



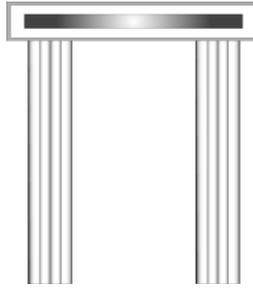
Patrick Minford

The Economics of Brexit

Getting the Best Deal for the UK

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POLITEIA

2018

First published in 2018
by
Politeia
14a Eccleston Street
London
SW1W 9LT
Tel: 0207 799 5034

E-mail: secretary@politeia.co.uk
Website: www.politeia.co.uk

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ISBN 978-1-9999171-0-4

Cover design by John Marenbon

Politeia gratefully acknowledges support for this publication from
The Foundation for Social and Economic Thinking (FSET)

Printed in Great Britain by:
Plan – IT Reprographics
Atlas House
Cambridge Place
Hills Road

Cambridge CB2 1NS

THE AUTHOR

Patrick Minford is a macroeconomist who holds the chair of Applied Economics at Cardiff University. Before academic life he was an economic adviser to HM Treasury's External Division and editor of the National Institute Review. His economic interests include monetary economics, macroeconomic modelling, trade economics and labour market economics. His publications for Politeia include *Trading on the Future: Brexit Trade Options and the UK Economy* (2017) and *Flawed Forecasts: The Treasury, the EU and Britain's future* (2016).

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I

The Economic Gains

Leaving the Single Market and the Customs Union

The Policy

As the 2018 round of Brexit talks get underway, the prime minister has again confirmed that the UK is leaving the single market and the Customs Union. But, as David Davis, the Secretary of State for Exiting the European Union, has said many times and in agreement with other government ministers, the UK is unique and should negotiate its own deal. What should this be and what is the wider context for the UK economy to be borne in mind?

This analysis will explain what the changes to Britain's formal position will imply economically, taking account of what the departure from the EU, the Customs Union, the Single Market and the EU implies for UK GDP and the British people themselves using a World Trade Model tested on the facts of UK trade, to make sure that it is accurate in assessing trade policy effects on the UK. It suggests a picture of prosperity and growth very different to the Treasury's analysis during the referendum debate, and as far as can be seen from the recent leaked extracts, to that by government civil servants for MPs and ministers.

A Changed Context for the UK Economy - the Implications

First consider the gains the UK can expect from leaving the EU's Customs Union and Single Market. The EU's protectionism of food and manufactures raises prices for all those products by an average of 20 per cent over the best available prices in the developed world; it could be much more than that compared with best available in the developing world, especially China (Minford et al, 2015, chapter 4, gives the basis for these calculations; and see also Berden et al, 2009, for direct estimates of non-tariff barriers consistent with these calculations). Eliminating this protection by setting our own tariffs against major world exporters of these products at zero via Free Trade Agreements would give a big gain from the resulting free trade: calculations indicate that consumer prices would fall 8 per cent and GDP be 4 per cent larger. (Minford, 2017a)

The EU's Single Market entails EU regulation across the whole of the UK's economic life- production methods, labour relations, energy market and financial markets - even though only 12 per cent of our GDP is involved in selling to the EU. The rest of the economy sells either in the UK or in the rest of the world. By leaving the Single Market the UK can in time recalibrate that regulation to suit the UK economy, with gains

estimated at around 2 per cent of GDP (see Minford et al, 2015, chapter 2 for basis). The firms in the 12 per cent who sell to the EU would simply need to meet EU product standards, nothing else. Immigration can be controlled, especially of the unskilled where the UK is obliged under the EU free movement within the Single Market to give a 20 per cent wage subsidy to EU immigrants through tax credits (net of taxes paid), housing benefits, and benefits in kind such as education and the NHS (see Ashton et al, 2017, for details). This would give another gain which is particularly significant for poorer households whose wages are also depressed by this subsidised competition. These households in fact benefit on the calculations by around a 15 per cent rise in living standards from the trade and immigration changes.

Any UK trade deal with the EU needs to leave these gains from a ‘clean’ Brexit intact. This is an economic must as well as politically necessary to honour the referendum result. Moreover, for any government at the latter stage of a parliament, it should be a key part of a strategy to boost the economy and demonstrate the future gains to be had from policies that optimistically build on Brexit.

Zero Tariff Reciprocal Agreement – Full Access to the Single Market and Free Trade with the World The simplest EU trade deal that achieves this is a simple zero reciprocal tariff agreement on goods. Since the UK’s product standards are already aligned and since it is to be assumed that rational UK exporters would continue to keep them aligned on their exports to the EU, there can be no ‘non-tariff barriers’ either way. On this basis there would be ‘Full Access’ to the Single Market. Combined with our free trade agreements around the world this would ensure that all goods from anywhere reach UK consumers at the most competitive available prices - giving the trade gains above. Because the UK would be free to regulate its economy as it wished it would also obtain the regulative gains above, and also control its borders.

A Deal on Goods, a Deal on Services?

There continues to be some pressure for the continuation of the Single Market in financial services in order to retain ‘passporting rights’ in some form. The Chancellor has tried to accommodate this by indicating that financial services must be part of a final trade deal ‘with some sort of enhanced equivalence regime’, which will replace existing passporting arrangements¹. In principle, whilst this is a desirable outcome, so long as it is implemented in a way that avoids the UK becoming a rule-taker, economically the City will continue to thrive as the world’s leading financial centre, deal or no deal. It has

¹ <https://www.bloomberg.com/news/articles/2018-01-25/hammond-says-he-s-very-happy-with-where-pound-is-at-the-moment>

been shown that there are various ways to conduct business with EU27 customers from the UK with minimal moves of infrastructure to the EU27 after Brexit (Reynolds, 2017b). Indeed there is no actual necessity for the City to be part of the Single Market. And whilst having an ‘enhanced equivalence’ deal would be preferable this is not absolutely essential either. The sector would also flourish if the UK were its own financial centre, having led the way in framing and shaping much of the international rulebook for financial services.

As the world’s leading financial centre, the City sells in all the major markets of the world without receiving any EU protection. In fact what the EU does and increasingly seeks to oblige its EU member states to do is to put in place a variety of controls for City services, mainly through national regulations of who may sell what in their countries; all that ‘passporting’ does is to reduce some of the national barriers between member states, making retailing within the EU a bit easier. The estimates suggest only around 9 per cent of City business is even in theory affected by passporting (Economists for Brexit, 2016). In practice with most firms the passport is principally used for wholesale business and barriers remain in the retail markets. Firms doing retail business inside EU countries typically use local subsidiaries anyway as ‘work-arounds’ for national regulations.

The City will gain from Brexit through the UK reclaiming financial regulation from the EU; and it will expand as free trade brings down its key input prices, especially land, i.e. rent as an input cost. It would of course be helpful in the EU trade deal if the EU were to agree to broad-based ‘equivalence’ under which both sides recognise each other’s financial standards as adhering to international over-arching principles established by the world’s regulatory bodies (Reynolds, 2017a). This would bring great benefits to the EU in keeping financial markets free within Europe. The EU needs the City which is a significant provider of many financial services.

Should the EU refuse this type of deal and in effect behave in a protectionist self-damaging way, the City would be no worse off in the longer term. In practice, EU business will locate to access the capital and expertise for which London has remained a centre for centuries. The economic model suggests the logic of world market competition will be followed: the City will divert its trade to other world markets, getting the same world prices there as it did before in its EU trade. This simply follows from the logic of world market competition: the EU by restricting its demands for UK financial products in favour of its home producers does not reduce total world demand for these products nor change world supply, so while the UK sells less in the EU, it replaces EU supply in the rest of the world and world prices are the same. Plainly a sensible equivalence deal is preferable as it avoids the short run costs of such ‘trade

diversion’; but these are small and quickly got over. To avoid these rather trivial costs by staying in the Single Market would lose the UK’s large and permanent gains from controlling its regulations and its borders described above. I am not including such routine things as airline agreements, tourism or visa arrangements in this ‘deal’; these are matters of simple cooperation which need to be concluded for ordinary people all over our continent to carry on their lives. Mostly these agreements are concluded within international bodies (such as IATA in the case of airlines). Some such as visas involve bilateral action by governments. In some cases (such as hotel provision) firms simply need to adopt country standards in shaping their products.

By contrast some suggestions that have been made that we should ‘shadow’ EU regulation in full and impose EU customs barriers in a ‘soft Brexit’ are incomprehensible. Nor should the UK agree to align its future laws with those of the EU after Brexit. Such an approach would lose the Brexit gains; and for what? ‘Access’ to the Single Market that the UK would have anyway; and a compulsion to have industrial protection designed for the benefit mainly of continental industries, at the expense of both our and their consumers.

II

The Flashpoints - EU Demands

What to Look Out for in the Negotiations

The key gain for the UK will be getting to free trade - getting trade deals with the non-EU world and the EU - which will, as discussed above, bring both GDP and consumer gains. What might arise during the negotiations which could prevent such a goal being achieved? The most predictable are the prospect of the EU demanding the UK retains current levels of protection against imports from third countries, which would damage this country's freedom to sign optimum trade deals. The EU might also threaten barriers to financial services trade, which under WTO law is prohibited discrimination.

Flashpoint 1 - Continued Protection - Tariff or Regulatory Barriers

Today the EU runs UK tariff and non-tariff trade policies with a high level of protection for agriculture and manufacturing, both of which represent major EU industries with vast lobbying power. Agriculture gets this power via the French government that fiercely protects French farmers; manufacturing gets it through the German government that is itself heavily lobbied by German manufacturers, whether the Mittelstand of small and medium-sized manufacturers or the large multinationals such as Siemens, VW and Bosch. While these producers are helped by such support, UK consumers pay much higher prices than they would obtain on the world market.

It is likely that the EU Commission will be under considerable pressure from both French and German governments and lobbies to force the UK to continue with this protection in the UK market so that UK prices of food and manufactures for EU producers are not driven down by tariff-free imports from the non-EU world. Although the UK will leave the Customs Union, the EU could demand that the UK become part of a new arrangement mirroring the fundamentals of the Customs Union as the 'price' of a trade deal. However, for the UK to allow this would be to lose the trade gains of Brexit-which work by pushing down prices for consumers of food and manufactures and forcing up productivity in both these sectors while also allowing some resources (whose productivity where they currently are cannot be raised easily) to flow to more productive service sectors.

The trade gain has been shown by economic modelling to arise whether one espouses a 'classical' model of trade (as here) or a 'gravity' model, currently favoured by many trade economists. It turns out that the concern 'gravity modellers' had about Brexit was due partly to using not the gravity model itself but various associations in the data that embody a variety of effects of policies and trends over the data period but do not reveal

the effects of Brexit. The other reason for their concern was that they simply did not assume the government's announced Brexit policy of moving to free trade. (Minford and Xu, 2017; see also appendices B-D below.) The recently leaked government figures (Feb 2018) are based on the same inaccurate assumptions (see Appendix A below), but the government has distanced itself from the figures, and pointed out the assumptions on which they rest do not reflect government policy. The government has announced that in any trade deal with the EU (outside the Single Market and Customs Union) it would not reduce its ability to make free trade deals with the non-EU world.

Therefore in principle it could not sign a trade deal that guaranteed continuing the current protection of EU producers, since that would cut across the main feature of Free Trade Deals with the non-EU countries who would want access to our food and manufactured markets at their world prices, facing no protection, whether non-tariff (e.g. anti-dumping duties, quotas, as well as discriminating regulations) or tariff barriers, from the UK. In this it will most likely be opposed not just by the EU during the negotiations but also by large parts of the UK farming and manufacturing industry that also benefit from protection. Such opposition will arise solely from the interest groups in both these sectors, which between them account for only 9 per cent of UK employment. They can and will however ably adjust to the requirements of full world competition by raising productivity in the long term. In doing this they would be doing no more than would be required of them under UK competition law in facing sharper domestic competition. In the short term they have been assisted in this adjustment by the huge boost to their profitability provided by the Brexit devaluation; in addition they have strongly demanded a transition period of no change, which has been agreed. (Minford and Miller, 2017)

Regulation In order to push its case the EU will also link the trade agreement to the role of regulation. By leaving the Single Market the UK can set its own regulation across the domestic economy. Of course any UK industry exporting to the EU must satisfy the product regulations of the EU for the products and only the products it sells to the EU. In principle this is straightforward. The EU has defined product regulations which it must register with the WTO; it can then in a non-discriminating way impose these on all countries' industries exporting these products to the EU. Our industries, like those of Russia or the US or China, will come under these regulations. Producers for the EU market will meet the criteria, just as today for products bound for North America, they meet the regulations for the US or Canada.

Negotiations Nevertheless there are some industries where regulation of exports goes 'behind the border' and is concerned with the circumstances of how they are produced or developed. For example for some foods the EU regulations extend to how the food is

produced; for medicines the way in which they have been clinically tested is subject to EU regulations. In such industries if one wants to export to the EU there is nothing for it but to obey these regulations. However of course there is nothing to stop these industries ignoring these regulations for home production or exports to other countries; they just have to make sure to keep the production processes separate if they do so.

This will be the first flash point of the EU trade negotiations. The EU is likely to press for UK protection and require that it imposes restrictions similar to those now in force under the current Customs Union and align the relevant laws with those of the EU. Unless the UK agreed, the EU could threaten to withhold agreement on export product standards as a means of exerting pressure for it to remain within the Single Market. However in the former it would damage UK interests too badly to be a possible basis for agreement; and on the latter it would be acting illegally.

Flashpoint 2 –Threatening the Financial Sector

By contrast the EU is in general pro-free-market in services. Although the lobbying by certain prominent banks and City firms may have made it seem that the EU provided some protection to the sector, that is not the case. In fact it has mainly been a source of increasingly burdensome regulations, brought in on grounds of social necessity while national governments have been a source of protection for their own domestic service industries.

On the contrary in the area of trade policy the EU has been a source of trade liberalisation in services imports into the EU. For example it has cut back the rights of EU national governments, as explained above, to restrict access for financial services via its ‘passporting’ facility, and it has created competition for airlines across the EU. In general it has favoured competition within the EU. In finance it has championed free capital movements.

This might seem surprising given that it is protectionist in farming and manufacturing. However the political economy of protectionism suggests the reason: the lobbies in services are far less powerful relative to consumer lobbies than they are in farming and manufacturing. The EU does not have large producer interests in services. For example in finance there are few strong producers; such as there are have naturally migrated to London as their base. In travel apart from some remaining inefficient national airlines, such as Alitalia, there is strong competition between airlines whose main interest is in amalgamating and cutting costs so as to compete internationally.

Nevertheless the EU will use any leverage it can find in services to bolster its aims in goods trade to secure as much protection as it can in the UK market.

What leverage could that be? The EU will withdraw ‘passporting’ from UK financial firms after Brexit, which was expected by the UK since passporting only applies within the Single Market. As noted by Reynolds (2017a), there is an effective alternative to passporting - enhanced ‘equivalence’ arrangements. This must be granted if the EU is not to violate the GATS non-discrimination clauses within the WTO. Furthermore most financial services are provided nationally via ‘work-around’ arrangements whereby subsidiaries meet national and EU standards inside the Single Market. As noted above the UK’s Chancellor has indicated that he wants an equivalence regime to be part of the final deal, which would render the EU’s existing equivalence regimes more fit for purpose, more predictable and more mutually beneficial.

The EU, as we have seen above, uses the City to provide efficient financial services and benefits generally from a free market in services. It can only exert protectionist leverage, where it is legal by doing so non-discriminatively, by withdrawing world-class service supplies from its own consumers. By doing so even where permitted legally, it would damage its own businesses.

That flashpoint might however arise, and an EU threat to use such protectionist leverage would lack credibility and should be dismissed by UK negotiators. The UK can move to other arrangements as discussed above. For that Reynolds (2017b) proposes a legal framework which would enable the City in its role as the world’s leading financial centre to continue to attract business from the EU and globally, though an Enhanced Equivalence deal would provide more benefits to both sides.

The No Deal Case

Negotiating Breakdown, Negotiating 'No Deal'

The key factor that determines which side gets the most of what it wants in any negotiation is the breakdown scenario. If one side loses nothing from breakdown, it can walk away from a deal; then if the other side would lose from breakdown, it will have to settle on its opponent's terms. In preparing for the forthcoming round of negotiations, ministers should recognise that the claims or threats which can characterise the EU's negotiating stance may be without foundation, or that they can be dealt with.

Short Term Inconvenience v Long Term Gains

Most of the analysis one reads about 'no deal' simply looks at short term inconvenience and disruption. However, because this is just short term it is not a good guide because the long term net costs or gains are what continue, by definition, indefinitely: hence if one discounts these by a sensible measure such as the long run rate of interest they accumulate to a huge number that totally dominates any short term dislocation. For example if the net permanent gain is £10 billion per annum and the rate of interest is 3 per cent, then the present value of this is $10/0.03 = £333\text{billion}$. That pays for a lot of short term disruption.

Short Term Inconvenience It is possible that if no deal was reached about trade with the EU, then there could be a fair amount of non-cooperation in a variety of areas. However it must be remembered that by law there cannot be discrimination by either side. Also there must be professional, smooth customs clearance again by law. This already happens with no hold-ups, largely by computer. Similarly there must be mutual recognition of product standards, again by law. When it comes to airline agreements these are concluded within international bodies: when there are no EU agreements they must be made bilaterally and a very large number of furious consumers could be involved on both sides.

In terms of general annoyance to consumers, producers and governments on both sides plainly 'no deal' could generate a lot. However this very annoyance and associated illegalities would force a quick series of practical solutions. Public opinion in countries all around the EU would demand that their governments reach solutions rapidly. In fact the pressure would be also felt by the EU Commission exerted by the ministers of national governments via the Council of Ministers, insulated though it is from public opinion. Short term disruption is so infinitely annoying to ordinary citizens that governments on all sides would feel extreme pressure to sort it out by all means available: such means are readily available under international agreements and do not

require a trade deal. Hence under a no deal breakdown short term disruption is a negative for both sides but each side would know it could be quickly removed. It acts as a general moderate incentive to both sides to find a deal but does not affect relative bargaining power.

It might be thought that because the UK has a minority government it is more vulnerable to such disruption than the governments of the EU or the EU Commission itself. However there is no reason to think this. In the event of breakdown where the UK is seen at home as having been 'reasonable' in pursuit of its Brexit aims, as agreed in the referendum, public opinion which wants to see Brexit 'done and dusted' would be sympathetic to the government and likely to support its walk-away stance. In the EU there would be likely to be considerable conflict between governments, many of which individually want to see a deal for their own reasons. The EU Commission wants to see general agreement to make progress on broader union, and so would be uncomfortable with such controversy.

There is a further point of some importance. In virtually all these areas of potential short term disruption it is illegal under international law to cause such disruption. Take the example of customs clearance where some EU politicians have suggested that traffic at ports might become highly congested. Under WTO customs procedures it is illegal for any country not to have a seamless 'virtual state of the art' customs clearance procedure under which ships are cleared via computer well before they reach port. HMRC have said they are entirely ready to deal with the extra customs load after Brexit as is required of them by law; the EU will need also to be ready, by law, to deal in its Channel-facing ports with the increased customs load. Some might say that the EU will be willing to breach international law. However this cannot be the case because all EU procedures are firmly and necessarily based by virtue of treaty on the observance of international law. Imagine if the EU breaks this law: how will it proceed against member countries that breach their EU Treaty obligations? These countries will argue that what is sauce for the goose is sauce for the gander.

Therefore we must take with more than a grain of salt the unfounded claims of those who say Armageddon will break out if there is no deal. It is a grim-sounding threat but in the event the claims do not reflect the position under law.

Long Term Gains What about the long term effects of no deal? Here it is important to use a proper trade model. As noted in Minford and Xu (2017) the classical model passes the test of matching the facts of UK trade, while the gravity model is rejected. Accordingly we will use the classical model.

Under no deal, but one where the UK pursues its planned policy outside the Single Market and Customs Union, of creating free trade by signing agreements with the non-EU world, the key effect is to lower UK prices of food and manufactures and create competition inside the UK economy with these new prices. Plainly with an EU free trade deal with no reciprocal tariffs and other trade barriers, EU goods would also arrive free of any duty or other hindrance in the UK and would also compete with these world prices; we can assume that in order to preserve their sales their prices would fall in line; otherwise they would lose all their sales, which we assume they continue, in order to contribute to their overheads.

For UK producers selling in the EU home competition would force their EU prices to equality with world prices: were one UK producer to get more others would divert output to their market, driving prices into line.

Suppose instead there was no deal and this consisted of existing tariffs being levied mutually by both sides (this in fact is the most likely scenario since non-tariff barriers would be discriminatory, given all export products on both sides satisfy product standards and can be assumed to continue to do so by virtue of industries' own self-interest.) Then the same logic would apply for pricing by EU producers selling in the UK: they would have to match the new competition, so that their UK prices would remain the same as with a deal. Similarly for UK producers selling into the EU; home competition would force them to match home competition with their EU prices. So EU producers would now have to absorb the UK tariff; and EU consumers would have to pay the EU tariff on top of the invariant UK price. Hence the tariffs on both sides would be paid by the EU, the UK tariffs by EU producers to the UK Treasury, the EU tariffs by EU consumers; of course the EU would receive the tariff revenue from its own consumers, making its overall loss equal to the UK tariff revenue- estimated at approximately £13 billion (Protts, 2016).

On top of this the no deal outcome would mean that there would be no UK financial settlement and no transition period. The EU would be short of some £28 billion over the rest of its budgetary septennial to 2020 (with the UK paying two years' contributions at about £14 billion a year); it would also lose the longer term contribution to net liabilities, reported to be worth another £10 billion or so. Also because its customs union with the UK would stop immediately, it would lose two years' worth of the terms of trade gain its producers make on its balance of trade surplus with the UK- estimated at around £18 billion a year: so two years' worth of that would be another £36 billion one-off loss. Some have suggested that the EU Commission would, in a narrow view, welcome receiving the tariff revenue on UK exports, even though this would be being paid for by EU consumers; however this is estimated at a mere £5 billion per year (Protts, 2016),

less than half the loss of the UK contribution. It does not alter the grim picture of no trade deal for the EU.

From the UK viewpoint paying no financial settlement would be a gain, avoiding the need to pay some £38 billion. So with no transition period, free trade, own-regulation and own-border-control would come two years earlier, bringing forward that long term gain at roughly 6 per cent of GDP excluding the budgetary transfer, that would amount to some 12 per cent of GDP; assuming that it would otherwise arrive in 2030, bringing it forward to 2028, when discounted at 3 per cent a year, means it would be worth around an extra one-off gain of 9 per cent of GDP, around £180 billion. It would also gain that tariff revenue paid by the EU producers to the UK Treasury, of £13 billion p.a.; which again, discounted, would be worth some £433 billion.

Benefits – the Breakdown

No Deal outcome: Cash benefits UK

Financial Settlement payment: £38 billion (total saved in present value)

EU Tariff Revenue: £13 billion p.a.: present discounted value (pdv) at 3%=£433 billion

Bring forward Brexit gains by two years: £180 billion (pdv)

Total pdv gained: £651 billion.

Source: discussion in text

Losses – the Breakdown

No Deal outcome: Cash losses EU

Financial Settlement payment: £38 billion (total lost in present value)

Tariff Revenue paid by EU to UK: £13 billion p.a.: present discounted value (pdv) at 3% = £433 billion loss

Bring forward EU terms of trade losses due to Brexit by two years: £ 36 billion (total lost in present value)

Total pdv loss: £507 billion.

Source: discussion in text

It would seem that overall the breakdown of talks would be positive for the UK to the tune of a one-off gain of £38 billion on the EU budget, plus £180 billion from bringing forward the non-budgetary Brexit gains, plus £433 billion from EU tariff revenue, some £651 billion in all. For the EU it would mean a one-off loss of £38 billion in financial settlement, plus another one-off loss of £36 billion in terms of trade gain, plus the permanent loss due to paying UK tariff revenue of some £13 billion a year which at a 3 per cent discount rate would be equivalent to a one-off loss of £433 billion. So plus £651 billion for the UK versus minus £507 billion for the EU: it could not be more open and shut who least wants a breakdown. For the UK a breakdown would be a short term nuisance but a substantial economic gain; for the EU it is both a short term nuisance and a substantial economic loss.

IV Win Win with an EU Canada+ Deal The Benefits

Plainly both the UK and the EU will strive to conclude a trade deal and in the process wrap up many other administrative details of cooperation. Failure to reach a deal will be greeted by incredulity and annoyance by citizens of both sides faced with potential short run disruption. However a breakdown remains possible if either side makes intolerable demands. It is for this reason that this paper presents the calculations about the costs and gains of breakdown, besides the short run disruption that could occur to both sides.

These calculations suggest that the EU has a lot to lose from no deal, while on a purely economic calculus the UK would actually gain a fair amount. This suggests that the trade deal, if it occurs, will be concluded on terms close to those the UK will settle for: namely a Canada-plus zero trade barrier on goods, with the plus of mutual recognition on services. The EU, in its natural desire to nullify Brexit altogether, has suggested there would be difficulties with such mutual recognition; however, ironically, once it recognises that Brexit will occur, it has a strong interest in that arrangement because it favours free trade in services and derives great benefits from its services trade with the UK. Even though the UK itself could be as well off without that element, the UK would naturally be happy to have it in the deal as this would avoid short term costs. As for zero trade barriers on goods, in fact we have seen that the UK would in narrow economic terms be better off without any such trade deal: however, plainly the UK would like to achieve a trade deal for the sake of general goodwill and again to avoid any short term costs, provided it does not obstruct the major gains it stands to make from the Brexit programme.

The UK would remain free to make free trade agreements around the world, to vary its domestic regulation as it sees fit, and to control its borders. In other words it will be free to get on with the Brexit programme, in ways we detail below.

Win Win – UK-EU

The EU will not however have done badly from this Brexit deal. It will still have a highly competitive UK service sector on its doorstep with which it will enjoy uninterrupted free trade- no change there. On farming and manufactures it will have lost the terms of trade gain on its large trade balance with the UK; and its farmers and manufacturers, while maintaining their UK sales, will be getting much less revenue on their UK sales generally, while in compensation its consumers will be paying less for UK goods. This generates more competition within the EU goods market which could be capitalised on by the Commission for its pro-competition policies. Furthermore as UK

regulation flexes it will put pressure on the EU to follow a more flexible regulatory agenda. With the UK taxpayer no longer subsidising unskilled EU immigration as a job market safety valve EU governments will be forced to adopt more flexible labour market policies- long an objective of the EU Commission. Finally the EU Commission buys two years of time to sort out a new budgetary agenda from 2021 onwards. In short while the EU will lose the gains it makes from goods sales at higher than world prices into the UK market and it will also lose the UK's financial budget contribution, there is little it can do about this as it is an inevitable consequence of Brexit which by now is generally realised will happen and must do so in a way that satisfies the referendum demands. However, it will be stimulated by Brexit into a more flexible and pro-market set of policies for the future which could prove a solid indirect gain to the future EU economy.

How to Make the Most of Brexit for the UK Economy

The government rightly says it wants to strike a deal best for Britain – and is not seeking to replicate one of the other models bandied about on news channels, Japan, Norway, Canada, Switzerland. But such circumspection should not exclude the prospect of using the CETA framework to model a Canada-plus deal with the EU which would open up UK policy to boost the UK economy in an exciting way over the coming decade.

First of all, it would allow the UK government to proceed with its announced strategy of Free Trade Agreements around the world, designed to open up the UK economy to free trade and to expand its export reach around the world to the fastest-expanding markets. It also opens up an agenda for the reform of regulation of our economy to conform with our economic interests in pragmatic procedures friendly to business, employment and innovation. Then it allows the government to adopt measures to control unskilled EU immigration, currently subsidised by poor taxpayers in the main to the tune of 20 per cent of unskilled wages.

These measures will boost UK growth in two ways. GDP on EFT model calculations (Minford, 2017a,b) will raise the level of GDP compared with no Brexit by around 7 per cent and will raise government revenue by about 10 per cent. Furthermore it will raise the ongoing rate of growth by a steady 0.15 per cent per annum as it improves the entrepreneurial business environment.

Matters do not end there. As this indicates there is a Brexit Dividend available from these changes. According to our calculations (Minford, 2017b) the government can afford, while still reaching the safe 60 per cent debt/GDP ratio by the mid 2020s, to make tax cuts and spending increases to the tune of £25 billion a year starting in 2020 and a further £40 billion a year from 2025.

Table: The Gains from Canada/CETA-Plus: The Path of Public Borrowing and Debt with the Post-Brexit Fiscal Fund (£ Billion, Current Prices)

Year	Brexit PSBR	+Fiscal Fund	Debt	GDP (Mkt Prices)	Debt/GDP % (ratio without Fund)
2018	32.9		1679	2127	78.9
2019	23.4		1702	2215	76.8
2020	6.4	+25	1734	2310	75.1 (74.0)
2021	-7	+25	1752	2410	72.7 (70.6)
2022	-11	+25	1766	2514	70.2 (67.3)
2023	-24.2	+25	1767	2630	67.1 (63.4)
2024	-29.5	+25	1762	2753	64.0 (59.5)
2025	-39	+65	1788	2891	61.8 (55.3)
2026	-49	+65	1804	3035	59.4 (51.0)
2027	-59	+65	1810	3187	56.7 (46.7)

Note- Public sector net debt (excluding Bank of England operations) estimated at £1646 billion at end 2017-18 FY (in Sept 2017 £1638 billion, source ONS.)

Illustrative Uses of the Brexit Dividend:

From 2020-21 £25 billion per annum could be used as follows:

- corporation tax and the top rate of income tax both cut by 2 per cent, and
- the very top rate of income tax by 7 per cent (to equality with the top rate)
- cost of these £11 billion.
- additional spending of £14 billion, reducing the strains in the public sector.

From 2025, the further dividend of £40 billion per annum could be taken. At this point

- The standard rate could be cut by 2 per cent, at a cost of £11 billion (raising the tax threshold is very expensive and hardly affects any marginal rates, mainly going in the form of lower taxes to the better off, barely helping the less well-off because they lose benefits);
- Corporation tax could be cut another 3 per cent, costing another £10 billion;
- The top rate of income tax could come down by 2 per cent, costing around £3 billion. The remaining £16 billion could be used on public spending.

Source for all above tables: Minford 2017b

A Canada/CETA plus Deal

UK economic gains

GDP Boost – 7% by 2030; Growth- implied extra 0.5% per annum approx over period to 2030. Ongoing growth boosted by 0.15% per annum. Government revenue— 10% by 2030...

Benefits - business, public services, people

By 2020:

Tax Cuts

Corporation tax cut by 2% to 17%

‘Additional’ super income tax rate abolished and the top rate cut to 38%

Public spending boost £14 billion a year, including £5 billion for the NHS.

In 2025 further possible changes

Tax Cuts

corporation tax cut to 14%,

top rate down to 36%,

standard income tax rate to 18%

Public spending

£16 billion boost for necessary infrastructure /other priority public needs.

This would be a programme that would rightly generate huge excitement about the future of the economy and everyone’s living standards. It would put firmly behind us the endless period of depressing ‘austerity’ and usher in an optimistic scenario for the UK as a pioneer once more of open and free markets around the world.

Appendix A

Treasury and Government Forecasts (2018 and 2016) - Comparing Calculations

The Civil Service Brexit Trade Evaluation, February 2018

As part of the Treasury's Project Long Term Fear during the referendum in 2016 its long term report estimated that if the UK left the EU on 'WTO terms' and without any trade deal with the EU it would cost the UK 7 per cent off GDP per annum in 15 years' time compared with no Brexit. A recent 'Civil Service' report (I will assume Dexeu) has taken over Brexit assessment from the Treasury; this was leaked in February. It suggested that the same policy would cost the UK 8 per cent of GDP. Of course accompanying that are different detailed implications for areas of the country and industries, which are equally gloomy and have since also been leaked. Whereas the Treasury's original 2016 report (HM Treasury, 2016) was published and downloadable and still is, the leaked 'report' is insubstantial and certainly unavailable. In fact now the Commons Brexit Committee has published a dozen or so slides with some further details of the Report; but this still does not reveal much of the workings behind the figures.

The leaking and the subsequently published slides has, however, told us some revealing things about it. First of all it uses 'quite different methods' from the Treasury's 'gravity approach'. Readers are led to understand it uses a reputable Computable General Equilibrium Model - probably GTAP, the workhorse created at Purdue University in Indiana that has been developed by multiple universities, government and international agencies since 1992. It is a very large model of the whole world and was used by Open Europe in 2016 via the Ciuriak Consultancy (Ciuriak, Xiao et al, 2015); the one they used had 57 sectors and 28 country groupings and is unlikely to be much different from what Dexeu has used.

So far so good: Dexeu have abandoned the Treasury's gravity approach which was riddled with problems, essentially because it was just a set of correlations and could not properly be used to predict Brexit outcomes as if it was a 'causal model'. Consider the analogy of using the correlations between crime and unemployment to predict unemployment; this would obviously be highly misleading.

However after this the problems begin and there are two main problems with the Dexeu/Civil Service analysis. The main one is the assumptions they have fed into the GTAP model. Many Dexeu civil servants, like those in the Treasury and across much of the Civil Service, are disproportionately focussed on the EU's importance in the UK's trade. They see this in terms of the EU's 'closeness' versus our 'distance' from the rest of the world; and especially in the avoidance of border costs. Both of these ideas are part of the gravity ideas in trade, that distance is costly and that border costs are large because of time to get paperwork agreed before ships allowed to unload.

However these ideas have been bypassed by the progress of technology. First, containerisation has reduced ocean transport costs to trivial amounts. Secondly, computerisation has more or less eliminated border costs among developed countries, since almost all ships are cleared before reaching port, with some 2 per cent or so physically inspected and even this taking only around a day typically. One of the great EU ideas was ‘integration’, to be created by having uniform EU regulation and no borders: today markets and technology mean there is no need at all for the EU ‘state’ to bring out its uniformity stamp any more.

Another of Dexeu’s assumptions is that the UK does not abolish EU non-tariff protection through the Brexit policies of free trade, though the UK would be mad not to. Such non-tariff protection amounts to around 16 per cent on manufactures, a big difference from merely counting tariff protection which on manufactures is less than 4 per cent. Total protection on food and manufactures by the EU is around 20 per cent on both.

Having redone the GTAP trade calculations reported for Open Europe with the right assumptions, the result is a ‘WTO option plus EU Canada-plus trade deal’ gain of 4 per cent in place of the 5 per cent loss for this in the Civil Service Buzzfeed-leaked report- a difference of 9 per cent.

The other main problem in the calculations is with the GTAP model itself. It is a theory-based CGE (Computable General Equilibrium) model, much in principle like the much smaller one that my Cardiff research team uses. However it is vast and it may not model UK trade and the economy in particular very well. No one has tried to test it on the UK, which is the concern in these calculations. However the Cardiff smaller model does fit the UK well (Minford and Xu, 2017) and its tests show it must be pretty accurate. On its assessment this WTO plus EU Canada+ deal generates a gain of 4 per cent, on the cautious assumption that only half of current EU protection would be eliminated by UK trade negotiations with the rest of the world. So with the model that fits the UK experience the gain is as high as the one on the adjusted GTAP model assuming full abolition of EU protection: a gain with the Dexeu report of 9 per cent as before.

So that, in a nutshell, is the position. The old Treasury trade report (2016) with all its gravity correlations is dead. But its Buzzfeed-leaked successor is alive and as misleading as ever, 8 per cent of GDP misleading on the central deal for the UK, namely free trade under the WTO for countries outside the EU together with a sensible EU free trade deal. Since the latest report also gets the whole economy wrong, it also gets all its parts equally wrong in the same pessimistic direction, from North to South and from Wales to Scotland and Northern Ireland.

Appendix B

The Treasury Calculations 2016: Wrong Assumptions, Wrong Results

It is clear that the Treasury and its several institutional acolytes suggested that Brexit would have a substantially negative long term effect, via trade, on GDP- HM Treasury, 2016. Why is this?

One reason lies in the assumptions used by the Treasury. For example, the Treasury assumed that Post-Brexit the government would

- Elect to maintain the EU Common Customs Tariff. This would have the effect of obviating one of the primary reasons for leaving the EU - namely to reduce tariffs with the rest of the world, thereby eliminating one of the major economic reasons for leaving
- Not capture any gains from no longer paying the annual EU budget contribution
- Not pursue any benefits from deregulation
- Not eliminate the taxpayer subsidy to unskilled EU immigrants

Our research has shown that such inputs to any economic model - including our own – will lead to negative economic outcomes. From the viewpoint of trade policy calculations, the first is important, as a key plank of government policy is to pursue free trade via agreements with non-EU countries.

The second reason is that the Treasury chose to employ what has been described as a ‘gravity model’ and to do so in a particularly misleading way. As explained below in some detail, there have been numerous problems in their use of this general framework, both theoretical and empirical. After work over the past year our research team has been able to replicate what a gravity model for the UK would have looked like, how it would have matched the historical facts of UK trade compared with our classical trade model (poorly), and what it would have said about the effects of UK Brexit trade policies (much the same as our classical model).

The conclusion from all this is that the Treasury used damaging policy assumptions out of line with the best clean Brexit policies and pursued a poor modelling procedure. Had it pursued a proper gravity procedure under the best policy assumptions it would have delivered similarly positive results of Brexit to those found by the Cardiff model. Had it pursued the more empirically valid classical model with these policy assumptions it would have replicated our results.

Gravity Models

During the referendum debate and since, the Remain side has relied on a ‘consensus’ of trade economists in favour of the ‘gravity model’. The Treasury’s case against Brexit was based on this, as has been the work at the London School of Economics (LSE) on which the Treasury relied for much advice (Breinlich et al, 2016).

But what is a gravity model? In principle it is a full model of the economy open to international trade, investment and borrowing. It (e.g. Costinot and Rodriguez-Clare, 2014) regards trade as an outcrop of internal trade, the only difference being that it crosses borders. Otherwise trade grows naturally due to the specialisation and division of labour within neighbouring markets. Viewed through the lens of the gravity model, a customs union merely makes official what is already a fact of neighbourly inter-trade. Other sorts of trade, with more distant markets, grow analogously but more weakly, the greater the distance; size of distant markets may make up for their distance to some extent, because they are a ‘neighbourhood’ that naturally leads to inter-trade. ‘Gravity’ in trade creation can be thought of as a function of distance and size. In this view of trade, it makes no sense to put obstacles in the way of trade with close neighbours, such as the EU, in the hope of boosting trade with distant markets via new trade agreements that lower trade costs. The disruption from the former will reduce welfare while the gains from the latter will be small, simply because the reduced trade costs will have little effect in switching demand from existing products in the presence of weak and imperfect competition.

Under this model trade is determined largely by the forces of demand, from neighbours wanting imports and from others modified by the factor of distance - due to transport costs and border costs; competition is rather limited, highly ‘imperfect’, and prices are set by producers as a mark-up on costs, so they move rather little. Once demand has determined trade and the production to meet it, foreign direct investment (FDI) and associated innovation follow it, boosting productivity. In short, while supply is important in this gravity approach, supply is largely determined by the forces of demand.

Because it is hard to break into new and distant markets it makes sense in this approach to support existing markets. Hence leaving the EU will damage existing markets’ demand, so reducing trade and so reducing supply and productivity via falling FDI and innovation. Reducing trade barriers with the rest of the world will only weakly substitute for this loss of demand by stimulating more demand there.

Even though the EU protects its markets via trade barriers, this on the gravity view is good for the UK because it raises demand for our exports within the EU. Hence this school of thought is in favour of EU protectionism - it could be called ‘neo-protectionist’.

In general, free trade, according to the gravity approach, is something that must be evaluated case by case on the basis of its effects on demand for UK products and so the supply side of the economy.

Proponents of this gravity approach claim that it is supported by the ‘facts’ - consisting of many estimated relationships between exports and the GDP of the demanding countries, adjusted for distance. Indeed the gravity ‘model’ is essentially calibrated to replicate these relationships. However, as already explained, we need to allow for a possible problem: that the rival classical model also generates these relationships. Indeed it has routinely been thought by proponents of this rival model that such gravity equations, first estimated by Tinbergen (1962) and well known since, would be implied by the model.

The Classical Model This classical model was developed by the great trade theorists of the past two centuries - starting with Ricardo (1817) - and pursued in much empirical work based on it. The fact that these ideas come from a long tradition of thinking does not of course mean that they are thereby wrong because ‘old’. We have also witnessed an earlier major reversal of classical thought, the Keynesian Revolution, which has now been largely ditched in favour of a return to classical principles.

The classical model assumes high competition across world markets, with world prices being the same across the world subject to transport costs and trade barriers; there is free entry into all industries so that prices equal average costs. Capital flows freely across borders in the modern world version, but each country has largely fixed supplies of other factors, namely unskilled labour, skilled labour and land. In this model, supply forces such as the supply factors and their productivity determine the size of a country's different sectors. The resulting income is then spent according to home demands and the surplus of supply over demand is then exported, the deficit imported in each sector. The model is silent on the allocation of demand to imports and home goods and on the allocation of exports to different foreign markets. However, it would be normal to add on some such allocative model of demand on top of the basic structure.

Thus, it can be seen that the causal structure of the classical model is quite different from that of the gravity model. In the classical model supply determines the essential structure of trade; demand adjusts to be consistent with this. In the gravity model demand determines the structure of trade and in turn forces supply to adjust to this.

How Do Gravity Modellers Implement Their Model? You might think from this account of the gravity model that you would expect to see - at the Treasury and at the LSE - a full computable general equilibrium model of the UK's economy, trade and foreign investment, complete with final demands, markets for labour and capital, and market-clearing, including balance of payments equilibrium. But this is not what you will find.

Instead, there will be some equations for bilateral trade in a lot of different goods with different countries in which GDP at home and in foreign countries figure together with relative prices; then another lot of equations for different countries relating foreign direct investment (FDI) to trade; then yet another lot of equations for UK industries relating productivity to FDI. The ‘model’ generates results by computing what under the first set of equations a trade regime change would do to trade; then this is ‘fed’ into the second set of equations relating FDI to total trade; finally the FDI effect is fed into the last set of equations relating FDI to productivity. The resulting estimate of the productivity effect of the trade regime change is then put into a model of the economy. This procedure can be found in the Treasury’s long-term assessment of the effects of Brexit. The LSE pursues a broadly similar methodology.

So far so reasonable, you may say. However, notice that there is no model here of the UK trade and economy interacting as it were from top to toe. What we have is one set of empirical associations between trade and trade regimes; another set of associations between trade and FDI; then another set of associations between FDI and productivity. Only at the last stage when all this has been computed from these associations is a model brought in, where productivity is inputted into a standard ‘macro’ model where the origins of trade and its interactions around the economy are not included. While all the empirical associations are based on data, they do not tell us what the causal origins of these associations are. There could be reverse causation (FDI could cause trade or productivity cause FDI; trade regimes could have been caused by closer trade), or simultaneous causation by a third factor (better policies could have led simultaneously to more trade, more FDI and more productivity). Association as is well known does not imply causation.

To reinforce this idea of how wrong it is to use associations to predict outcomes of policy changes, think about penal reform and all the associations that exist between penalties, crime, unemployment, and rehabilitation. What is causing these associations? Is it penalties reducing crime? Or is it crime increasing penalties (via popular demands)? Is it unemployment increasing crime? Or is crime raising unemployment (because crime pays better than employment)? Is rehabilitation reducing crime or crime reducing rehabilitation (again via popular frustration)? All these causal processes may be going on and must be allowed for in a full ‘underlying set of relationships’, often known as a ‘structural model’. Such models must be tested to see which of them gets close enough to explaining or ‘matching’ the associations; the one that does can then be used to predict the effect of policy reform, in the knowledge that it is most likely to embody the full causal processes at work. By this means we can see what the reform will do to crime after allowing for all its effects through the full network of relationships.

Gravity trade economists dismiss these objections as nitpicking. They think they ‘know’ what the causal processes are and their estimates give these a concrete numerical reality; all this empirical evidence makes their case a shoo-in. However, for those who are more sceptical, such as those who espouse the classical model, there is a serious question of interpretation. They would like the gravity modellers to write out a complete system of causal equations that they believe and set them side by side with a rival system such as the classical model. Then we could check which of these two systems comes closest to implying all these associations we observe - more precisely since this is about Brexit, implying the associations we find for UK trade and the UK economy, i.e. the ‘UK trade facts’.

The ‘dark secret’ of gravity modelling and Brexit is that no gravity modeller has done this and that hence: **THERE IS NO GRAVITY MODEL**, either at the Treasury or at the LSE. There is in existence at the Treasury (see appendices to HM Treasury, 2016) and the LSE (see chapter 2 of Breinlich et al, 2016) no complete gravity trade model linking all goods, labour, capital and land markets into one (UK) ‘economy’ linked to the rest of the world. Nor by implication has anyone in either place asked whether such a model would fit the UK trade facts; it simply has not occurred to them to build the model or to ask it this question.

It is important to understand what these gravity modellers have done. They have used the argument (based on work by Costinot and Rodriguez-Clare, 2014) that if one did have a gravity model, including cost, price and consumer demand equations, one could arrive from this at associations between GDP, traded prices and trade- the ‘gravity equations’. So far, so correct.

They have then used these associations - their so-called ‘state of the art’ model of international trade relationships - to predict how trade would move if trade barriers were changed. This is where we meet the problem. The problem is twofold. First, some other model may also generate the very same associations, but with a quite different causal interpretation. Thus it may be quite wrong to use these equations to predict trade, as if they work according to the logic of the gravity model. For, as we have seen, the classical model may be generating these associations: if so, the effects of the trade barriers would work differently, with possibly different results.

The second problem is that, when these associations are used, it is assumed that the GDPs and prices (and costs) in the equations can be held fixed. This assumption is not warranted. GDP and prices/costs will react to trade regimes indirectly.

Without repeating the same critique in detail we can say that exactly the same problems apply to the other steps used by gravity modellers. The next steps are to use associations

between FDI and trade; and then associations between FDI and productivity. Again these associations are justified as being generated by some causal chain in the gravity production relationships; such a chain is largely asserted at this time, as there is no good theory for why FDI in particular is either linked to trade or to productivity, as opposed to capital in general, linked to them by the usual marginal productivity theory. In this case, the causation may run from productivity to both trade and FDI. In addition, the same argument applies as above: that other elements in these associations respond also to trade barriers indirectly. So they should have used not the associations but the underlying causal model; and again they should have tested it against rival models that could also produce these associations.

What these gravity modellers should have done, according to standard modelling practice, was to use a full gravity model of the UK economy ‘from top to toe’ to assess the effects of the trade regime changes. Furthermore, they should have tested this model against the facts of UK trade and shown that they fitted. It is one thing showing that ‘gravity equations result from’ the gravity model; what we need to know is whether the data-based gravity equations and other key trade associations in the data could have been generated with some numerical accuracy by the gravity model. The gravity modellers should then have compared this with a similar test of the ‘classical model’ (which indeed also generates gravity equations and other data associations).

Gravity and Classical Trade Models – Tests, Checks and Policy Implications To make some progress on these issues, our research team has spent a year doing this work on a gravity model of the UK. We took a full classical trade/economy model and adjusted it for gravity assumptions: first, imperfect competition and second an effect from total trade to productivity (via FDI). What we found is detailed in Minford and Xu (2017).

We found that the main UK trade associations on their own are broadly accounted for by both the classical and gravity model, though the classical is slightly more probable. But when you add in the associations with labour market developments, which strengthen the test, the gravity model is statistically rejected while the classical model survives the test.

But perhaps more important for policy - since for all the statistical tests in the world, we can never know for sure which model is really true - when we put the assumption of free trade into the gravity model it produces the SAME answer for the effects on UK welfare and GDP as the classical model.

What this means is had gravity modellers used the true underlying causal model of trade and the economy, together with the full free trade assumptions about policy, to compute the effects of Brexit they would have come to a strongly positive conclusion about post-Brexit economics, as we did. The reason is clear: even in the gravity model general free

trade lifts all boats: that is, lowers consumer prices and stimulates resource movement to the more productive sectors.

The policy simulation, under which free trade agreements are made with all including the EU, assumes that EU producers match the fall in price in the UK market to avoid a catastrophic loss of market. But, even if it is assumed they keep their prices higher than this and so experience a loss of trade share to rest of the world (ROW) competition, there is simply a shift of trade away from the EU within each sector, which is offset by a rise in trade with others, so that total trade remains unchanged. In this case, which corresponds to the no-EU-deal assumption discussed above, there would be some minor loss of welfare but the Brexit assumptions would not be triggered, so that one obtains the same result again as in the classical model.

Notice that when discussing the no-deal assumption above, we argued that even under no EU deal it was more likely that EU producers would drop their prices in the UK market to match the competition; so even under no EU deal we consider the most likely result to correspond to full free trade.

In conclusion, gravity modellers did not do their job properly and produce/use a full causal model in their calculations. Such a model, had they used it, could have been shown not to fit the UK trade facts well statistically; but it would also have supported the Government's free trade Brexit policies strongly, to the same extent as the classical model.

Appendix C

Trade Modelling – The Policy Assumptions by Economists for Free Trade

Our basic set of assumptions for the ‘free trade scenario’ is FTAs with the rest of the world which imply no tariff or non-tariff barriers on our imports from them. Also an FTA with the EU which implies the same. Both classical and gravity model then give a solution in which UK prices on food and manufactures fall 10 per cent (the amount of long term EU total protection assumed) on imports, exports and home consumption.

This also includes services, where there has been no EU protection hitherto; indeed rather the opposite as the EU has tried to reduce national barriers to services trade via e.g. the aviation agreement and ‘passporting’ for investment banks. We assume that the FTA with the EU includes an ‘equivalence’ arrangement similar to passporting.

No Trade Deal

Our ‘No EU trade deal’ assumptions include the assumption that the UK concludes a wide range of Free Trade Agreements with the rest of the world (ROW). For EU trade we assume that competition in the home market drives EU import prices of food and manufactures to equality with ROW and home prices; UK export prices to EU fall similarly. In the classical model this happens via the process of perfect competition. For EU export prices to UK we assume that the EU retains its UK market share via discriminating export pricing- in effect facing an ‘infinite’ demand elasticity in the UK market.

As a result the No Deal solution is the same as the free trade scenario solution. However tariffs are charged by both sides in EU-UK trade. These would average around 20 per cent on food and around 3.5 per cent on manufactures. One can see that the UK tariff reduces EU export margins while the EU tariff raises EU consumer prices. It follows that No Deal damages the EU but not the UK- another illustration of the ‘importance of being unimportant’ in trade.

In this No Deal scenario we assume that there is no basis for either side to impose non-tariff barriers since both will trade products that meet the other’s product standards as notified to the WTO. We assume that this continues indefinitely on the basis that exporters will always produce in conformity with their export market’s standards.

Are there ‘on-off’ standard barriers imposed under No Deal? We assume that standards involved in such products as chemicals, medicines are negotiated as above- namely that both sides adhere to product standards of the other for exports.

We assume customs procedures and mutual recognition proceed as mandated by WTO rules: namely customs must be state-of-the-art (almost entirely ‘virtual’) and mutual recognition of the UK would have to be the same as that of any third country under non-discrimination rules.

What about services in a No Deal scenario? Here it is possible that the EU will not make equivalence available (though it must do so in a non-discriminatory way under the GATS). However, other important countries are involved in this such as the US and other financial centres, with further interest from the BIS as the general international regulative banking authority. Therefore we assume nothing much will come of this because of retaliatory threats from around the world to EU financial institutions. For aviation we assume that current agreements continue in some form or other- while outside the GATS and under IATA the pressure here will come from citizens on both sides.

The Effects on Trade Volume

In these Brexit policy simulations the direct impact of Brexit falls entirely on prices, and there are no direct effects on trade volumes. Once one includes effects on sectoral output and factor prices, there are indirect effects through these on trade flows. However the effects of Brexit on total trade relative to GDP is rather small as is revealed by the Brexit simulation on the gravity model, which despite including an effect from total trade on productivity is little different from that on the classical model.

All this is happening because Brexit is a large shock across two main sectors, food and manufacturing, and across three main suppliers, EU, non-EU world, and UK. The equilibrium response of these suppliers is to lower UK prices in parallel, so that their relative ‘competitive position’ is unchanged, according to these two models.

Appendix D

Trade Analysis by Economists for Free Trade – an Outlier?

The first point to note is that EFT are not the only group to find that Brexit would have a positive long term effect under favourable policy assumptions. One was Open Europe which used the GTAP CGE model from Purdue, just as the Dexeu/Civil Service latest analysis has now done; also as noted by Whyman and Petresku ('The economics of Brexit', Palgrave, 2017), there were a large number of differing assumptions used in obtaining generally negative effects of Brexit, some of them short term about uncertainty, some on migration, some on regulation, that were not simply about long term trade effects.

Nevertheless where long term trade effects were computed they were generally found to be negative under the WTO option of free trade under WTO rules.

These negative effects came from some combination of 1) a different CGE trade model 2) the observed associations coming from some CGE trade model and 3) a different set of policy assumptions, from those used by EFT. Without access to the full CGE Gravity model through which we could put our own policy assumptions, EFT could not determine which of these was creating the difference until now. We can now explain, using the Gravity model we have created to include the underlying mechanisms the Treasury and most other groups have claimed exist: namely imperfect competition and a channel from total trade to productivity.

What we can now say is that the difference with the Treasury came not from a different CGE model, 1), but from some combination of 2) and 3). In our discussion we use the Treasury as the comparator; we have been unable to examine in detail all the other modellers' activities.

We can make the following statements:

- a) had the Treasury used the Gravity model in its CGE form, and applied to it the WTO assumptions plus an FTA deal with the EU, our basic 'free trade' assumptions, then it would have found a gain, just as we have.
- b) had it used the assumptions that there would be no FTAs with any country but the status quo with the EU, then it would have found no change on the Gravity CGE model. This is essentially the 'soft Brexit' assumption.
- c) had it used No Deal assumptions as here with Free Trade then as we have seen it would have again found a gain as we do.
- d) had it used no FTAs with any country and No Deal with the EU, it would have found no change using the Gravity model, just as we do on the classical model.

Hence in a fundamental sense the Treasury's negative conclusions for the WTO option with No Deal must result either from different policy assumptions rather than from using the CGE Gravity model or from using the associations found in the data coming from whatever model was generating them. They cannot come from using the Gravity model rather than the Classical model, as these do not give any difference.

What Lies Behind the Treasury's Relative Pessimism to Policy Assumptions? Which combination of these two other things was going on? These associations will give misleading effects, as we have explained.

We can use the one policy assumption case, b), where we find on the CGE Gravity model, no change, but the Treasury found a loss of 4 per cent, to 'decompose' the two effects. It would seem that, holding the policy assumption of status quo the same, the Treasury found a differential loss of 4 per cent due to using the data associations.

Turning to the 'WTO option' as defined by the Treasury, viz no FTAs with non-EU countries and No Deal with the EU, the Treasury finds a loss of 7 per cent against our finding on our model and the gravity CGE model, of no change. This 7 per cent difference on the same policy assumptions now comes from the Treasury's use of associations rather than the Gravity CGE model.

So we can conclude that between 4 per cent and 7 per cent of the Treasury's long term relative pessimism on trade effects comes from using associations instead of the underlying or 'structural' CGE Gravity model. Assuming no FTAs with the non-EU world adds a further 4 per cent to its pessimism. The total relative pessimism of the Treasury on long term trade effects of the WTO option (with no EU trade deal) of 11 per cent comes 7 per cent from using associations, 4 per cent from assuming no FTAs with non-EU countries.

The total relative pessimism on 'soft Brexit' of 4 per cent comes entirely from using associations in place of the CGE model.

Why Exactly was EFT an Outlier? In sum then why is EFT an outlier? The reason is two fold.

First we use a CGE model in place of associations. It turns out that for Brexit it would not have mattered had we used a CGE Gravity model in place of the Classical model. What matters is using a CGE model instead of associations. Using associations the way the Treasury did, added 4-7 per cent to its pessimism.

Second we used the assumptions under the WTO option of FTAs with the non-EU world and the Treasury did not. By not using this assumption the Treasury added 4 per cent to its pessimism.

Finally why did the Treasury and several others (not all by any means- Open Europe and PWC both used various CGE models) use associations instead of the Gravity CGE model? The reason is that there has been a rising school of thought in the past decade or so among trade economists that this can be justified. They have argued a) that there is a structural Gravity CGE model but that b) it gives rise to robust associations at the level of micro industrial behaviour and that c) these can be used for prediction. However this approach is intellectually flawed on the grounds we have explained and now demonstrated: you do not get the right Gravity model predictions of a Brexit policy change from using these associations. Nor are we alone in applying this critique among trade economists, as is shown by the widespread use of CGE models among the various modellers in the ‘consensus’ and latterly by the decision of Dexeu/Civil Service to drop the ‘gravity approach’ of associations in favour of a CGE model.

There is an irony in all this. Much energy has been spent on both sides of the debate arguing the relative merits of the Gravity and the Classical models. Yet this issue turns out to be irrelevant to Brexit! Yes, the Classical model fits UK trade facts the better of the two when all relevant shocks to UK policies and other things are taken into account; but had the protagonists used the less appropriate Gravity model correctly and with the right policy assumptions they would have reached the same conclusions as we did about the particular Brexit policy shock.

From now on it becomes really important in our negotiations with the EU for all researchers to compute best policies using both the correct CGE approach and also the correct assumptions about HMG policies.

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Alternatively, there might be no trade deal. But this option would be expensive for the EU. Their producers would pay tariffs to the UK of around £13 billion a year. The EU Commission would not receive the UK financial settlement of some £40 billion. Moreover, Brexit would start two years earlier than now planned, with the EU losses entailed in that. For the UK, there are mirroring economic gains. But the EU losses imply that it too is not on the table.

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