

Year	UK Real GDP						UK Public Finances		
	%	LB	UB	\$ Billion	LB	UB	\$ Billion	LB	UB
2020	-0.06	-0.06	-0.06	-1.90	-1.97	-1.83	-0.55	-0.57	-0.53
2021	-0.06	-0.06	-0.06	-1.96	-2.03	-1.89	-0.56	-0.58	-0.54
2022	-0.06	-0.06	-0.06	-2.01	-2.08	-1.94	-0.57	-0.59	-0.55
2023	-0.06	-0.06	-0.06	-2.10	-2.17	-2.03	-0.58	-0.60	-0.56
2024	-0.06	-0.06	-0.06	-2.15	-2.22	-2.07	-0.59	-0.61	-0.57
2025	-0.06	-0.07	-0.06	-2.25	-2.32	-2.17	-0.61	-0.63	-0.59
2026	-0.06	-0.07	-0.06	-2.30	-2.37	-2.22	-0.61	-0.63	-0.59
2027	-0.07	-0.07	-0.06	-2.35	-2.43	-2.28	-0.62	-0.64	-0.60
2028	-0.07	-0.07	-0.06	-2.43	-2.51	-2.36	-0.64	-0.66	-0.62
2029	-0.07	-0.07	-0.07	-2.51	-2.59	-2.44	-0.65	-0.67	-0.63

NOTE: entries report the annual GDP effects and effects on public finances (net-borrowing) for the UK associated with changes in UK FDI flows (inwards and outwards). LB and UB represent the lower and upper bounds of the parameter estimate (95% confidence interval). The values are reported as percentage points difference to the baseline and as \$ values (2019, US Dollar).

Implications

Our analysis indicates that uncertainty around the future trading relationship between the UK and the EU could have some tangible economic implications for the UK, with the estimated effects increasing with the length of the renegotiation period.

For trade alone, the UK's weaker exporting performance in light of increased trade policy uncertainty during the UK–EU renegotiation period is estimated to reduce UK GDP by the end of 2020 by about 0.11 per cent, increasing to about 0.33 per cent by 2025. That is compared to a hypothetical world where the UK would not be in a renegotiation period with the EU about its future trading relationship, which represents the baseline scenario. The evidence suggests that in light of uncertainty about the final arrangements for trade with the EU, UK-based companies may hold back in introducing new product lines for continental and overseas markets, cut back in

investment in advertising and marketing support, and in the case of agricultural commodities, perhaps reduce planting intentions or livestock herd size. As exports also serve as income source to finance imports, a reduction in UK trade would also mean potentially lower living standards for UK consumers.

Furthermore, our analysis suggests that changes to UK FDI flows (inward and outward flows) have a smaller effect than the trade effect alone. Based on existing research it is assumed that foreign firms, including both EU firms and non-EU firms, are projected to reduce their investments in the UK because of the uncertainties associated with the unresolved nature of Britain's relationships with the EU, which make it difficult to plan or to import or export to or from the EU from UK facilities. Furthermore, there is evidence that UK companies could be setting up subsidiaries in the EU in order to keep market access in continental Europe.⁶⁹ It is estimated that the net effect of a reduction in FDI inflows and an increase in FDI outflows (e.g. measured as capital that would have otherwise been invested in the UK) would be a reduction of annual UK GDP of 0.06 percentage points compared to baseline by the end of 2020.

Taking together the trade and inward and outward foreign direct investment effects associated with prolonged trade policy uncertainty during the renegotiation period, we estimate that by the end of 2020, the estimated effect is a 0.17 percentage point lower UK GDP compared to the baseline, increasing to 0.39 percentage points by 2025. This would correspond to a cost to the UK public finances in terms of extra borrowing of almost \$1.6bn by 2020, and increase to \$3.75bn by 2025.

69 Breinlich et al. (2019).

4 Conclusions – The end of the beginning

A 2017 RAND Europe study on Brexit examined the likely economic costs of the various Brexit scenarios, such as an FTA, a Customs Union, continued membership in the Single Market, or ‘no deal’ (which was termed ‘WTO rules’).⁷⁰ A second RAND Europe study considered the possible effects of Brexit on defence and security cooperation in Europe.⁷¹ Another study, in conjunction with Kings College and the University of Cambridge, utilised ‘discrete choice’ methods to ascertain what the British public really wanted to result from the vote to exit the European Union.⁷²

The past three years of Brexit developments may only be the beginning of a new chapter between Britain and its European Union neighbours. The main negotiation of the future relationship begins now, and it may take considerable time. Accordingly, the present study looks beyond the current 31 January 2020 deadline for Brexit to assess the costs to the British and EU economies of the uncertainty about the final destiny of the UK–EU trade and economic relationship. There has been much focus on whether and when the UK may formally leave the European Union, but relatively little on what happens the day after, and during the extended period of time before new arrangements have been negotiated, ratified and implemented.

Chapter 2 of this study presented background on the debate that took place in Britain once the referendum decision had been taken, how the divided nation came to reject a withdrawal agreement negotiated with the European Union, and how the date of effective Brexit was put back to 31 January 2020. The chapter explored the findings of a number of studies that examined the impact of such uncertainty – mainly on the British economy – during the more than three-and-a-half years between the referendum on 23 June 2016 and the date Brexit is expected to become a reality: 31 January 2020. Using a variety of analytical techniques and data sources, studies have established that the British economy performed relatively worse than its peers during this period. The negative effects have been associated with lower levels of consumption and investment, as domestic investors held off making new commitments. Moreover, uncertainty around the future trading relations with the EU have been associated with higher trade policy uncertainty, potentially affecting firms’ foreign trade and investment decisions; banks, brokers and other service firms moved operations to the continent; and value-added manufacturing chains marked time. For both

70 RIES et al. (2017).

71 BLACK et al. (2017).

72 GRANT et al. (2018).

trade and FDI flows, the existing evidence suggests that the UK would have performed better if it had not voted to leave the EU in June 2016, even in light of the fact that the terms of the economic relationship with Britain's EU partners (and the rest of the world) changed little during this three year period. That is, the expected future increase in trade barriers, either through tariffs or non-tariff barriers (e.g. increased regulatory burden) may have already had negative implications for the UK economy, and may continue as long as the future relationship is not established.

Chapter 3 of this study looked past the expected 31 January 2020 departure date, using a macro-economic model to develop estimates as to the magnitude of prolonged trade policy uncertainty associated with the renegotiation of the UK–EU trading relationship. The trade policy uncertainty in this renegotiation period will not be related to *whether or not the UK withdraws*, but be associated with the *very unsettled nature of the UK's long-term terms of trade* and applicable regulatory provisions for exchanges with the EU, and to a much lesser extent, other major industrial countries. (We assume that, even after departing from the EU, the UK will continue to offer least developed countries one-way tariff preferences on a basis similar to, if not identical with, that of the EU's 'Everything but Arms' initiative.⁷³)

We estimate that the economic effects of trade policy uncertainty associated with changes in trade and FDI are tangible. By the end of the initially planned transition period on 31 December 2020, based on trade policy uncertainty affecting trade and FDI, the UK GDP would be expected to be 0.17 percentage points lower compared to the baseline where the UK was not in a renegotiation period about its future trading relationship with the EU. If the renegotiation period was to last longer, by 2025 the estimated effect would be a 0.39 percentage point lower UK GDP compared to the baseline. The uncertainty effect would be expected to increase over time – should it last to 2029, GDP is estimated to be minus 0.55 percentage points. Using estimates from HM Treasury that 1 per cent of foregone GDP is associated with about \$9.5bn of extra borrowing annually, the cost to the UK public finances by 2020 would be almost \$1.6bn, increasing to almost \$3.75bn by 2025. The estimated effects on trade tend to be larger than for FDI. For instance, the estimated effect of lower UK exports associated with trade policy uncertainty on UK GDP by 2025 is estimated to be minus 0.33 percentage points, compared to 0.06 percentage points from changes in FDI alone.

Our 2017 study estimated the opportunity cost of the UK changing the nature of its trade and economic regime from a frictionless Single Market to a (for example) 'free trade agreement.' We calculated that if an FTA was in effect from the point of UK departure from the EU, at the end of ten years the UK economy would be 1.9 per cent smaller than it otherwise would have been if it had continued as an EU member state. We also estimated that if the UK had no transition or other preferential trade barrier reducing arrangements with the EU (i.e. 'no deal'), UK GDP would be 4.9 per cent smaller than it would have been if it had remained within the EU. The current analysis focuses on the potential additional costs associated with trade and FDI from increased trade policy uncertainty that apply as long as the trade arrangements are unsettled.

The implications of this additional analysis are that in the upcoming phase of the negotiations with the EU, the UK will need to weigh up the potential short-term economic implications of

prolonged trade policy uncertainty if negotiations last beyond December 31 2020, versus the potential negative long-term economic implications of an agreement that is made quickly but lacks the comprehensiveness required for a broad and deep future UK-EU trading relationship. Britain's allies, especially the United States, will also be concerned by a prolonged period of uncertainty about the UK's security and defence relationships with its neighbours.⁷⁴ The prolonged economic implications of increased trade policy uncertainty may also affect Britain's ability to fund defence modernisation initiatives.

In all these senses, 31 January 2020 will be just the end of the beginning.

74 Black et al. (2017).

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Appendix A: The macroeconomic model

Model description

The macroeconomic model used in this analysis is a computational general equilibrium (CGE) model. A CGE model fits economic data to a large set of equations with the aim of capturing the structure of the economy and the behavioural response of its agents, including households, firms and the government, among others. The model provides a framework to simulate the effects of shocks or policy changes and to trace their impact on key economic variables, such as GDP, income, trade, government expenditure, investment, private consumption or inequality.

The economic impact of the economic shock being modelled is estimated by comparing the economy before and after the shock. The output estimates produced by a CGE model set out the potential longer term effects of different 'what-if' scenarios. The analysis is not a forecast of a country's economy over a specific timeframe and does not estimate the short-term transitional impacts associated with business cycles. The output parameters represent estimates of the potential difference to the level of the economy at baseline across a wide set of economic metrics, including GDP, GDP per capita, consumption, consumption per capita, real wages, investment or government expenditure.

The CGE model assumes the underlying economy will grow in the long-run (e.g. due to growth in total factor productivity or technological change), but any shock to the economy will affect the overall growth path. In general, a 'shock' could take many different forms – for instance a change in economic policy – and in the case of this analysis, an increase in trade uncertainty due to the consequences of the Brexit decision.

The pre-shock baseline economic projection is generated by fitting the model equations and the behavioural parameters to the base-year data, with the base year reflecting the current structure of the economy. Each modelled 'shock' is considered to change the composition of different parameters in the model economy – such as labour and capital – and the model economy subsequently responds, adapting to the shock by changing the weights of each of the inputs and adjusting prices and quantities until the system is again in a new equilibrium. The dynamic component in the CGE modelling framework stems from the underlying demographic cohort-component sub-model, which provides the future path of the labour supply within an economy. The labour supply (e.g. for different skill groups) and the overall population stocks in the model are projected into the future using an accompanying cohort-component model. The demographics sub-model makes the model dynamic over time as it predicts the future populations of each of

the countries in the analysis using information on age and gender-specific mortality and fertility rates, as well as potential (net-) migration flows.

Calibrating the model to reflect the UK situation: the data inputs

The base year underlying economic data used for the purpose of this analysis is from the Global Trade Analysis Project (GTAP) database. Overall, GTAP covers 140 countries for 57 GTAP commodity categories, and includes all bilateral trade patterns, production, consumption and intermediate inputs of commodities and services. For the purpose of this analysis, we used the version GTAP 10.⁷⁵ From the GTAP database, we assembled a Social Accounting Matrix (SAM) for the specific countries and regions included in the analysis, including the UK, the EU-27, the United States and the rest of the world (ROW).

The SAM is a complex table expressed in terms of incomes and expenditures, i.e. a double-entry accounting method. GTAP includes SAMs for individual countries, based on national accounts data (e.g. use-supply tables, input-output tables) and information from household survey data and trade data. GTAP collects and coordinates country SAMs from researchers across the world, and cleans and standardizes the data. Furthermore, the GTAP database includes detailed sectorial information for up to 57 sectors, but in order to make the model tractable we followed Her Majesty's Government analysis and aggregated the 57 different sectors into 11 sectors:⁷⁶

- Chemicals, pharmaceuticals, rubber and plastic;
- Machinery, electronics and aerospace;
- Motor vehicles and parts;
- Other manufacturing;
- Agri-food including fisheries;
- Business services;
- Financial services;
- Construction;
- Public administration, defence, education and health;
- Other services;
- Networks.

As described above, the dynamic component of the economic model stems from the population forecasts, which project how the labour supply and the overall population of a country will evolve over time. Specific data for the cohort component population model, including age- and gender-specific mortality rates, fertility rates and (net-) migration rates come from the UN Population Database.⁷⁷

We calibrated the model to reflect the UK economic growth forecast at the time of 2019 with about a 1.5 per cent annual increase in real GDP, which follows guidance from the Office for Budget Responsibility (OBR).

75 Global Trade Analysis Project (2020).

76 Her Majesty's Government (2016).

77 United Nations (2019).

Appendix B: GDP effects for the EU-27

Tables B.1 and B.2 report the estimated changes in EU-27 GDP due to changes in UK exports and changes in FDI, as discussed in Chapter 3 of the report.

Table B.1: Annual EU-27 GDP effects of changes in trade

Year	EU-27 GDP					
	%	<i>LB</i>	<i>UB</i>	\$ Billion	<i>LB</i>	<i>UB</i>
2020	0.00	-0.01	0.00	-0.77	-0.91	-0.63
2021	-0.01	-0.01	-0.01	-1.56	-1.70	-1.42
2022	-0.01	-0.01	-0.01	-2.37	-2.52	-2.23
2023	-0.02	-0.02	-0.02	-3.21	-3.35	-3.06
2024	-0.02	-0.02	-0.02	-4.08	-4.23	-3.93
2025	-0.03	-0.03	-0.03	-4.96	-5.11	-4.81
2026	-0.03	-0.03	-0.03	-5.89	-6.04	-5.73
2027	-0.03	-0.04	-0.03	-6.82	-6.98	-6.67
2028	-0.04	-0.04	-0.04	-7.78	-7.94	-7.62
2029	-0.04	-0.04	-0.04	-8.78	-8.95	-8.62

NOTE: entries report the annual GDP effects for the EU-27. LB and UB represent the lower and upper bounds of the parameter estimate (95% confidence interval). The values are reported as percentage points difference to the base-line and as \$ values (2019, US Dollar).

Table B.2: Annual EU-27 GDP effects of changes in FDI

Year	EU-27 GDP					
	%	<i>LB</i>	<i>UB</i>	\$ Billion	<i>LB</i>	<i>UB</i>
2020	0.001	0.000	0.001	0.099	0.049	0.148
2021	0.002	0.002	0.002	0.392	0.343	0.442
2022	0.003	0.002	0.003	0.506	0.456	0.555
2023	0.005	0.005	0.006	1.021	0.971	1.071
2024	0.005	0.005	0.006	1.005	0.955	1.054
2025	0.007	0.007	0.007	1.440	1.390	1.489
2026	0.009	0.009	0.010	1.887	1.838	1.937
2027	0.009	0.009	0.010	1.640	1.591	1.690
2028	0.010	0.010	0.011	1.789	1.739	1.839
2029	0.015	0.015	0.016	2.723	2.673	2.773

NOTE: entries report the annual GDP effects for the EU-27. *LB* and *UB* represent the lower and upper bounds of the parameter estimate (95% confidence interval). The values are reported as percentage points difference to the baseline and as \$ values (2019, US Dollar).