



Two Tests for UK Trade:

Does seamless, tariff-free trade boost exports and does distance matter?

Phil Radford

CIVITAS

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Introduction

From June 2016 to December 2019, debate about the UK's future trade policy was dominated by two assertions. First, that tariff-free trade with the EU was the optimal arrangement for UK exporters; second, that trade grows fastest with countries that are nearest. The UK Treasury built these assertions into forecasting models and used them to predict the likely impact of potential trading relations. Neatly, these models predicted an increasingly negative impact on UK trade, the further that UK policy diverged from seamless, tariff-free trade with its nearest neighbours. In December 2020, the UK left the EU Customs Union on the second-least-worst terms. According to HM Treasury forecasts models, only a departure on World Trade Organisation (WTO) terms would deliver a worse long-term outcome the UK economy.

But does the recent history of UK trade corroborate these two assertions? Do 'seamless, tariff-free trade' and 'proximity' significantly impact UK trade? If they do, which sectors are affected the most, and do exports react the same as imports?

The topic is a source of academic dispute. Several economists have repeatedly questioned the accuracy of official trade forecasting models, including Graham Gudgin of Cambridge University and Patrick Minford of the Cardiff Business School. Especially prior to 2019, they questioned the prominence given to 'Gravity Theory', which predicts

that trade between countries increases with geographical proximity. And they have asserted that economic models exaggerate the benefits of seamless, tariff-free trade. There is factual cause for concern. During the final two decades of UK membership of the Customs Union, goods exports to the EU stagnated, while exports to distant, non-EU markets grew by a compound annual growth rate of 2.6 per cent, once precious metals are extracted from calculations. And during this period approximately three-quarters of the UK's non-EU trade was conducted under what are thought to be least-favourable terms – that is, according to WTO rules.

The issue of what drives British exports will now become a central feature of UK trade policy. The UK wants to grow exports and reduce import dependence in critical industries. It has also just regained sovereign control over trade policy. The UK Government has ambitions to join the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), which includes Canada, Australia, New Zealand, Japan and Southeast Asia countries. Without a clear idea of what drives UK trade performance, however, trade negotiators and industrial policymakers will be flying blind. Besides, the UK's continuity EU trade agreement is already subject to ill will, accusations of non-compliance and political tension in Northern Ireland. The price that the UK pays to keep that trade agreement is already high. As its liabilities accrue, calculating its real value to UK companies will be an ongoing endeavour.

This short research report takes the two basic precepts on which orthodox trade forecasting models are built and tests them against actual UK trade performance for the period 2000–2019 using Office of National Statistics (ONS) data published in February 2021. It asks two questions:

- Did UK goods exports demonstrably benefit from seamless, tariff-free trade with the EU Single Market. If so, which sectors delivered the best performance?
- Did UK exports perform better with large trade partners that are geographically close to the UK?

To test the first assertion, this paper will compare the performance of the UK's 14 largest manufacturing export sectors in EU and non-EU markets from 2000-2019. It will note whether companies in each sector enjoyed a commercial advantage in EU markets given the extent of the EU Single Market, and the tariff advantage gained from the Customs Union. It correlates the theoretical benefit of seamless EU trade with the actual export performance of each of those 14 sectors. It uses a comparative performance metric to account for the fact that some manufacturing export sectors are faster growing than others. Together, these 14 sectors delivered 93.2 per cent of UK manufacturing exports in 2019, or 79.1 per cent of goods exports. So, the test is comprehensive.

The correlation reveals whether there is any direct link between the presumed advantage of seamless trade with the EU and the proven ability of UK exporters in major manufacturing sectors to increase exports. It illuminates whether the preservation of seamless, tariff-free trade with the EU is necessary, irrelevant or even counterproductive to the UK's ambitions to increase exporters.

The second test examines distance as a factor in export performance. The challenge here is that the economies of UK trade partners in the EU are slow growing compared to trade partners elsewhere, especially in the Asia Pacific. So, a straightforward comparison of bilateral growth rates with geographical distance says little. Instead, the test will calculate how fast UK goods exports grew to the UK's 40 top

export partners once those partners' individual economic growth rates are taken into account. Then it will correlate individual export performance against the distance of each trade partner's distance from the UK, using a metric called 'economic distance'. This illuminates where the UK should focus its trade policy endeavours.

This research builds on the detailed, sector-by-sector analysis of UK trade published by Civitas in April, *Lessons learned for a Global Britain: UK manufacturing 2000-2019*. It is not a test of trade forecasting models. It is an empirical test of whether the conclusions drawn from those models by expert commentators matches the actual performance of UK trade during the last two decades of the UK's membership of the Customs Union. It pits the theoretical assumptions that underpin UK trade policy against the recent historical data. Its purpose is to discover what factors help to grow British exports – and as importantly, what factors do not.

1.

The academic debate on trade forecasting models

The EU referendum ignited debate on the UK's optimal trade arrangements. From early 2016 to the end of 2020, pro- and anti-Brexit arguments on trade hinged on the supposed importance of two factors: seamless market access and geographical proximity. Pre-referendum, officials and most trade-forecasting economists argued that the UK's prime interest was in preserving seamless access to its nearest markets. Post-result, this consensus urged the UK to remain in the Customs Union and Single Market or retain the closest links to it. The worst outcome for the UK – according to this view – would be a clean break from the EU, and trading on World Trade Organisation (WTO) rules.

The UK Treasury published and updated several official forecasts as negotiations proceeded. These forecasts informed public policy and public debate. For example, in November 2018, the Treasury forecast asserted that:

- An exit from the EU on WTO terms would cause a –7.6 per cent impact on UK GDP over 15 years.
- A free trade agreement (FTA) with the EU would have a –4.9 per cent impact on UK GDP.

- Membership of the European Economic Area (EEA) and alignment with Single Market Rules would have a –1.4 per cent impact on GDP.
- Remaining within the Customs Union and Single Market would have none.¹

This forecast was neat and logical. The further the UK deviated from seamless, tariff-free trade with its nearest neighbours, the greater the negative impact on UK trade and the greater the cost to the UK economy. The ordering of these four options never changed, in the sense of how harmful they would prove to the UK economy. By Treasury reckoning, the UK settled for the third-worst option.

Table 1.1: UK goods export performance, 2000-2019

Trade partnership type	CAGR goods exports 2000-2019	% of 2019 non-EU goods exports	% of UK goods exports 2019
World Trade Organisation	2.8%	79.4%	41.8%
European Free Trade Association ³	1.7%	6.1%	3.2%
Free Trade Agreement with UK ⁴	1.4%	6.2%	3.3%
UK's top 40 non-EU export partners	2.6%	94.0%	49.5%
European Union	0.1%	N/A	47.4%

Source: ONS: UK Trade in Goods – All Countries – Annual Exports. January 2021.

Trade in precious metals is extracted from the data. Turkey is not included in any group, as that country was in a hybrid customs union with the UK during this period. It delivered 1.2% of UK goods exports in 2019, and partners not included took 3.1% of goods exports.

GDP figures taken from World Bank trade data with estimates for Taiwan.

But the UK's actual goods-export performance over the past 20 years reveals almost a reverse set of outcomes to the ones predicted by official forecasts. Analysis of UK trade with all EU partners and the UK's top 40 non-EU partners – covering 97 per cent of goods exports in 2019 – shows that exports to WTO partners grew fastest during the period 2000-2019 and exports to the EU grew slowest.² And note: the UK's trade in goods is the sector where changes in tariffs

and alignment to Single Market rules hit home. Goods comprised 58 per cent of all UK exports to the EU in 2019. Financial services delivered just eight per cent of exports to the EU in the same year.

The obvious explanation is that the results are skewed by differing economic growth rates. As measured by gross domestic product (GDP), the economies of the UK's non-EU trade partners grew far more quickly than EU economies during this period.

This is true, but it doesn't account for the whole 2.6 percentage points (ppts) that separated the long-term growth rates of UK exports to EU and non-EU partners up to 2019. In *WTO versus EU: an Assessment of the relative merits of the UK's trade relationships*,⁵ Michael Burrage and the current author demonstrated that the compound annual growth rate (CAGR) of goods exports to the UK's top 14 EU partners underperformed those EU partner economies by -0.76 ppts from 1999-2018. Conversely, UK goods exports to the UK's top 14 WTO partners outperformed WTO partner economies by 0.3 ppts. In other words, even after economic growth rates were taken into account, UK goods exports to WTO partner countries still grew faster than to EU partners.

Moving the time period on one year changes the results slightly. A spurt in export growth in 1999 falls out of the equation, lowering CAGRs exports to the EU and to non-EU partners even more. But the fundamental difference in export performance as between EU and WTO partners remains. In this 2000-2019 period, good exports to WTO partners underperformed WTO partner GDP growth by -0.46 ppts. But goods exports to EU partners underperformed EU partner GDP growth by 1.36 ppts. Exactly as in the Burrage-Radford study, goods exports to WTO partners grew

approximately 1 ppts faster, per year, than to EU partners – *after* economic growth rates are taken into account.

The chronic underperformance of UK exports to the EU was absent from debate on the UK's optimal post-Brexit trade relations with the EU. This was odd in itself, given the national angst triggered by the prospect of a breakdown in negotiations. But a small number of UK-based economists did detect that UK trade was behaving quite strangely – and not at all as most forecasting models predicted. This mattered, because forecasting models were being used to determine the UK's strategic options for post-Brexit trade relations with the EU, including the wisdom of exiting without a deal.

David & Goliath: the 2016-2019 tussle on UK trade forecasting

From 2016 onwards it fell to a small grouping of dissident economists to challenge official UK trade forecasts. Most were proponents of 'free trade' – the branch of classical liberal economics that favours minimal or zero barriers to trade. These free trade-leaning economists argued that the importance of geographical proximity and seamless access were overstated in most trade-forecasting models, including those used by the Treasury. Specifically, they warned of the dangers of using Gravity Theory as a basis for modelling economic forecasts.

A brief overview of Gravity Theory helps to explain why distance, tariffs and regulatory alignment are relevant to the formulation of UK trade policy. In simple terms, Gravity Theory asserts that the closer the geographical proximity of two large trading partners, the greater the gravitational 'pull' of trade. Essentially, trade is determined by the size of two economies and the distance between them. The theory

has evolved since it first appeared in 1962 to include multiple factors such as common borders, a common language and migration. It has spawned a vast academic literature and is supposed to be the most-used model in international economics.⁶

For all its complexities, the practical implications of Gravity Theory are straightforward. Forecasts based on Gravity Theory invariably suggest that countries' best economic interests are to maximise trade with countries that are geographically close. Conversely, Gravity Theory suggests it makes no sense to expect free-trade with distant partners to compensate for placing obstacles to trade with closer ones.⁷ This was precisely the outcome envisaged by many supporters of the UK's exit from the EU. And so, the effects of Gravity Theory in forecasting models became a matter of hot dispute between pro-Brexit academics and their more conservative-minded economic colleagues.

The UK Treasury incorporated Gravity Theory into its forecasting models for UK-EU trade from 2016 up until 2018, with the help of economists from the London School of Economics.⁸ During this period, Treasury forecasts became the benchmark for analysis and discussion on the UK's various trading prospects. Views cited as 'expert' were typically based on the conclusions drawn from these official Gravity-based forecasts. They invariably followed the pattern described above – that the further the UK drew away from seamless, tariff-free trade with its large, neighbouring countries, the greater the long-term harm to the UK economy.

Economists who were sceptical of Gravity Theory were a clear minority within their profession. Patrick Minford of the Cardiff Business School warned of the dangers of using gravity modelling even before the referendum.⁹ He pointed

out several specific flaws in the models used by the Treasury. These included the contention that Gravity-based trade-forecasting models omitted some factors that might be highly relevant to how trade evolves, such as investment flows. Kenneth Coutts and Graham Gudgin from Cambridge University, along with other UK economists, pointed out in a series of papers that the Gravity-based models used by the UK Treasury, the IMF and the World Bank tended to over-predict UK exports to the EU.¹⁰

One distinctive feature of these dissident economists was their desire to test economic theory against the reality of UK trade growth. In 2018, Minford built his own model for UK trade based on classical theory, which did indeed ‘fit the facts’ of UK trade. And he noted in passing that this was probably the first time that trade models had been tested in this way.¹¹ As an academic aside, the opposing camps fell neatly into recognised schools of scientific thought. On the anti-Brexit side were the rationalists, who based their arguments on theory. On the pro-Brexit side were the empiricists, who wanted theories tested against historical facts. ‘Expert’ opinion largely drew its conclusions from the former.

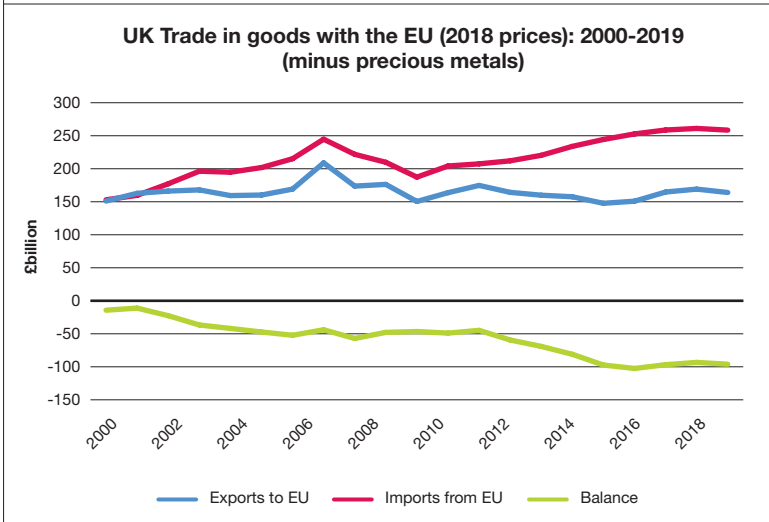
The liberal, free-trade economists had one powerful auxiliary on their side: recent history. Not only were UK exports to EU stagnating by 2016, but a clear divergence between UK exports and imports had opened up since 2000. This was a warning signal that UK trade was at odds with theory and evolving to the UK’s disadvantage. In the half decade that preceded the 2016 referendum, the UK’s goods trade deficit with the EU more than doubled from approximately –£40 billion to over –£90 billion. This deficit had grown far more quickly than the UK’s services trade with the EU. By 2019 the deficit in trade in goods with the

EU was over four times larger than the UK's equivalent surplus in services.

Meanwhile, UK trade in goods with countries outside the EU was growing more or less steadily. Despite being conducted mostly on WTO terms, UK exporters prospered in global markets. By 2016, the deficit in trade in goods was now smaller (–£38 billion) than in EU trade, and a surplus in trade in services (£75.6 billion) paid for it twice over. Something strange was going on, but the sheer mass and proximity of the UK's trade with the EU appeared to cloud analysis. Debate focussed on the dislocation of a sudden rupture with the EU, rather than on whether the existing trade relationship really boosted exports, and if so, in which sectors.

Global comparisons should have shed light on the UK's insular, euro-centric debate. As the UK Treasury refined its forecasting models, the UK's trade deficit per head with the EU surpassed the US's with China.¹² In the US, the deficit with China was a hot political topic and it triggered a trade war. But the root causes of the UK's relatively more severe trade deficit went oddly unexplored. In the US, protagonists pointed out that at least the US-China trade deficit benefited consumers, because it brought in low-price goods courtesy of lower-cost labour. No such counterargument was possible in the UK, because Germany was and remains the UK's largest source of imports.¹³

Yet the consensus economic opinion remained fixed and was hard-wired into HM Treasury forecasts. It argued that the best trade relationship the UK could have with the EU was the one it already enjoyed, regardless of the alarming deficits in EU trade that were springing up across almost all major manufacturing sectors. Orthodox trade-forecasting remained oddly dissociated from the asymmetric performance of UK-EU trade – and its brutal consequence.

Figure 1.1: UK trade in goods with EU, 2000-2019

Source: Office for National Statistics BoP Publication tables, UK trade in goods, CPA (08) UK Trade in goods by Classification of Product by Activity, time series dataset, June 2021. Deflated using the current ONS differential import/export trade deflator, 2018 prices. Deficit calculated using the 2018 import deflator.

Initially, the UK Treasury made no response to Minford's criticisms, or the detailed analyses presented by Gudgin and his colleagues. The Treasury did abandon Gravity Theory in its modelling in 2018, but the successor models incorporated significant estimates for non-tariff barrier (NTB) costs if the UK were to leave the Customs Union and diverge from Single Market rules. The result, bizarrely, was that the Treasury's estimates of the long-term damage to the UK economy under various exit arrangements remained almost precisely the same, as Patrick Minford duly pointed out.¹⁴ The theory changed; the forecasts didn't.

These updated trade-forecasting models remain problematic. They determine perceptions about the value of the current trade agreement with EU. They include factors such as the supposed costs of customs declarations and the

benefit of zero tariffs. They assume costs will be incurred if and when UK industrial sectors diverge from EU Single Market regulation.¹⁵ They will be used to determine the attractiveness of potential trade deals. Most importantly, they will be used to determine the necessity of maintaining current UK-EU trade relations, as set out in the EU-UK Trade and Cooperation Agreement (TCA).

Optimal trade policies for the UK

Debate over the UK's optimal trade relations with the EU will now intensify for four major reasons.

First, UK trade is now a subject of increased academic interest. Trends that went unexplored pre-Brexit will now be subject to scrutiny because UK governments have gained the power to act on them. This means the long-term deterioration in the UK's trade with the EU will be examined and questioned. The task is an urgent one. The TCA ensures quota-free, tariff free trade with the EU, even though that trade is evolving to the EU's clear advantage, and not the UK's. And since the factors that led to stagnant exports and fast-growing imports went unexplored by UK analysts, it is likely they were embedded into new trade arrangements. As a result, the imbalance in UK-EU trade in goods will probably deteriorate and academic economists will be asked to account for it.

Second, the UK failed to negotiate continued market access for UK financial services. This was one of the very few UK exports sectors to demonstrate a competitive advantage in EU markets. Its value should be set in proportion. Generating a surplus of £18.2 billion in 2019, UK trade in financial services didn't even balance the -£29.6 billion deficit in motor vehicles that year. But it did generate the UK's largest sectoral surplus. It was one industry that clearly benefited

from the status quo in UK-EU trade relations, and it's the one industry where the status quo was up-ended. This makes the TCA imbalanced. In normal circumstances, no country would allow its best-performing industry to be extruded from a bilateral trade deal. The TCA is therefore unlikely to survive a recovery in national political confidence.

Third, the Northern Ireland Protocol and its political consequences. Whether or not the original 'Backstop' was conceived as a device for keeping the UK in the Single Market and Customs Union, the resulting Northern Ireland Protocol is an inherently unstable piece of international law. It hived off part of a sovereign country into a separate regulatory jurisdiction, which is unprecedented in any post-war international treaty. It did so without the explicit consent of the population concerned, in apparent defiance of the expressed intent of the Belfast (Good Friday) Agreement.¹⁶ And it made the citizens of Northern Ireland subject to market legislation over which they have no democratic influence.

The fourth reason is practical legislation. Debate over the value of UK-EU trade terms will intensify because Parliament has assumed full responsibility for market regulation in Britain. Every fresh proposal it considers on the topic will trigger the question: 'will this align UK manufacturing with EU Single Market regulation?' If not, this will trigger a supplementary: 'what's the cost of divergence from the EU?' Industry will deliver insights. Analysts will chip away at assumptions. The process will be continuous as new priorities begin to steer UK policy away from a harmonised EU approach to regulatory challenges. Comparative trade research from economies around the world was and remains absent in the UK, but practical politics will trigger a demand for it.

So, a mixture of iniquities and ignorance places an unusual strain on the TCA. Trade research will now accumulate. Assumptions will unravel. Without trade research, the merits of acceding to multilateral trade agreements like the CPTPP will be un-debatable. Without it, the wisdom of sticking to TCA with the EU will be unfathomable. Besides, there is a clear risk that dissent in Northern Ireland will force the UK's hand. The EU has already asserted that that current TCA depends on fulfilment of the terms of the Northern Ireland Protocol. And as a mechanism for generating ill will between the UK and the EU, the protocol could hardly be bettered.

The importance of value delivered

But how to assess the commercial value of seamless, tariff-free trade with the EU? Specifically, does it boost exports? If so, in which sectors? Does it have an equal impact on imports and exports? One approach, so far untried, is to turn from forecasting models entirely and look deep into the trade data across all principal sectors.

In *Lessons learned*, I stepped through the UK's biggest export sectors to see how each performed from 2000-2019. This exercise showed that treating manufacturing as a 'bloc' in any analysis misses vital differences in competitiveness. Some export sectors – such as aerospace, pharmaceuticals and beverages – performed extremely well, while exports of computers and electronics crashed. Some export sectors – such as automotive goods – stalled in EU markets but soared in others. These subtleties help reveal where the UK's competitive advantage lies in international trade. But these variances in performance also reveal where supposed barriers to trade really do matter and *where they do not*.

This research goes one step further and statistically

correlates the performance of the UK's top 14 sectors from 2000-2019 against the supposed advantages that each sector enjoyed, courtesy of seamless trade with the EU. This reveals whether the supposed value delivered by membership of the Customs Union and Single Market translated into enhanced export performance. It also takes the analysis in *WTO versus EU* one step further by correlating export performance against distance from the UK, after GDP growth is taken into account. This helps to understand whether one of the principal elements in Gravity Theory – distance – affects trade growth in UK manufacturing. Neither of these two correlation tests have been done before.

The results help to show the true value of seamless EU trade to UK exporters. They will help the UK Government to understand the value of keeping UK market legislation aligned with the Single Market. They will help to show where the UK should liberalise global trade to boost exports. And the results will help Government appreciate whether the current TCA is worth keeping, as its liabilities steadily mount.

2.

The comparative performance of UK manufacturing sectors in EU markets

Almost all UK goods exports that are impacted by tariffs and EU market regulation are manufactured goods. Using the ONS' CPA classification, the principal exception is 'agriculture, forestry and fishing', which contributed just under 0.9 per cent of UK goods exports in 2019. In contrast, manufactured goods delivered 84.8 per cent of UK goods exports in 2019 – once the value of all precious metals is extracted. This analysis concentrates on manufacturing and specifically the UK's top 14 manufacturing-export sectors. These 14 sectors delivered 93.2 per cent of UK manufacturing exports in 2019, or 79.1 per cent of goods exports.

The comparative performance of the UK's top 14 export sectors, 2000-2019

The precursor to this paper – *Lessons learned for a Global Britain* – assessed the performance of UK manufacturing exports using a comparative performance test. The test springs from a straightforward observation that different manufacturing sectors were impacted to a different degree by the UK's membership of the Customs Union and Single Market. In theory, the sectors that were *most* impacted by

a tariff advantage and alignment with Single Market rules should have performed better in EU markets, as compared to export sectors that enjoyed little or no advantage.

This paper uses the same data series from ONS, including revisions executed by ONS in the course of 2020/21 (see Appendix D). These reduced some CAGRs and resulted in different CAGRs for the sectors as compared to those published in *Lessons learned*. The fundamentals remain, however. Instead of a 2.6 ppts difference between export growth rates to EU and non-EU countries, there is a 2.4 ppts difference.¹⁷

A practical demonstration shows how the comparative performance test worked. The UK's food-products exports to the EU enjoyed a huge advantage because they avoided high tariffs applied to UK food exports to non-EU countries, and very high tariffs that most non-EU exports had to pay to export into the EU. Also, Single Market regulation is pervasive in food production, food safety and package labelling. Therefore, if UK exporters genuinely benefited from harmonised EU regulation and a large, steeply protected market, this should be one sector where UK exports to EU markets performed well as compared to exports to EU markets in other sectors. The 2.4 ppts difference between EU and non-EU export growth rates should have narrowed.

And so it did. Exports to non-EU markets still grew faster than to EU markets (by 4.0 per cent p.a. to 2.9 per cent p.a.) but the *difference* between the two narrowed from 2.4 ppts average to just 1.1 ppts. That narrowing difference between EU and non-EU export growth rates is a signal that this was a sector where the Customs Union and the Single Market exerted a positive effect on UK exports. Compared to manufacturing as a whole – and taking into account the competitiveness of UK food

products in overseas markets – the UK’s food exports to the EU performed comparatively well.

Conversely, the reverse effect should be apparent in the UK’s transport and aerospace sector (and since 92 per cent of the goods in this export sector are aerospace-related, the term ‘aerospace’ will generally be used). WTO members eliminated tariffs on aerospace goods in 1980, so UK-manufactured parts enjoyed no preferential access to EU markets during the 2000-2019 period. And regulation is – in effect – global. The US Federal Aviation Administration collaborates with the European Aviation Safety Agency on certifications, and other jurisdictions generally follow suit, at least with civilian aircraft. In practice, UK aerospace companies do not enjoy a substantive advantage in EU markets courtesy of the Customs Union or the Single Market.

Consequently, aerospace is one of those sectors where the 2.4 ppts difference between EU and non-EU growth rates in UK manufacturing should have widened. But in this instance, mysteriously, it did not. UK aerospace exports grew quickly in EU markets from 2000 onwards in absolute and comparative terms. In EU markets they grew by 3.1 per cent per year, which was the fastest of any top-10 manufacturing sector. Export growth to non-EU markets was 3.6 per cent p.a. The difference of just 0.4 ppts is easily the narrowest of the UK’s biggest export sectors. This means UK aerospace companies performed exceptionally well in EU markets even though they gained minimally from the UK’s membership of the EU.

The first step in a full correlation is to capture all the differences in export growth rates in each major exporting sector. This test also uses the two decades up to the end of 2019, just before global trade was impacted by Covid-19 lockdowns. The resulting metric is called ‘comparative

performance’. Once all the CAGRs were aggregated, the ‘comparative performance’ results make for interesting reading. With the sectors extended to 14, there is just one – apparel – where export growth to the EU outpaced other exports. But the scale of underperformance in EU markets in some sectors – like automotive goods – is blistering.

Table 2.1: UK Manufacturing export growth rates, EU & non-EU markets, 2000-2019

Manufacturing Sector	CAGR exports non-EU markets	CAGR exports EU markets	Comparative Performance (ppts)	% of UK manufacturing exports 2019
1. Motor vehicles & parts	6.3%	-0.1%	-6.4	14.1%
2. Transport/Aerospace	3.6%	3.1%	-0.4	12.7%
3. Machinery	2.1%	0.8%	-1.3	11.4%
4. Chemicals	1.0%	-0.2%	-1.2	9.8%
5. Computers/electronics	-1.8%	-5.4%	-3.7	9.6%
6. Pharmaceuticals	5.3%	2.6%	-2.7	8.2%
7. Refined Petroleum etc	3.4%	1.8%	-1.6	4.4%
8. Food products	4.0%	2.9%	-1.1	4.6%
9. Electrical	1.1%	-0.6%	-1.7	4.3%
10. Beverages	3.7%	2.1%	-1.6	2.8%
11. Rubber & Plastics	2.3%	1.7%	-0.5	2.5%
12. Apparel	3.0%	3.9%	1.0	2.5%
13. Jewellery, medical items, sports equipment	6.2%	4.2%	-2.0	4.6%
14. Basic metals (minus precious metals)	0.1%	-0.3%	-0.4	1.4%
All manufacturing	2.3%	-0.1%	-2.4	100%

Source: Office for National Statistics BoP Publication tables, UK trade in goods, CPA (08) UK Trade in goods by Classification of Product by Activity, time series dataset, June 2021 CAGRs calculated using the current ONS import/export deflator series with 2018 base prices.

A correlation of comparative advantage with comparative performance

The next step is to quantify the advantages that seamless, tariff-free trade with the EU delivered to each sector for the period 2000-2019. This naturally falls into two parts:

the tariff advantage the sector enjoyed from selling freely into protected EU markets; and the putative advantage of automatic alignment with Single Market rules and the avoidance of non-tariff barriers (NTBs).

A detailed analysis of how these factors apply to each of UK's top 10 sectors is set out in chapters 3-12 of *Lessons learned*. Also, a table summarising tariff rates and the impact of Single Market regulations per sector is presented in Appendix A. In simple terms, each sector is given a score out of five for the degree to which it gained a commercial advantage from the UK's membership of the Customs Union, and a score out of five for the degree to which it should have benefited from harmonised UK-EU market regulation. Put together, they confer a metric called 'comparative benefit'.

For the Customs Union side of the calculation this analysis chiefly uses analytic work by Justin Protts for Civitas in October 2016,¹⁸ though numerous estimates of effective tariff rates have been executed. In scoring out of five, due regard is paid to global tariff rates as well. For example, the fact that the EU imposes high tariffs on food products gives UK exporters a commercial advantage in EU markets. But the fact that most other countries also impose high food tariffs means that UK exporters also face high obstacles in overseas market. So, the 'comparative benefit' of Customs Union membership in this case is the maximum. Other sectors are more nuanced. For example, tariffs on whisky vary enormously around the world. So, the putative advantage of Customs Union membership has to be ameliorated somewhat.

The Single Market side of the equation is harder to quantify. Some market regulation is ubiquitous and specific to the EU, such as for food products. Others are generally local versions of globally accepted rules, such as for

aerospace and medical devices. And in some cases, the fact that the EU creates unified rules for 27 countries is a benefit that accrues as much to countries outside the EU as in it. Licensing for vaccines is an example. Both the Pfizer and Astra-Zeneca vaccines only had to complete one licensing process for the whole of the EU, even though the applicants themselves were US- and UK-based.

Fortunately, this is a comparative exercise and most major sectors are not difficult to rank. The motor vehicles and food sectors both score high for regulatory impact. For example, EU engine-emissions regulations were sufficiently impactful on Jaguar Land-Rover (JLR) in 2013 as to force the closure of the Defender production line at Solihull the following year.¹⁹ This is as powerful as regulation gets. Similarly, EU food regulations dominate the production, packaging and retailing of food products, including how animals are slaughtered, and their flesh processed and preserved. Chlorinated chicken is a casualty of EU market regulation, and the ban on it constitutes a well-known non-tariff barrier (NTB) to trade in food.

On the opposite scale, few would argue that trade in aerospace and pharmaceuticals products incur only mild impact from the EU Single Market. Aerospace goods are in effect globally regulated, and global trade in pharmaceutical goods typically rests on a series of mutual recognition agreements (MRAs), including between the EU and countries such as the US, Canada, Australia and Switzerland (see Appendix A).²⁰ Nor is the low scoring for apparel contentious. Labelling is hardly the most costly or complex element in the creation of a garment. Many of the 'middling' sectors are open to debate. There are thousands of different types of goods in the electrical sector. The author has assumed that, on balance, the fact that just nine per cent

of exports in this sector are domestic appliances as opposed to industrial goods ameliorates the overall influence of consumer legislation. The scores attributed are based on multiple sources – including those used for official UK trade modelling. These sources are also listed in Appendix A.

There are some cases where the Single Market/Customs Union was positively unhelpful to sectors. For example, subsidy rules prevented UK governments from protecting the UK steel industry from 2015 onwards when global steel prices fell. So, the theoretical benefit of being in a Customs Union did not translate into action being taken to defend the market interests of that sector. That makes it difficult to quantify the benefit to the basic metals sector of being in the Customs Union.

Other incidents stick out. For example, James Dyson did, in the end, win his court case, claiming that EU-mandated efficiency rating tests discriminated *against* the technology used in Dyson vacuum cleaners. Most irksome is the case of the classic Land Rover ‘Defender’ model. JLR’s diligence in complying with EU emissions regulation was not matched by the behaviour of competitor auto makers elsewhere in the EU, who flouted emissions regulations in the ‘Dieselgate’ scandal.²¹ Varying levels of compliance with Single Market legislation had the potential to place UK manufacturers at a huge competitive disadvantage – in the EU and in global markets.

Nevertheless, with the best information available the author has assumed that where Single Market regulation is impactful it is also beneficial. Combining the results for tariff and regulatory advantage gives a combined ‘comparative benefit’ score, as set out in Table 2.2, below. Thus, food products gains a maximum ‘10’ score as the sector that should have gained the maximum comparative benefit from

the UK's membership of the Customs Union and Single Market. Aerospace gains a minimum '2', as the sector least likely to benefit from either.

Even before executing a correlation, ominous signals emerge among the UK's three most-valuable export sectors. With a 9-10 per cent tariff advantage and a regulatory environment sufficiently powerful to cull successful models, the UK's motor vehicle manufacturing sector should have been one of the UK's principal beneficiaries of the Customs Union and Single Market. Yet its comparative performance is easily the worst. The CAGR of exports to the EU undershot non-EU exports by 6.4 ppts per year.

Table 2.2: Comparative benefit for UK sectors of trading tariff-free within the Single Market

UK's Top 14 export sectors	Tariffs (1-5)	NTBs (1-5)	Comparative benefit
1. Motor vehicles & parts	4	4	8
2. Transport/aerospace	1	1	2
3. Machinery	1.5	1	2.5
4. Chemicals	2.5	4	6.5
5. Computers, electronics etc.	2	1	3
6. Pharmaceuticals	1	2	3
7. Refined petroleum & coke	2.5	4	6.5
8. Food products	5	5	10
9. Electrical	2	1.5	3.5
10. Beverages	3	2	5
11. Rubber & plastics	3	2	5
12. Apparel	4	2	6
13. Jewellery, medical, dental, etc	2	1	3
14. Basic metals	3	2	5

Source: See Appendix A.

The result for aerospace was just as perverse in the opposite direction. With no protective tariffs and effectively no regulatory advantage inside the EU market, this sector

benefited least from the UK's EU membership. But exports to the EU grew by a CAGR of 3.1 per cent – just 0.4 ppts slower than exports to non-EU countries. This made aerospace a star performer in EU markets in absolute and comparative terms. Machinery disappoints too. Export growth rates to EU *and* non-EU markets were separated by just 1.3 ppts, when, in reality, exports to the EU experienced only a tiny comparative benefit in EU markets. The result for machinery is not far short of the UK's food (–1.1 ppts) and chemicals (–1.2 ppts) sectors, which gained moderate-to-strong advantages from tariff protection and from regulatory alignment.

There are hopeful signs. Exports in the UK's apparel sector actually grew faster in EU markets than in non-EU markets, and the sector scores moderately highly for comparative benefit. This reflects the fact that tariffs are quite high for most of the goods in this sector, with the common external tariff (CET) in knitwear at eight per cent, and most clothing at 11-12 per cent. This is comparable to EU tariffs on motor vehicles. As noted, the UK's food products sector also matches a high comparative benefit score, with a good comparative performance score (–1.1 ppts). The catch for the UK is that these are minor export sectors for the UK. They deliver just 2.5 per cent and 4.6 per cent of manufacturing exports, respectively.

A weighted correlation delivers the reverse of expectations

If there is a strong relationship between a) the comparative benefit a sector enjoys within the Customs Union and Single Market, and b) that sector's comparative export performance, then a correlation test should deliver a strong positive result. According to convention, a value of +0.3 would denote a weak positive correlation, a +0.5 value a moderate correlation, and a +0.7 value a strong

correlation. So, a result of around +0.5 would indicate a moderate positive connection between the degree to which a sector is supposed to benefit from the Customs Union and Single Market (comparative benefit), and its comparative performance. Meanwhile negative correlations of -0.3, -0.5 and -0.7 would imply the reverse.

Table 2.3: Correlation of comparative benefit with comparative performance for UK's top 14 export sectors, 2000-2019

Sectors included in correlation	Percentage of manufacturing included	Correlation
Sectors 1-5	58%	-0.64
Sectors 1-10	82%	-0.22
Sectors 1-14	93%	-0.10
Weighted correlation		
Sectors 1-13	92%	-0.44

The results deliver a harsh judgement on the UK's EU membership. Across all sectors the correlation generates a value of -0.1. This means that, on the above assessment, there is no relationship between the comparative benefit enjoyed by a sector in the EU – in terms of tariffs and seamless access – and its comparative performance in EU markets over the past 20 years. In other words, there appears to be no connection at all between the supposed benefits of seamless, tariff-free trade with the EU, and the export performance of UK manufacturing sectors.

Unnervingly, restricting the correlation to just the top five sectors – which account for 58 per cent of UK exports – achieves a moderate-to-strong negative correlation, at -0.64. Restricting the correlation to the top 10 sectors, which account for 82 per cent of UK manufacturing exports – almost achieves a 'weak' negative correlation, at -0.22

But giving equal weight to each sector fails to reflect the relative value of UK export sectors to UK manufacturing. The UK's motor exports are worth three times its food-products exports, for example. From the table above, it's clear that the correlation fails because of the strong negative correlation in the UK's largest export sectors – motor vehicles and aerospace. These sectors are the country's most valuable. They have also demonstrated competitive advantage in overseas markets over the past 20 years.

A truer correlation should weight the results according to the relative export value of each sector. This involved recalibrating the table to give the UK's auto industry a prominence seven times greater than beverages or apparel; aerospace six times; and so on. Shorn of precious metals, the basic metals category fell out of the equation altogether. With this refinement, the verdict is brutal. A score of -0.44 implies a mild-to-moderate negative correlation between the theoretical benefits that manufacturing sectors enjoyed from seamless, tariff-free trade with the EU, and their actual performance in EU markets. In other words: the less the supposed benefit to a UK manufacturing sector from EU membership, the better that sector's exports performed in EU markets, and vice versa.

The notable exceptions were the UK's food and chemicals sectors. The comparative performances of these sectors do at least reflect the advantages conferred by the Customs Union and the Single Market. Unfortunately, the food export sector is one of UK's smallest export sectors and chemicals is one of UK's slowest growing. Otherwise, most major sectors return a perverse result. The UK's auto export industry enjoyed the greatest advantage in EU markets after the food export sector, and yet its comparative performance in EU markets was by far the worst. And the UK's aerospace

sector enjoyed the least advantage in EU markets, compared to other manufacturing sectors, and yet its comparative performance was easily the best.

Is the scoring mechanism robust? The scores for tariff advantage are not open to much debate, but could the scores for regulatory impact be skewing the results? In short, not by much. Assessments were based on a range of academic assessments (see Appendix A) and the relative degrees of impact match the inputs in official UK trade-forecasting models. Among the various analyses and forecasts produced there was a general consensus on the impact of non-tariff barriers on most major UK sectors. Ideally, the relative impact of tariffs versus NTBs could be adjusted per sector. If tariffs are low in a particular sector and goods are not commoditised, then NTBs are likely to matter much more in a benefit assessment. Only industry-based research could inject this refinement.

But to achieve a positive correlation of, say, +0.5 would require a radically different appraisal of the benefit each sector theoretically gains from the EU. In other words, no amount of juggling with the Single Market or NTB side of the equation – which is the hardest to quantify – is going to sway the correlation towards a meaningful positive result.

Imports follow a different path

There is a clear discrepancy between the growth rates of exports to and imports from the EU, and this discrepancy is absent from non-EU trade. Table 2.4 below sheds some sector-by-sector light on the phenomenon. The CAGRs of UK exports to the EU are compared to the CAGRs of the UK's EU markets over an identical time period: 2000 to 2019. For comparison, the CAGRs of imports from the EU

are also shown and compared to the UK's economic growth rate, also for 2000 to 2019.

Table 2.4: Export and import performance of principal manufacturing sectors, 2000-2019

Manufacturing Sector	CAGR UK exports to EU	Performance against EU 27 GDP 2000-2019 (CAGR 1.43%)	CAGR UK imports from EU	Performance against UK GDP 2000-2019 (CAGR 1.74%)
1. Motor vehicles	-0.1%	-1.5	2.9%	1.1
2. Aerospace	3.1%	1.7	3.4%	1.7
3. Machinery	0.8%	-0.6	3.5%	1.7
4. Chemicals	-0.2%	-1.7	2.3%	0.6
5. Computers, electronics etc.	-5.4%	-6.9	-1.6%	-3.3
6. Pharmaceuticals	2.6%	1.2	5.3%	3.5
7. Refined Petroleum & coke	1.8%	0.4	5.3%	3.6
8. Food products	2.9%	1.5	4.9%	3.1
9. Electrical	-0.6%	-2.1	2.2%	0.4
10. Beverages	2.1%	0.6	3.3%	1.6
11. Rubber & Plastics	1.7%	0.3	3.5%	1.8
12. Apparel	3.9%	2.5	3.5%	1.8
13. Jewellery, medical etc	4.2%	2.7	6.4%	4.7
14. Basic metals (minus precious metals)	-0.3%	-1.7	2.3%	0.6
All Manufacturing (minus precious metals)	-0.1%	-1.5	2.6%	0.9

Source: Office for National Statistics BoP Publication tables, UK trade in goods, CPA (08) UK Trade in goods by Classification of Product by Activity, time series dataset, June 2021
CAGRS calculated using the current ONS import/export deflator series with 2018 base prices.
GDP data: The World Bank IBRD-IDA data based. Accessed July 2021.

Exports to EU markets undershot EU GDP growth rates in four out of the UK's top five export industries. Conversely, imports from the EU outpaced the UK's economic growth in 13 out of 14 sectors – and in some cases by hefty margins. While the growth of petroleum imports is linked to the long-term decline in UK oil production, the ultra-rapid growth in pharmaceutical imports is less easily explained.

As described in *Lessons learned* (Chapter 7), the latter was partly due to rapid offshoring of UK pharmaceuticals manufacturing from 2009 onwards, including, especially, to the Irish Republic (see Chapter 4).

A correlation performed on exactly the same pattern as for exports nudges the result closer to economic orthodoxy. Across all 14 sectors there was no correlation at all (-0.07), and a weighted correlation also gives a null result (0.0). Only if the correlation is restricted to the UK's largest import sectors – automotive, computers & electronics, machinery, food products and chemicals (in that order) does a positive result emerge. There is a very mild link between the comparative benefits that a manufacturing sector enjoyed via EU membership, and the performance of EU exporters in UK markets – but it is limited to the UK's largest manufacturing-import sectors. And this mild link is almost entirely owing to trade in food, and to a lesser extent chemicals.

Table 2.5: Correlation of comparative benefit with comparative performance for UK's top 14 import sectors, 2000-2019

Sectors included in correlation	Percentage of manufacturing imports included	Correlation
Sectors 1-5	49%	0.31
Sectors 1-10	77%	0.14
Sectors 1-14	87%	-0.07
Weighted correlation		
Sectors 1-14	87%	0.01

In summary: a comparison of the supposed benefits of EU membership and actual trade performance leaves UK policy makers with a paradox. Weighted to reflect value, there's a mild-to-moderate *reverse* correlation between benefits and

export performance, and no correlation for imports. The less a sector was impacted by the Single Market and Customs Union, the better its comparative export performance in the EU, and vice versa. The notable exceptions were the UK's chemicals export industry, which is slow growing at just 0.2 per cent p.a. and the food sector, which delivers just 4.6 per cent of UK manufacturing exports. For the rest, theory doesn't match practice.

What's more, there is a difference between how imports and exports performed. In crude terms, the only area of UK trade in which there is a clear positive correlation between the supposed benefits of seamless, tariff-free trade on the one hand, and comparative performance on the other, is in the UK's largest manufacturing import sectors. The reverse effect is observed in the UK's largest export sectors. All trade forecasting theory should take heed of this difference in export-import performance.

So should UK trade ministers and officials. In general terms, most countries develop trade policy to increase exports and to discourage imports from displacing domestic production – at least where domestic production appears to be competitive. This is more or less the reverse of what seamless, tariff-free trade with the EU achieved in the final two decades of UK membership. In so far as the TCA with the EU replicates the terms of the UK's previous trading relationship, it may turn out to be a very bad deal for the UK. And if the UK's goal is to maximise exports it will need to be revisited, especially the parts that are relevant to the UK's largest export sector – motor vehicles.

3.

Does distance matter?

Most trade modelling executed by the UK Government prior to the UK's exit from the Customs Union incorporated Gravity Theory to some degree. To be fair to the UK Treasury, it refined its methods during the 2016-2019 period, possibly in response to expert criticism from free trade-minded economists.²² But the basic premise of Gravity modelling remains a factor in many trade-forecasting models: that – all things being equal – trade grows fastest between countries that are close together, as opposed to countries that are far distant.

The UK's goods-export performance measured against geographical proximity

But maybe the other factors that impact trade are not *at all* equal. Maybe they are so unequal that distance matters only slightly – or strongly only with certain goods. For example, trade in chemicals and refined petroleum might be skewed towards proximate countries, simply because they are dangerous bulk commodities.²³ Perhaps in some sectors, distance matters strongly but in a negative sense. Cultural and climactic factors, industrial skills and entrepreneurial spirit all impact the development of competitive advantage – or the ability of one country to produce goods more efficiently than another. Sometimes, countries develop

strategic industries. Taiwan and microchips is one example. Trade reflects these traits.

The paper co-authored with Michael Burrage in 2020 – *WTO vs the EU* – strongly suggests that for UK trade, distance may not be as important as Gravity Theory suggests. The paper compared the UK's goods export performance with 14 EU neighbours against 14 exports partners where trade was conducted according to WTO rules. It showed that over the period 1999-2018, UK goods exports to EU neighbours grew 2.6 percentage points (ppts) more slowly each year to EU neighbours than to WTO partners, who are scattered around the globe. It showed that the export underperformance with EU countries remained, even after each trade partner's GDP growth rates was taken into account.

This research takes the country-to-country trade analysis one step further by correlating export performance against distance. It also increases the sample to the UK's top 50 goods export partners. Collectively, this group accounted for 94.1 per cent of UK goods exports in 2019, once deductions were made for trade in precious metals. For each country, an export performance metric is calculated as in the *WTO versus EU* paper. This is the CAGR of goods exports 2000-2019 minus the CAGR of that country's GDP. A positive ppt value indicates that UK goods exports outperformed that country's economic growth over the 20-year period; a negative number indicates that exports underperformed.

Defining distances between countries is less straightforward. Is the Irish Republic closer to the UK than the Netherlands? On a map, yes. But if the measure is Felixstowe-Rotterdam, or London-Schiphol, the answer is less clear. A French institute, the Centre d'Etude Prospectives et d'information Internationales, has provided one solution, with the concept of 'economic distance' in its 'GeoDist'

database. This measures the distance between capital cities and also gives distances according to the distribution of populations within countries. In practice the difference between the two proved immaterial to the correlation, but the latter was used.

This is a simplistic measure. It takes no account of historical trading links, nor similarities in language. On the other hand, neither does the distance metric incorporate the preferential terms with which the UK traded with all its nearest neighbours from 2000-2019. Nor does it take into account the fact that the UK's most distant major trade partners almost universally conducted trade with the UK under WTO rules during this period – the principal exception being South Korea. This means the UK's nearest neighbours go into the test with an inbuilt advantage, in that trade with them was already conducted on preferential terms.

Bilateral export growth with the UK's biggest export partners

The export growth totals for the UK's 50 biggest exporters are available in Appendix B. This group covers 94.1 per cent of UK goods exports in 2019, minus the estimated value of exports of precious metals. A sample of the top 15 is shown in Table 3.1 below. Figures in red indicate 'underperformance' – or a trade partnership where the CAGR of UK goods exports from 2000-2019 fell below the partner country's own economic growth, as measured in the CAGR of GDP. Also, trade partners that are members of the EU are shaded.

The EU contributed seven of the UK's top 15 export trade partnerships. All these partnerships were top underperformers, with the exception of Canada. With the top 20, the picture changes, with the EU contributing just two more partners, or nine out the 20 – and it provides a dwindling

proportion thereafter. But even this truncated version of a 50-row table is a harbinger of unlikely outcomes. No EU country except Poland attracted a rise in exports from the UK that matched its own economic growth during the 2000-2019 period. And those GDP growth rates were generally very low anyway: 1.2 per cent p.a. for Germany; 1.4 per cent p.a. for Netherlands; and 1.3 per cent p.a. for France.

Table 3.1: UK's top 15 goods export partners, showing export performance against partner GDP growth; 2000-2019

Rank	Destination	Goods export value 2019 £bn	Goods exports performance: export CAGR minus GDP growth 2000-2019 (ppts)	Distance weighted for population distribution (kms)	% of UK goods exports 2019	Cumulative % of UK goods exports 2019
1	United States	61.0	-0.5	6,655	17.0%	17.0%
2	Germany	36.5	-0.9	753	10.2%	27.1%
3	Netherlands	24.6	-0.9	436	6.9%	34.0%
4	France	24.5	-1.9	599	6.8%	40.8%
5	Ireland	21.9	-3.9	395	6.1%	46.9%
6	China	24.4	3.5	8,513	6.8%	53.7%
7	Belgium	12.9	-2.2	400	3.6%	57.3%
8	Italy	10.1	-1.4	1,399	2.8%	60.1%
9	Spain	10.4	-2.5	1,369	2.9%	63.0%
10	Hong Kong	8.1	-0.1	9,631	2.2%	65.2%
11	Switzerland	7.1	0.4	873	2.0%	67.2%
12	Japan	6.7	0.1	9,432	1.9%	69.1%
13	UAE	5.4	0.6	5,592	1.5%	70.6%
14	South Korea	4.0	0.4	8,929	1.1%	71.7%
15	Canada	5.3	-2.0	5,734	1.5%	73.2%

Source: Export data: ONS Trade in Goods – All Countries – All Exports. Released January 15, 2021. Export values for trade partners adjusted to eliminate trade in gold & precious metals (see Appendix C). CAGRs calculated using ONS export/import 2018 deflator series. GDP data (except Taiwan): The World Bank IBRD-IDA data based. Accessed July 2021.

The results for non-EU countries are far more positive. Most trade partnerships saw goods exports exceed GDP

growth rates, or undershoot them by less than 0.5 ppts. The standout performer was China. The UK's goods-export growth rate to China was a stellar 12.9 per cent per year, 3.5 ppts faster than China's own nine per cent growth rate over the period. It is instantly clear that UK exports to EU partners tended to underperform by around 1.0 ppts or more, while exports to non-EU partners are more likely to meet or exceed partner GDP growth rates – although Canada and India (not shown) are major exceptions.

Exports grow faster with countries that are furthest away – after GDP is accounted for

The correlation as performed delivers a result that is positively related to distance. In other words, if it were true that UK exports grew fastest with countries that are farther away – after GDP growth rates are taken into account – then this would give a result close to +1. Conversely, if UK exports had grown fastest with countries that were closer to the UK – as prescribed by Gravity Theory – then the expected correlation value would be close to -1.

Table 3.2: Correlation of UK goods export growth rates against top export partners, after GDP growth rates are taken into account

Goods export partners	Correlation with weighted distance	% of 2019 Goods exports	Composition
Top 10	0.73	65.2%	7/10 EU
Top 20	0.33	80.0%	9/20 EU
Top 30	0.12	87.7%	12/30 EU
Top 40	0.05	91.7%	16/40 EU
Top 50	0.00	94.1%	18/50 EU
Weighted correlation			
Top 30	0.37	87.7%	12/30 EU

The results are shown in Table 3.2 above. Looking only at the top 10 countries, there is a strong *positive correlation*. This means that for 65.2 per cent of UK goods exports, there is a strong *inverse* relationship between geographical proximity and export growth. The further a nation is from the UK, the faster exports grew – after GDP growth is taken into account. The correlation decreases as the pool of partners expands. It reaches zero when the top 50 are included, comprising those countries that took 94.1 per cent of UK goods exports in 2019. This implies that – without weighting – there is ‘no linear relationship’ between distance and the performance of the UK’s goods exports.

The correlation treats all trade partnerships equally, and yet all trade partnerships are not of equal value to the UK. So, while a correlation that includes the UK’s top 50 trade partners covers an impressive 94.1 per cent of UK goods exports in 2019, it puts Chile, which took 0.3 per cent of UK exports in 2019, on the same par as the US, which took 17 per cent. Weighting the result gives a more balanced but brutal verdict. With a correlation of 0.37, there is a mild *inverse* correlation between geographical proximity and goods export growth – once the GDP growth of each partner country is taken into account.

No linear relationship between imports and distance

The same correlation can be performed in reverse to assess the relation between import growth and distance. This is simpler because the UK economy has only expanded at one speed. The correlation is the CAGR of import-growth from a specific country against the distance involved. This time two countries were added. Bangladesh is a major source of textile imports, with exports to the UK worth £3.1 billion per year. This is a good example of an

enduring trade relationship. Algeria was also added.

The tabulated results instantly reveal the EU's domination of UK imports. Germany easily outstrips China and the US as the UK's biggest import partner. It also makes Germany a strange, asymmetric case for UK trade. It delivered a huge £28.5 billion deficit to UK accounts in 2019, and the below chart shows why. Imports outpaced the UK's own economic growth by 1.0 ppts per year from 2000-2019 (see Table 3.3). Meanwhile the UK's exports to Germany underperformed that country's GDP growth by 0.9 ppts per year (see Table 2.2).

This might imply that the terms on which the UK trades with Germany are slanted heavily in Germany's favour. Alternatively, it could imply that the UK is peculiarly dependent on German goods for inputs into its own manufacturing economy. Machine tools would be an example. However, the UK imported just £887 million of metal-forming machinery and machine tools from the EU in 2019, which was just 4.1 per cent of all machinery imports. Nevertheless, detailed, sub-sectoral trade research might reveal that some of the UK's bilateral deficits with EU economies are due to UK demand for industrial inputs.

Table 3.3 makes for interesting comparison with Table 3.1 above. With the exception of France and Ireland, all the UK's principal import partners in the EU have succeeded in increasing exports to the UK faster than the UK economy itself has grown. This is the obverse of the result for exports. Also, imports from *all* the UK's principal EU partners grew faster than from the US from 2000-2019. This too is the mirror image of Table 3.3, which showed that UK exports to the US grew faster than for all major EU partners. These results highlight the odd asymmetries that ripple through UK trade data. They imply that the terms on which the UK traded with the EU from 2000-2019 were slanted in the

EU's favour. They imply that these terms gave preference to imports from the EU over imports from the US.

The correlation indicates there is no real relationship between distance and import growth. The results for the top 10 partner countries showed a moderate negative correlation, but that's owing to one result: the 9.4 per cent CAGR of imports from China. Progressively add all the remaining countries, and the correlation disappears. The weighted correlation gives a result of +0.14, which means no relationship at all.

Table 3.3: UK's top 15 goods import partners, showing import growth against UK GDP growth; 2000-2019

Rank	Import partner	Goods imports value 2019 £bn	CAGR of goods imports	Import performance vs UK GDP growth	Distance weighted for population distribution (kms)	% of UK imports 2019	Cumulative % of imports 2019
1	Germany	65.0	2.7%	1.0%	753	13.3%	13.3%
2	United States	43.4	0.7%	-1.1%	6,655	8.9%	22.2%
3	Netherlands	42.6	3.6%	1.9%	436	8.7%	30.9%
4	China	41.4	9.4%	7.6%	8,513	8.5%	39.4%
5	France	31.3	1.0%	-0.7%	599	6.4%	45.8%
6	Belgium	26.0	3.1%	1.4%	400	5.3%	51.2%
7	Italy	19.8	2.1%	0.4%	1,399	4.1%	55.2%
8	Spain	17.0	2.7%	0.9%	1,369	3.5%	58.7%
9	Norway	16.2	3.5%	1.7%	1,077	3.3%	62.0%
10	Ireland	13.7	0.0%	-1.7%	395	2.8%	64.8%
11	Poland	11.0	11.5%	9.8%	1,407	2.3%	67.1%
12	Japan	9.7	-2.4%	-4.2%	9,432	2.0%	69.1%
13	Canada	8.3	2.7%	0.9%	5,734	1.7%	70.8%
14	Russia	8.3	6.7%	5.0%	2,972	1.7%	72.5%
15	India	8.2	6.6%	4.8%	7,293	1.7%	74.2%

Table 3.4: Correlation of UK goods export growth rates against top export partners, after GDP growth rates are taken into account

Goods import partners	Simple 1:1 Correlation	% of 2018 Goods imports	Composition
Top 10	0.56	64.8%	7/10 EU
Top 20	-0.13	81.1%	10/30 EU
Top 30	0.01	89.1%	13/30 EU
Top 40	-0.07	94.0%	16/30 EU
Top 50	-0.12	96.3%	17/40 EU
Weighted correlation			
Top 30	0.14	89.1%	13/30 EU

However, the distance correlation mirrors the sector correlation in one curious way. The results for imports are one notch *closer* to anticipated results than the export correlations. In neither case do imports behave as they should do if the Customs Union/Single Market or distance were the prime dynamics acting upon trade. But in each case, imports came nearer to meeting orthodox economic expectations than exports. This again implies that UK exports behave differently to imports.

The results don't nullify or disprove Gravity Theory. But they should circumscribe the conclusions that are drawn from forecasting models that rely on it. It is possible that Gravity Theory is correct: that all things equal, countries trade more with large countries that are close, but that so many other factors impact trade growth that it consistently swerves trade performance from the predicted path, and that these other factors apply to individual sectors and individual countries.

Out of curiosity, the same test was executed on UK services exports. The results were mildly more encouraging for Gravity Theory. All the results at least showed a negative

correlation between distance and export growth, after GDP was taken into account. The UK's top 50 export services partners delivered an unweighted result of -0.31, and this sample accounted for 83.6 per cent of services-export partners in 2019. Services exports to non-EU countries still grew faster than to the EU, but after all bilateral GDP growth rates are accounted for, UK services exports performed slightly better in the EU than elsewhere.

Whether this reflects the importance of tourism or is due primarily to financial services are big questions that deserve scrutiny. But it may be of some comfort to Gravity Theory practitioners to know that the theory works better on people than on goods – at least as far as the UK is concerned.

4.

What drives export growth for UK manufacturing?

The previous two chapters analysed the UK's top 14 manufacturing export sectors and top 50 export partners. The analyses covered 79.1 per cent and 94.1 per cent of UK goods exports, respectively, in 2019. They correlated export performance, first against sectoral advantage in the Customs Union and Single Market, and secondly against distance. Two conclusions were drawn:

- There is a mild-to-moderate, inverse link between the apparent benefit that a UK manufacturing sector derived from seamless, tariff free trade with the EU, and its export performance in EU markets from 2000-2019.
- There is a mild, inverse link between the geographical proximity of UK trade partners and UK export performance from 2000-2019. In other words, the further away a trade partner, the faster UK exports grew, after GDP growth rates are taken into account.

Both of these conclusions support the assertions of liberal, free trade economists that the benefits of seamless, tariff free trade with neighbouring economies in the EU are overstated in the economic models used in official trade forecasts.

The correlations could be missing subtle movements

in trade and the methodologies could be refined. Trade is volatile, so the CAGRs between 2000-2019 could be misleading. For example, including 1998 and 1999 in the data would see the long-term CAGR of exports to the EU grow slightly. But exports to non-EU countries grew even faster during those years, so the results will hold. A correlation against distance was run on 1999-2018 data, which incorporated this rapid growth in EU and non-EU exports in 1999. But the correlation result was nearly identical. All results were within 0.08 points of the results for 2000-2019.

If these two tests are a fair reflection of UK trade performance then it follows that tariffs, non-tariff barriers and distance *are not* the principal drivers of UK export performance – at least for goods. The final chapter examines what these drivers might be.

Subsidies pull UK manufacturing overseas – even in competitive industries

One factor that could explain these results is subsidies. If EU countries give bigger subsidies to industries in which the UK is a competitive exporter, that might explain the UK's uneven export performance. Agriculture is the principal focus for taxpayers' support in the EU, but agricultural exports were worth just 0.9 per cent of UK goods exports in 2019. What matters is industry subsidies, and whether they are significantly higher in continental Europe than in the UK.

According to European Commission (EC) data, they are. The EC's own scorecard for member state subsidies published in 2019²⁴ – which omits fisheries, railways and agriculture – shows a vast disparity in subsidy levels across EU nations. According to the scorecard, the UK spent less

on state aid than any other major EU economy in 2018, at just 0.34 per cent of GDP. This was half the EU average of 0.76 per cent of GDP.²⁵ The French Government was judged to expend just over the EU average at 0.79 per cent of GDP, while Germany's rate was 1.45 per cent of GDP. This was *over four times* the UK's subsidy levels, measured as a proportion of GDP.²⁶

From the sectoral analysis in *Lessons learned* it is clear that state subsidies in EU countries definitely impacted the trajectory of some manufacturing. The UK automotive industry stands out. For example, the new, top-selling Land Rover Defender is built at a €1 billion factory in Nitra, Slovakia. Jaguar Land-Rover decided to build this plant in 2015 with €125 million of state aid from the Slovak Government.²⁷ This aid received post-facto approval from the EU Commission in 2018.²⁸

Another example is the MINI brand, now owned by BMW. MINI is a reinvigorated global style icon, and the degree of customisation that MINI permits heralds a decisive shift in premium car manufacturing. But one-third of MINIs are not made in Oxford, but rather in Born, Netherlands, by a contract manufacturer called VDL Nedcar. The car plant at Born has a chequered ownership history. When Mitsubishi effectively transferred ownership of the plant to VDL in 2012, the deal was lubricated by a €6.5 million grant that was worth 7.9 per cent of the €82.4 million investment required.

This may seem a minor sum, but across the EU car industry, the level of subsidisation is vast. In 2017 the newspaper *Handelsblatt* reported – on the basis of government data – that German carmakers had received more than €115 billion of public money in the preceding decade.²⁹ This is a gigantic sum. And these monies were dispersed in the manufacturing

sector that saw easily the worst comparative performance of any UK manufacturing sector (see Chapter 2). By 2019, the value of the UK's auto exports to the EU were actually below their 2000 level in real terms. Meanwhile, exports to non-EU countries had grown by 6.3 per cent p.a. – faster than any other sector inside or outside the EU (see Table 2.1).

More pointedly, autos is also the sector that generates the UK's biggest manufacturing deficit with the EU, which reached –£29.6 billion in 2019. What appears to happen in the UK car industry is that global car companies³⁰ periodically announce that their plants will have to close unless they receive government support. But support is also solicited from governments in the EU, and since subsidisation is far higher overseas, that's the direction in which manufacturing generally skids. Sometimes these investment decisions are prominent, car-crash events, such as Ford's closure of its Southampton and Bridgend plants in 2013 and 2020, respectively. Sometimes it's an imperceptible sidle, as with JLR's relocation of some Discovery models and the new Defender to its plant in Slovakia.

But the offshoring process is ongoing and its impact is massive. Investment is diverted from the UK; imports replace domestic production; exports to the EU drop; and the UK is left with a huge and growing deficit. The irrefutable evidence for this process is the steady growth in the UK's deficit in automotive vehicles and parts with the EU, from –£7.7 billion in 2000 (or approximately –£10.5 billion in 2019 prices) to –£29.6 billion in 2019. This is clear evidence that investment is a main driver of the trajectory of UK trade in cars and auto parts with the EU. And the scale of subsidies involved indicate that tax-payers' cash is the magnet that draws investment away from UK plants.

The UK's choice of what to subsidise needs to become smarter

Decisions about what UK Governments choose to subsidise may also play a role – although a negative one. The one sector where the UK clearly exceeds the EU average for state aid is research and development (R&D),³¹ according to European Commission data. Of major EU economies, only Belgium spent a greater proportion of state aid on R&D in 2018. In 2018, 64 per cent of UK state aid was devoted to fundamental research.³²

This may be globally philanthropic but it has short-changed UK industry. For example, in 2010, the UK pharmaceuticals industry received an estimated 40 per cent of total R&D state aid in manufacturing.³³ Yet that was precisely the moment when UK pharmaceuticals manufacturing collapsed, with production declining by almost one-third over the following five years.³⁴ Pharmaceuticals companies moved operations offshore, and exports to the EU stagnated and then declined. A huge new deficit of over –£10 billion in UK-EU trade emerged in less than a decade.³⁵ For UK manufacturing and taxpayers alike, this was a disastrous return on investment.

The consequences of this offshoring emerged in 2020 and 2021 as the UK's reliance on EU facilities for vaccine manufacturing facilities became clear. Before the pandemic, the UK's pharmaceuticals industry was only modestly sized compared to most EU countries, according to Eurostat data. It was two-thirds the size of the pharmaceuticals industry in Germany or Italy, and barely bigger than Ireland's.³⁶ This will be rectified somewhat as the UK's Vaccine Manufacturing and Innovation Centre at Harwell expands. But UK vaccine manufacturing is only reviving thanks to subsidies in manufacturing, not because of subsidies in pharmaceuticals research. Subsidising research guarantees

nothing, as the UK pharmaceuticals industry's post-2010 experience demonstrates.

The issue of EU subsidies will inevitably become a source of trade tension between the UK and the EU. The EU recognised this during negotiations for the TCA, which is why it figures so prominently in the resulting agreement. And since the onset of the pandemic, subsidies have become endemic with state finance pouring into distressed industries across the EU. Even new industries aren't safe. In January 2021, the EU Commission Vice President, Maros Sefcovic, announced that the EU had approved €2.9 billion in subsidies for electric vehicle (EV) battery manufacturing.³⁷ This was on top of €3.2 billion of subsidies approved in 2019. The UK had to counter with its own EV subsidy scheme or accept its car industry would be a non-starter in the EV manufacturing race.

But the UK should be warned. It has signed a free trade agreement with the EU that allows all EU-made goods into the UK tariff free. The recent history of UK-EU trade in autos shows the potential cost. To keep manufacturing in the UK, the Government could have reverted to trading with the EU on WTO terms and allowed tariffs to counteract the effect of EU subsidies. Alternatively, it could sign a free trade agreement with the EU and match those subsidies. The former would see consumers pay; the latter, taxpayers. But someone has to pay because subsidies are swerving investment decisions.

At any rate, here is one explanation for why UK exports did not behave as predicted by economic forecasting models in 2000-2019. In the auto industry – which is now the UK's biggest goods-export industry – subsidies lured production away from the UK, which then reduced growth in exports. A rough calculation for the inflation-adjusted

£19 billion rise in the UK-EU auto deficit since 2000 suggests it is responsible for the equivalent of just over 20,000 jobs moving from the UK to the EU.³⁸ UK Treasury models only ever factored in tariff-free trade with the EU as having a positive net effect in forecasts of economic growth. And yet here is a clear example of how tariff-free trade with the EU was the enabling factor that allowed investment to be pulled out of UK car manufacturing, resulting in lower UK output. Tariff-free trade had a counterproductive impact on the UK car-manufacturing industry, thanks to the scale of subsidies dispersed to EU plants. It will continue to do so unless the UK Government does something to stop it.

Corporate taxation and the offshoring of UK pharmaceuticals manufacturing

Another factor that may heavily impact UK trade is corporate tax and tax rebates. The fact that the UK Government has now committed to global thresholds for corporate tax indicates that officials are at least aware of the potential for differential tax rates to hobble UK manufacturing. The sector most impacted for the UK is pharmaceuticals. From 2000-2009, this was the UK's fastest growing export trade. But after generating a healthy surplus in EU markets during that decade, exports to the EU stagnated and then fell (see *Lessons learned*, Chapter 7). The switch-around is dramatic. In 2019, pharmaceutical exports to the EU were worth just 69 per cent of their value in 2019.

Part of the reason is because global pharmaceuticals companies moved production to Ireland from 2010 onwards, where they enjoy a 12.5 per cent rate of corporation tax. The highest profile example was Pfizer's 2011 decision to relocate its Viagra plant from Sandwich in Kent to Ringaskiddy in Ireland.³⁹ Stepping across the Irish Sea, Ireland's trade

statistics show that the Republic has sprouted an enormous pharmaceuticals industry. It was twice as big as the country's next biggest industry – food – in 2019.⁴⁰ Ireland's inward investment agency, the IDA, claims that the last decade has seen 'close to' the biggest wave of investment in Biotech facilities anywhere in the world.⁴¹

There are multiple accounts of what's driven this investment surge, and these will be investigated in a subsequent research publication. Most sources cite a combination of low corporate tax in Ireland, skilled workers and strong regulation. But the latter two are also UK strengths, while the UK's Medicines and Healthcare Products Regulatory Agency is one of the most authoritative health regulators in the world. The professional services company, PwC, also cites Ireland's tax treaty network and the availability of R&D credits.⁴²

So far, the evidence indicates that the Irish Government is alive to the threat posed by global measures to equalise the rate of corporation tax that companies pay.⁴³ In May, Ireland's finance minister objected.⁴⁴ Ultimately, only the pharmaceuticals companies know what tips the balance in their investment decisions. A definitive answer requires a bout of corporate sleuthing. And this is an instance where delving into corporate annual reports will deliver a better grasp on trade as compared to diving into economic models.

Since pharmaceuticals is one of the UK's top five or six biggest export industries, the impact of tax-driven production decisions on the UK's overall trade is potentially huge. For the first 10 years covered in this study, pharmaceuticals was the UK's fastest-growing export sector. And for a brief period it became one of the UK's top five export industries. But its performance since 2010 has been dismal, and one of the culprits appears to be the way global pharma is taxed.

Consequently, any forecasting model that fails to take into account the potential for tax policies to impact investment and therefore trade flows is likely to wildly miss its mark, at least in the UK's pharmaceuticals industry – or Ireland's for that matter.

The Euro & UK competitiveness

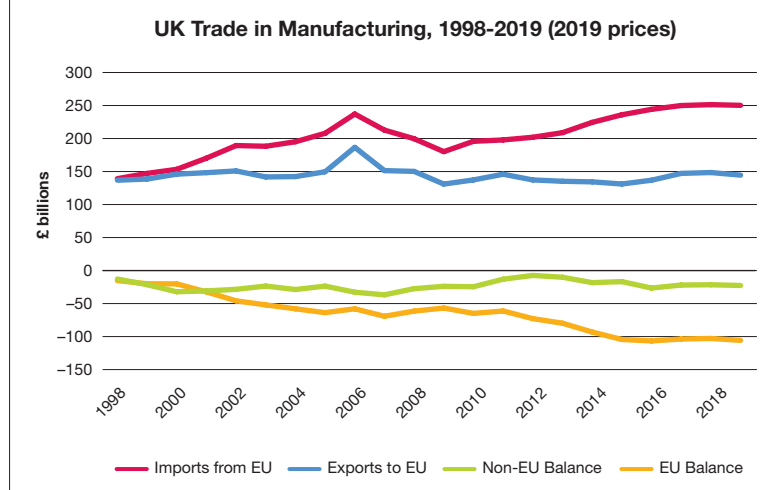
Currency competitiveness might also explain the UK's deteriorating export performance in EU markets since 2000. The idea has obvious merits. It would help explain why multiple UK sectors perform far better in global markets as compared to EU ones – even after differences in GDP growth are taken into account. The UK's exports of motor vehicles, aerospace goods, pharmaceuticals and beverages all outpaced the average annual growth rates of the UK's global export partners from 2000-2019. But *all* major UK sectors performed poorly or falteringly in EU markets, with the exception of aerospace and food products.

The *Lessons learned* report identified the operation of a 'captive market' effect in some of the UK's most valuable industry sectors. This is the phenomenon whereby the EU takes an ever-smaller share of UK exports but supplies an ever-growing share of UK imports. The trait is pronounced in UK-EU trade in motor vehicles, machinery, chemicals, steel, pharmaceuticals, food products and beverages. For example, in 2019 the EU supplied 83 per cent of all UK imports of motor-vehicles and parts, while its share of UK exports plummeted from 72.1 per cent in 2000 to 44.1 per cent in 2019. If UK manufacturers were fundamentally uncompetitive, this trait should repeat to some extent at least in the UK's global trade as well. It doesn't, and currency valuations may be the underlying cause.

First, a steadily deteriorating trade balance with the EU

that impacts almost *all* export sectors is exactly the result that could be expected if UK trade had to deal with a chronically undervalued Euro. In 1998, the UK's manufacturing trade with the EU registered a deficit of just –£10.8 billion, or –£15.2 billion in 2019 prices. Over two decades, that deficit rose steadily to –£105.7 billion in 2019 (see Figure 4.1 below). Over the same period, the UK's trade balance with the rest of the world stayed relatively balanced. The deficit in manufactured goods rose to –£36.8 billion in 2007, before falling back to –£22.6 billion in 2019.⁴⁵

Figure 4.1: UK Manufacturing trade with the EU, 1998-2019 (2019 prices)



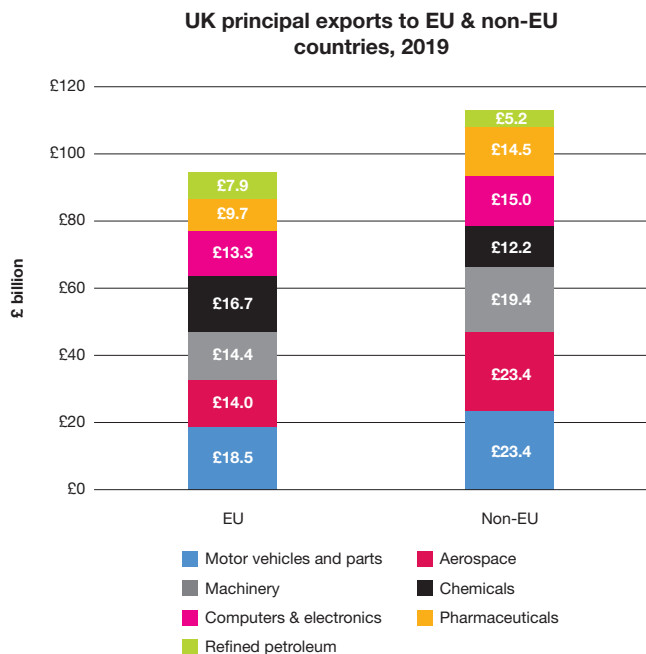
Source: Office for National Statistics BoP Publication tables, UK trade in goods, CPA (08) UK Trade in goods by Classification of Product by Activity, time series dataset, June 2021.

Perhaps the UK sells different goods to the EU as compared to global markets? This would explain divergent export performance and balances. But the sectoral analysis in *Lessons learned* shows that the goods the UK sells to global markets are broadly similar to the goods it sells to EU

markets (see Figure 4.2 below). The UK's top-ranking exports to EU markets are motor vehicles, chemicals, machinery, aerospace, computers & electronics, pharmaceuticals and refined petroleum, in that order. The UK's top-ranking exports to non-EU markets are the same in a slightly different order: aerospace, motor vehicles, machinery, computers & electronics, chemicals then pharmaceuticals.

The principal difference is that the UK's trade in refined petroleum and chemicals is heavily skewed towards the EU. Also, the UK's aerospace industry is more global. Given the comparative performance of chemical and refined petroleum exports (see Table 2.1), it is tempting to conclude that the UK's bulk, commoditised goods sell better in EU markets than other forms of manufacturing. Perhaps dangerous liquids are more likely to be transhipped through Rotterdam than non-bulk commodities. But the essential point remains. The UK is selling essentially the same goods into EU and non-EU markets but proving more successful in the latter.

There are differences at the sub-sector level. The UK sells mostly premium marque motor vehicles in markets outside the EU, but mass-market models inside it. This explains why the UK sells more vehicles into EU markets than to global markets, but their value is far lower – or just 70 per cent of the export value of global sales in 2019 (see Figure 4.2 below). In the machinery sector, exports to the EU are skewed towards lifting and handling equipment, whereas exports to non-EU countries are skewed towards industrial machinery such as pumps and valves – including, especially, machinery used in the oil and gas industries. But otherwise, the results are perplexing. UK manufacturing is somehow more competitive in non-EU markets than in EU markets, even though – broadly speaking – the same goods are involved.

Figure 4.2: UK's top six manufacturing exports to EU and non-EU markets

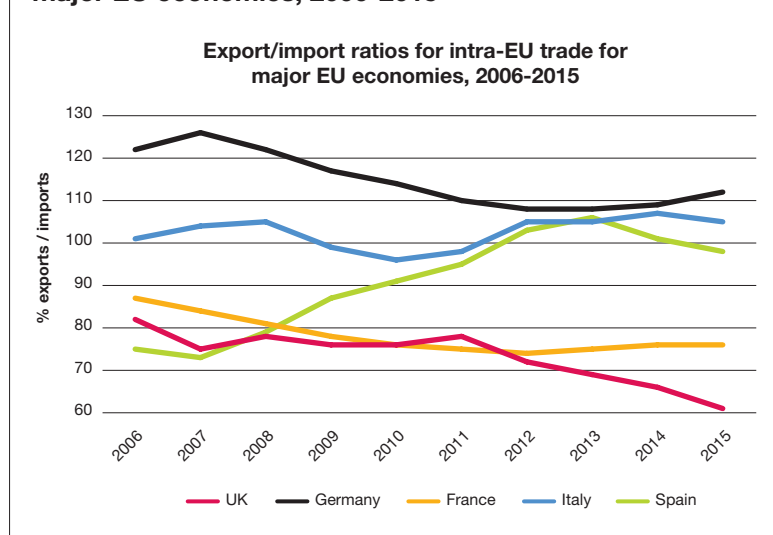
Source: Office for National Statistics BoP Publication tables, UK trade in goods, CPA (08) UK Trade in goods by Classification of Product by Activity, time series dataset, June 2021.

So, is the Euro to blame? Dr David Blake, Professor in the Faculty of Finance at City, University of London estimated in 2021 that the Euro was undervalued against Sterling by 15.2–20 per cent on a purchasing power parity basis.⁴⁶ The result, according to Blake, was that the UK was becoming an EU ‘dumping ground’, as EU goods displaced UK manufacturing from domestic markets and UK goods from EU markets. Blake reports that by 2019, the UK’s export/import ratio with the EU was just 79 per cent.

This is poor by comparison with other major EU economies, though a distinct improvement on recent ratios.

According to Eurostat data no longer publicly available,⁴⁷ the UK's export/import ratio for intra-EU trade declined steadily from 82 per cent in 2006 to 61 per cent in 2015 – the year before Sterling's referendum-induced devaluation. By 2015, the UK had by far the worst export/import ratio for intra-EU trade of any major EU economy – including France.

Figure 4.3: Export/import ratios for intra-EU trade for major EU economies, 2006-2015



Source: Eurostat; Statistics Explained, Intra-EU trade in goods, Recent Trends. Accessed January 2017. Original [Link](#). (Data no longer presented.)

One subtlety of the ‘cheap Euro’ explanation is how it specifically keeps German export prices low. This is because it anchors German production into a currency that is less valuable in currency markets than would otherwise be the case if Germany industry still used the Deutschmark. According to this theory, high productivity rates in German industry in the pre-Euro era were constantly offset by an appreciating Deutschmark. In effect, higher export prices counteracted German competitiveness.⁴⁸ This auto-

balancing mechanism disappeared when Germany joined the Euro, hardwiring German competitive advantage in a currency that is comparatively weaker in exchange markets – or so the theory goes.

The best supporting evidence for this theory is that Germany now accrues enormous trade surpluses both inside and outside the EU. German physical exports got badly hammered by shutdowns and the dislocation of global trade in 2020, but in 2019, the country recorded the world's largest current account surplus, at US\$293 billion.⁴⁹ This was the fourth successive year Germany had achieved this feat. These surpluses are an issue in contemporary international political economy. The EU and the IMF have consistently urged Germany to adopt policies to boost domestic demand, in order to reduce the balances.⁵⁰

There are variations in the theory. Some commentators assert that the Deutschmark entered the Euro after a period in which its value was deliberately depressed.⁵¹ This built in a competitive advantage for Germany within the European market. The country's Hartz IV labour reforms also helped Germany's long-term competitiveness by limiting industrial wage rises. The combination of a restricted rise in manufacturing labour costs, and export prices that cannot appreciate in currency markets leaves German goods becoming ever more competitive. Hence, Germany's enormous global trade surplus in goods.

Debate on the degree to which German industry enjoys in-built currency competitiveness is ongoing. But the sectoral analysis in Chapter 2 of this paper provides *some* supporting evidence. Except for electronics, the major industries where the UK's export performance in the EU were weakest in absolute terms were: autos (where UK-EU exports grew -0.1 per cent CAGR); machinery (0.8 per cent); chemicals

(-0.2 per cent); and electrical goods (-0.6 per cent). These are precisely the industries where German companies dominate within the EU. According to Eurostat data, German companies accounted for 23.4 per cent of intra-EU exports of motor vehicles in 2020, 21.8 per cent of chemicals, and 30.5 per cent of machinery and equipment.⁵² These are very high ratios.

Note also from Chapter 2 (Table 2.1), that the UK's exports to EU markets performed comparatively well in aerospace, food and beverages – where German industry is not nearly so dominant within EU markets.

But even if the UK's competitiveness issue is with Germany rather than the rest of the EU, that doesn't alter the core problem. In 2020, the EU's large global trade surplus was driven by those same industries in which the UK performs poorly in EU markets – machinery & vehicles (€174 billion) and chemicals (€178.4 billion), according to Eurostat data.⁵³ Perhaps the root-cause of the UK's recent failure in EU markets lies deeper still.

Historical perspective: The UK's free-trade fling with Europe

Perhaps history offers the best clue to what went wrong for UK trade with the EU. Looked at strategically, the UK progressively abandoned free trade from 1932 onwards, while maintaining mostly free trade with commodity economies. In 1973, the country flipped this policy on its head. It entered a Customs Union with similar industrial economies and erected tariffs against low-cost commodity exporters. It switched from a trade policy that preferenced complementary economies, to a trade area that was designed specifically to fuse similar industrial economies.

One of the most powerful economic arguments advanced

in favour of a European-centric trade policy was that it would help cure UK industry of its chronic un-competitiveness. Perhaps it worked, but other forms of shock therapy were administered soon after accession. And whatever benefit the Customs Union delivered to UK manufacturing ceased in 1999. This was the last year in which an increase in exports to the EU was sustained, in real terms. Since then, seamless, tariff-free trade with the EU has delivered stagnant exports and import growth that exceeds the UK's own economic growth rate by 0.9 ppts per year.

What's more, this is specifically a UK-EU phenomenon. Other major economies did not experience the same result in their exports into the EU. According to official US data, US goods exports to the EU grew by a CAGR of 2.5 per cent from 2000 to 2019.⁵⁴ The UK's performance was 0.0 per cent during the same period, or 0.1 per cent if precious metals are included. Among the EU's four biggest external trade partners, the UK is the only country to have *failed* to grow goods exports into the EU from 2010 to 2020, according to official EU data.⁵⁵

From whichever angle the trade data is approached, it fails to register any sign that seamless, tariff-free trade with the EU helped UK goods exporters from 2000 to 2019. Other big economies performed better without it.

Conclusion: the experts got it wrong

This research shows that over the past two decades, UK exports to the EU performed best where the effect of the Customs Union and Single Market was weakest, or absent. The only sectors that performed comparatively well in EU markets were either small (food products) or slow growing (chemicals) or facing imminent decline (refined petroleum). What's more, UK exports are now growing faster in countries

that are furthest away from the UK, even after different rates of GDP growth are taken into account. The two basic premises on which expert, trade-related opinion was based from 2016 have no basis in the actual performance of UK trade from 2000-2019.

From the sectoral review in *Lesson learned*, it appears that different factors impact different sectors to different degrees. The decisive factors in the growth of UK exports over the past 20 years appear to have been: movements in investment (automotive goods and pharmaceuticals); subsidies (automotive and aerospace); corporate taxation (pharmaceuticals); and sheer entrepreneurship (aerospace, machinery, beverages).

There are also sectors where oil production (chemicals) and the cost of power (chemicals and steel) directly impact UK manufacturing and trade. There are sectors where tariff-free trade with the EU should have delivered a substantial benefit but clearly didn't (autos and beverages, to a degree), and only a few where tariffs, regulatory access and proximity resulted in a positive comparative performance (chemicals and food products).

The trade-forecasting models that cannot accommodate these varying factors across manufacturing sectors are hardly fit for purpose. And without thorough research into what drives UK trade performance in different sectors around the globe, the UK's Department for International Trade is flying blind in its pursuit of new trade agreements.

Also, this research shows that the continuation of tariff-free trade with the EU carries inherent risks. For example, the process of offshoring in the UK's auto and pharmaceuticals industries will likely continue unless the UK Government does something to stop it. Besides, seamless, tariff-free trade with the EU has had a perverse impact on UK trade.

A correlation of the performance of the UK's top 14 export sectors shows that seamless, tariff-free trade with the EU did not benefit the sectors that should have benefited, and sectors that performed comparatively well in EU markets did so despite gaining little or no advantage.

The current UK-EU trade agreement faces multiple challenges as its iniquities become obvious. At some inflection point in the future, the UK Government will have to decide what it is ultimately worth. If its purpose is to increase exports, then its proven benefit is limited to the food and chemicals sectors.

This analysis may help to explain why so many free trade economists were relaxed about the UK leaving the Customs Union on WTO terms. In reality, free trade with the EU means embracing a succession of subsidised manufacturing sectors on disadvantageous terms, the net effect of which is the reverse of what was intended. In the circumstances, preserving seamless, tariff free trade with the EU while extruding the UK's financial services from the trade deal is prejudicial to UK interests. Should the UK do anything about this? Even Adam Smith, the champion of free trade, said there were good reasons to retaliate against 'prohibitions',⁵⁶ if it offered the recovery of free markets.

Appendices

Appendix A: Assessments of comparative advantage of UK manufacturing sectors in trade with the EU, 2000-2019

Note: A detailed analysis of the comparative benefit each sector enjoyed while the UK was in the Customs Union is given in chapters 3-11 of *Lessons learned for a Global Britain*.

Manufacturing Sector	Score / 5	Tariff rates that UK exporters would have to pay if exporting to EU without membership of the Customs Union or a free trade agreement. Rating: 1 = 0-1%; 2 = 1-4%; 3 = 5-9%; 4 = 10-20%; 5 = 20% +
Motor vehicles	4	9-10 %
Transport/aerospace	1	92% of goods in this category are aerospace. There are no tariffs globally on aerospace goods as they were abolished under GATT. Most is either wings supplied to Airbus and Rolls-Royce aeroengines supplied to Boeing and Airbus. Bikes and motorbikes was 1.8% of sector exports in 2019.
Machinery	1.5	1.7% for electrical machinery and mechanical appliances. In terms of global tariffs, JCB says it pays 0% for most of its exports.
Chemicals	2.5	Varies. Inorganic chemicals at 2.6%, organic at 3.8%. Paints at 6%. The Chemicals Industry Association say rates vary from 0 to 6.5%, with an average 4.7% for the EU 27 in its no deal Brexit briefing. Fertilizers at 3.7%. Veld puts MFN tariffs at very fractionally above petrochemicals
Computers, electronics etc.	2	Thousands of products, but tariffs are sub-3% generally.
Pharmaceuticals	1	There are no tariffs, courtesy of Uruguay Round.
Basic metals	3	Zero tariffs, but anti-dumping tariffs are common globally. Also, theoretical effectiveness of EU mass in trade disputes. Veld says low for MFN tariff, but anti-dumping activity means benefit should rate high. Hard to rate as EU could have been more active in using tariffs to protect UK steel from anti-dumping post 2016 but wasn't.

APPENDICES

Manufacturing Sector	Score / 5	Tariff rates that UK exporters would have to pay if exporting to EU without membership of the Customs Union or a free trade agreement. Rating: 1 = 0-1%; 2 = 1-4%; 3 = 5-9%; 4 = 10-20%; 5 = 20% +
Refined petroleum & coke	2.5	3.5 to 4.7%. Veld rates slightly above chemicals.
Food products	5	The highest of any UK sector. Most fall within a 20–60% range. E.G., effective rate on beef is 60%. Quotas are a major factor in trade in food.
Electrical	2	Tariffs often in 4% range. However, most UK electrical goods exports are sold industrially. Electric motors and distribution equipment were 36% of exports in 2019. Domestic appliances were just 8% of UK electrical exports in 2019.
Beverages	3	EU charges zero on whisky and gin, and distilled drinks were 77% of sector exports in 2019. EU takes 33% of UK exports of distilled drinks. US is UK's next biggest at 26%; pre 2018 they were zero on whisky (US-EU trade dispute). Not easy to quantify fact that Scotch penalised in US-EU trade war and benefited directly from UK exit from Customs Union. Markets in Middle East, South Asia and Asia-Pacific impose generally high tariffs. So, in the EU, no net benefit; US, partly negative impact owing to trade war; outside, split 50:50. Proportion of Scotch going to high-tariff markets has risen since 2000.
Rubber & plastics	3	Tariffs in the 3.2%-4.5% (rubber) to 6.5% (plastics) range. Veld article gives it mid-range at 5.35% for MFN. About 78% of exports are plastics, so latter rate predominates.
Apparel	4	Tariffs on most clothing items is 11-12%. Knitted goods at 8%. Footwear at 11.4%.
Jewellery, medical equipment, sports gear	2	Jewellery is half this sector, and tariffs are 2.5-4 %, though none on diamonds and pearls. Bijouterie is 4%. Medical devices are low.

Manufacturing Sector	Score / 5	The putative advantage of alignment with Single Market rules, and the avoidance of NTBs in EU trade.
Motor vehicles	4	Some areas of motor vehicles have very high impact on design, for example emissions. The UK Government's 'Long Term Economic Impact (LTEI)' showed Motor Vehicles along with Chemicals as the most negatively impacted manufacturing sector from No Deal, and the second most impacted under FTA (not including food) but including machinery/electronics/aerospace. (Page 59)

TWO TESTS FOR UK TRADE

Manufacturing Sector	Score / 5	The putative advantage of alignment with Single Market rules, and the avoidance of NTBs in EU trade.
Transport/aerospace	1	Berden & Francoise set the NTBs, (US to EU) grade as moderate, just below textiles. However, regulations are in effect set globally. Membership of Single Market does not aid aerospace manufacturers as almost all goods HAVE to conform to global rules, and certification bodies collaborate. Makes sense given that planes fly across borders. Are there any examples of planes/engines licensed to fly in one jurisdiction and not another? Briefly after crash investigations. LTEI suggests machinery/transport/aerospace as LEAST impacted of all sectors (except 'networks')
Machinery	1	The Machinery Directive prescribes a wide variety of areas in which machinery put on the European Market must conform to a recognised standard and safety, in order to be CE certified. But machinery scores lowest on UK Government modelling estimates of NTBs in 2018. UK Government's Long Term Economic Impact also says the least impacted. Page 59.
Chemicals	4	The Chemicals Industry Association asserts high impact of EU legislation, and similar globally. Veld asserts a high degree of positive impact.
Computers, electronics etc.	1	Generally low: products generally produced from single, transnational supply chains and sold globally. Berden & Francoise says very low.
Pharmaceuticals	2	There is an EU medicines agency (EMA), but drug licensing is mostly via national authorities, according to the EMA (below). The centralised authorisation procedure is mandatory for biotech medicine, and therapies added to mandatory list in 2005/2009. (<i>Lessons Learned...</i> pp 103–104). Switzerland not part of Single Market, but access via mutual recognition agreements (MRAs). And MRAs are common for EU, it has MRAs for multiple pharmaceutical and medicinal products with countries that do not have an FTA with the EU, including US, Canada, Switzerland, Israel and Canada. Also, the benefit of EMA accrues to UK anyway, as single authorisation covers 27 others. All countries require authorisation for new drugs, so drawback of having to get 1 extra authorisation is marginal, unless a drug is specifically brought to market for Europe. Unlikely: if they work, they are sold globally.

APPENDICES

Manufacturing Sector	Score / 5	The putative advantage of alignment with Single Market rules, and the avoidance of NTBs in EU trade.
Basic metals	2	EU rules cut both ways: State aid rules hinder UK Government from assisting UK steel. On balance, Single Market should help UK compete, but in fact doesn't because high industrial energy prices make UK steel uncompetitive in EU. Collapse in UK production in 2016 compared to Germany shows how complex the market is. Berden rates very low.
Refined petroleum & coke	4	Similar to chemicals.
Food products	5	Regulation on food production, packaging, labelling, storage is massive. Veld gives it the highest rating (page 809).
Electrical	1.5	Safety regulations, but again globally produced. Articles generally rate impact as low. Most UK electrical goods exports are industrial not consumer, further lowering impact.
Beverages	2	Distilled drinks are 77% of exports (2019). Biggest impact is on labelling, which is a common factor for all consumer goods. In Scotch Whisky Association (SWA) submission to UK Treasury prior to Brexit, SWA complained that EU labelling rules for Scotch were far from perfect. Claim that geographical indicator is rooted in EU law, but UK managed to replicate easily in trade agreement with Japan in 2020 (and add some to food products). Have Single Market rules really changed how Scotch is made? No evidence of significant impact, and sales growth of US bourbon in EU pre- EU tariffs easily beat slow pace of export growth in Scotch. David Frost was CEO of SWA prior to referendum. He saw chief value of EU as being able to negotiate lower tariffs – which it largely failed to do for Scotch (South Korea, and that's not even a top 10 market). Mexico is 7th biggest by volume. UK got an FTA including Scotch with Vietnam in Dec 2020 including geographical indicators and a gradual elimination of a 45% tariff. Already UK appears to be eliminating barriers to trade in whisky faster than EU managed on UK's behalf.
Rubber & Plastics	2	EU regulation tends to be on environmental aspects of tyres. Disposability regulation, so impact on UK manufacturing probably bigger impact than trade. But rubber is just 22% of exports.
Apparel	2	Veld article ranks regulatory impact above basic metals. Berden & Francoise puts these as moderate to low. Just lower than aerospace.

TWO TESTS FOR UK TRADE

Manufacturing Sector	Score / 5	The putative advantage of alignment with Single Market rules, and the avoidance of NTBs in EU trade.
Jewellery, medical equipment, sports gear	1	Jewellery is approximately half of exports in this category; medical devices one quarter. UK is member of the Hallmarking Convention which covers most jewellery exports that include gold, silver and platinum. This covers some EU countries, but not Germany, France and Spain. Germany doesn't require hallmarking but as of July 2021, exports to France and Spain have been impacted (Financial Times). So, impact limited to 2 big EU markets. Regulations for medical equipment are ubiquitous. The EU only recently introduced (transitional) 2017 – May 2021 Medical Devices Regulation, replacing the Medical Devices Directive, in place since mid-1990s. This required national bodies to meet EU standards, rather than create an EU wide regulatory regime. Is likely that the advantage plays out in a similar way to Pharmaceuticals. Manufacturers must ensure products meet standards in all markets; UK not being in EU adds one more market, but it still gives benefit of auto access for the remaining 27. So, benefit really accrues to external parties anyway so long as goods are 'born global'.

Principal sources

1. Justin Prott: Potential post-Brexit tariff costs for EU-UK trade.	Link
2. Veld: The Economic Benefits of the Single Market in Goods and Service, (European Commission); page 808.	Link
3. Berden and Françoise 2015: Quantifying non-tariff measures for TTIP; page 10.	Link
4. EU Exit Analysis: Cross Whitehall Briefing, January 2018.	Link
5. UK Treasury: EU Exit: Long-term economic analysis. Page 59	Link
6. The Chemicals Industry Association: The Chemicals Industry: Brexit priorities for UK Growth.	Link
7. The European Medicines Agency: The European Regulatory System for Medicines, 2016.	Link
8. The European Medicines Agency. Human regulatory. MRAs.	Link
9. Scotch Whisky Magazine: Does EU membership benefit Scotch whisky?	Link
10. Eurostat. European Business, facts and figures. Chapter 7, Rubber & Plastics.	Link
11. The Financial Times. Brexit brings hallmark havoc for UK jewellers.	Link (paywall).

Appendix B: UK goods export performance with principal trade partners measured against distance

Rank	Destination	Goods export value 2019 £bn	Export CAGR minus GDP (ppts) 2000–2019	Distance weighted for population distribution (kms)	% of UK exports 2019	Cumulative % of goods exports 2019
1	United States	61.0	−0.5	6,655	17.0%	17.0%
2	Germany	36.5	−0.9	753	10.2%	27.2%
3	Netherlands	24.6	−0.9	436	6.9%	34.0%
4	France	24.5	−1.9	599	6.8%	40.8%
5	Ireland	21.9	−3.9	395	6.1%	46.9%
6	China	24.4	3.5	8,513	6.8%	53.7%
7	Belgium	12.9	−2.2	400	3.6%	57.3%
8	Italy	10.1	−1.4	1,399	2.8%	60.1%
9	Spain	10.4	−2.5	1,369	2.9%	63.0%
10	Hong Kong	8.1	−0.1	9,631	2.2%	65.3%
11	Switzerland	7.1	0.4	873	2.0%	67.3%
12	Japan	6.7	0.1	9,432	1.9%	69.1%
13	United Arab Emirates	5.4	0.6	5,592	1.5%	70.7%
14	South Korea	4.0	0.4	8,929	1.1%	71.8%
15	Canada	5.3	−2.0	5,734	1.5%	73.3%
16	Sweden	5.0	−3.3	1,256	1.4%	74.7%
17	India	4.3	−5.2	7,293	1.2%	75.9%
18	Poland	5.4	1.5	1,407	1.50%	77.4%
19	Turkey	4.4	−2.6	2,874	1.23%	78.6%
20	Singapore	5.1	−1.2	10,917	1.4%	80.0%
21	Australia	4.1	−2.2	16,564	1.1%	81.2%
22	Norway	4.1	−0.8	1,077	1.1%	82.3%
23	Saudi Arabia	3.3	−1.1	4,921	0.9%	83.2%
24	Russia	2.8	1.8	2,972	0.8%	84.0%
25	Qatar	2.7	4.3	5,316	0.7%	84.7%
26	Denmark	2.7	−2.6	910	0.8%	85.5%
27	South Africa	2.0	−3.1	9,477	0.5%	86.0%
28	Brazil	2.0	0.6	8,837	0.6%	86.6%

TWO TESTS FOR UK TRADE

Rank	Destination	Goods export value 2019 £bn	Export CAGR minus GDP (ppts) 2000–2019	Distance weighted for population distribution (kms)	% of UK exports 2019	Cumulative % of goods exports 2019
29	Czech Republic	2.2	−0.5	1,194	0.6%	87.2%
30	Austria	1.9	−1.0	1,267	0.5%	87.75%
31	Nigeria	1.6	−2.3	4,983	0.4%	88.2%
32	Mexico	1.5	−0.3	8,726	0.4%	88.6%
33	Thailand	1.3	−2.1	9,587	0.4%	89.0%
34	Portugal	1.6	−3.0	1,584	0.4%	89.5%
35	Hungary	1.4	−0.5	1,570	0.4%	89.9%
36	Taiwan	1.5	−1.65	9,822	0.4%	90.3%
37	Malaysia	1.4	−5.02	10,705	0.4%	90.7%
38	Finland	1.3	−3.91	1,842	0.4%	91.0%
39	Egypt	1.4	−1.12	3,625	0.4%	91.4%
40	Romania	1.3	0.28	2,079	0.4%	91.8%
41	Israel	1.5	−5.68	3,689	0.4%	92.2%
42	Greece	1.0	−3.08	2,467	0.3%	92.5%
43	Oman	0.6	0.99	5,904	0.2%	92.7%
44	FYR Macedonia	1.3	23.44	2,083	0.3%	93.0%
45	New Zealand	0.9	0.34	18,516	0.2%	93.3%
46	Pakistan	0.8	1.13	6,304	0.2%	93.5%
47	Indonesia	0.7	−3.21	11,742	0.2%	93.7%
48	Morocco	0.7	−3.82	2,147	0.2%	93.9%
49	Vietnam	0.6	3.85	9,922	0.2%	94.0%
50	Chile	0.7	5.61	11,669	0.2%	94.3%

Note: UK goods exports growth rates are CAGR adjusted to 2018 prices using the current ONS trade deflator series. GDP growth rates are taken from World Bank IBRD–IDA database, calculated in constant 2010US\$, except for Taiwan. [Link](#). Distances are taken from the GeoDist database, CEPII, Thierry Mayer and Soledad Zignago. Notes, [here](#). Database available on registration from [here](#).

Appendix C: Adjustments for trade in gold & precious metals in 2019

The value of trade in non-monetary gold has been extracted from all calculations via two principal methods. For the sectoral analysis, the method was straightforward. This involved extracting the value of all precious metals from calculations. This meant that the value of silver, platinum, and multiple other metals forms no part of this analysis.

For the per-country analyses, the method was more complex. This is because the ONS does not publish per-country data on trade in non-monetary gold for confidentiality reasons. Therefore the value of trade in gold has to be estimated from two sources: ONS Trade in Precious Metals, BoP CP SA, accessed February 2020; and ONS Trade in Goods Country by Commodity, accessed February 2020. This definition of precious metals includes non-monetary gold, silver, platinum and palladium.

The estimates of precious metals are made possible because, over 20 years, exports of unspecified goods (which are delineated per-country) closely track exports of precious metals (which are not). In 2019, the value of unspecified goods exports shot up by £13.4 billion and exports of precious metals by £12.5 billion. Trade is erratic for both, but the latter undershoots the former by an average of £1.5 billion per year over the last four years, with the difference in 2019 only slightly wider than usual. The ratio of precious metals to unspecified goods reached 86 per cent in 2019, after the surge in exports. This 86 per cent ratio has therefore been used to estimate the value of precious metals exports per country.

The results closely match expectations. According to the ONS manufacturing data used for the sectoral analysis, exports of all precious metals to non-EU countries jumped

£12.9 billion in 2019. The jump in Unspecified Goods to non-EU countries in 2019 was £13.4 billion. The below figures remain estimates, but they have been calculated in a way that makes them consistent with the BoP data used throughout this study.

Countries	Exports PM £ bn	Imports PM £ bn
Switzerland	4.00	3.70
China	6.19	5.60
Turkey	1.02	1.13
United States	0.24	3.00
United Arab Emirates	1.62	1.12
Japan	0.09	0.06
South Korea	0.14	0.04
Hong Kong	0.56	0.04
Canada	0.42	0.03
Australia	0.42	0.03
Singapore	0.42	0.03
Saudi Arabia	0.14	0.01
India	0.28	0.02
Total here	13.29	14.82
Total non-EU	13.49	15.07
Belgium	0.01	0.01
France	0.05	0.06
Germany	0.13	0.35
Ireland	0.03	0.04
Spain	0.28	0.28
Total EU	0.58	0.85

Note: the estimates for per-country trade in gold use a tighter definition of Precious Metals than SIC 24.4 used in manufacturing data. For example, it excludes trade in uranium, which is included in SIC 24.4. Consequently, CAGRs for manufacturing exports are very slightly higher when calculated from per-country data than when calculated from sectoral data.

Appendix D: Notes on ONS Data

The ONS makes periodic revisions to trade data. Usually these are minor for trade in goods data, although major revisions for trade in services data can be made up to 18 months post publication.

This paper used ONS sectoral trade data as published in June 2021, for the period 2000–2019. This included major recent revisions to trade data for 2019 and, in some cases, to all preceding years, as compared to the data published in 2020. According to ONS, this was due to [an error identified in HMRC Overseas Trade Data](#), which is used to compile ONS trade statistics.

Revisions that impact this research, and which caused variations to CAGRs published in *Lessons learned*, include:

- A £2.6 billion downward revision to exports to non-EU countries of transport/aerospace goods.
- A £2.5 billion downward revision to exports of chemicals.
- A near halving in exports of basic iron and steel – with reductions over multiple years to 2016.

These and many minor revisions have altered the CAGR results for most sectors analysed in this paper. Most changes are minor. However, they were sufficient to reduce the CAGR for exports of manufactured goods to non-EU countries as a whole from 2.56 ppts for 2000–2019 to 2.32 ppts.

For the purposes of this paper, the general effect of these revisions were that the difference between EU and non-EU CAGRs for manufacturing exports dropped from 2.6 ppts to 2.4 ppts. The *difference* between EU and non-EU export CAGRs for goods dropped from 2.6 ppts to 2.5 ppts.

Notes

- 1 UK Treasury: EU Exit: Long-term economic analysis, November 2018. Page 6. [Link](#)
- 2 Trade in most precious metals has been extracted from all calculations. This is because trade in non-monetary gold became volatile in 2019, dramatically increasing trade values for precious metals. The methodology for extracting the value of precious metals is shown at Appendix C.
- 3 This group includes Switzerland, Norway, Iceland and Liechtenstein. Switzerland is not a member of the European Economic Area.
- 4 The FTA group comprises trade partners with whom the UK had a free trade agreement for most, or a substantial portion of the 2000–2019 period, courtesy of the EU. Seven countries qualified in the top 40 category non-EU category: South Korea, South Africa, Mexico, Egypt, Israel Morocco and Chile. Canada and Japan were excluded since the FTAs were implemented too close to the end of the period to justify inclusion. Countries with whom UK trades under the Generalised System of Preferences (GSP) were included in the WTO category, since the focus of this study is on exports, while GSP terms principally impact imports.
- 5 Michael Burrage and Phil Radford: WTO versus EU, An assessment of the relative merits of UK trade relationships, 1999-2018. Civitas. [Link](#)
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- 7 Patrick Minford: The Effects of Brexit on the UK Economy. Wiley – The World Economy. 2019; 42:57-67. [Link](#) (Paywall). Page 58.
- 8 Patrick Minford: The Effects of Brexit on the UK Economy. Wiley – The World Economy. [Link](#) (Paywall).
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- 10 The Role of Gravity Models in Estimating the Economic Impact of Brexit: Graham Gudgin, Kenneth Coutts, Neil Gibson, and Jordan Buchanan. [Link](#).
- 11 Patrick Minford: The effects of Brexit on the UK Economy. Wiley – The World Economy. 2019; 42:57-67. [Link](#) (Paywall). Page 60.
- 12 Radford: Lessons learned for a Global Britain, 2021. Civitas. [Link](#)
- 13 Germany accounted for 13.3% of UK goods imports in 2019, excluding all trade in precious metals. This equated to 24.3% of all goods imported from the EU.
- 14 Patrick Minford: The effects of Brexit on the UK Economy. Wiley – The World Economy. 2019; 42:57-67. [Link](#) (Paywall). Page 65.
- 15 Patrick Minford: The effects of Brexit on the UK Economy. Wiley – The World Economy. 2019; 42:57-67. [Link](#) (Paywall). Page 60.
- 16 Clause 3 ‘... that it would be wrong to make any change in the status of Northern Ireland save with the consent of a majority of its people’.
- 17 Incidentally, this difference in export growth rates is a fairly stable constant in UK trade data. Shift the analysis backwards a year, and exports to non-EU countries still grew 2.6 ppts faster than to EU countries. Include all goods, not just manufacturing, and the difference is 2.5 ppts. Take averages from 1997-1999 and 2017-2019, and the difference remains 2.6 ppts. Strip out all precious metals, or just gold, and the difference is 2.5 ppts. This means however the data is cut, exports to countries outside the EU still grew faster than to countries inside the EU by about 0.6 ppts – *after economic growth rates are taken into account*.
- 18 Protts, Justin: Potential post-Brexit tariffs for UK trade. Civitas, 2016. [Link](#)
- 19 BBC: Emissions rules to end Land Rover Defender Production, October 2013. [Link](#)
- 20 The European Medicines Agency. Human regulatory; Mutual Recognition Agreements. [Link](#).
- 21 BBC: VW pleads guilty to emissions cheating. January 2017. [Link](#)
- 22 Patrick Minford, Overview of Published Treasury Forecasts, [Link](#)
- 23 These are two of the three major UK manufacturing sectors where exports to the EU still exceed in value exports to non-EU countries. The other is food.
- 24 European Commission: State Aid Scoreboard 2019. [Link](#)
- 25 IBID. Page 87.
- 26 IBID. Page 69 and 70.

- 27 European Commission: State Aid Commission opens investigation into proposed public financing of Jaguar Land Rover plant in Slovakia. [Link](#).
- 28 EU: The Commission: State Aid: Commission approves Slovakia's €125 million state investment aid to Jaguar Land Rover. [Link](#)
- 29 Handelsblatt. Germany's pampered car industry. May 2017. [Link](#)
- 30 Almost all UK car manufacturing is owned by global car companies or conglomerates that are based overseas. See Chapter 3, Lessons Learned for a Global Britain.
- 31 European Commission: State Aid Scoreboard 2019. Page 19. [Link](#)
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- 33 MakeUK, Pharmaceuticals Sector Bulletin. Page 14. [Link](#)
- 34 ONS. Annual Business Survey for 2019. Lines 1455 to 1460.
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- 36 The European Federation of Pharmaceuticals Industries and Associations. The Pharmaceuticals Industry in Figures, 2019. Page 11. [Link](#)
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- 38 The calculation is made thus: Once deflated, the deficit has increased by £18.6 billion from 2000 to 2019 (2018 prices). The ABS Survey reckons that the total turnover of the sector in 2018 was £62.781 billion, which supported 85,000 employees. On the gross assumption that in the car industry, the export value of a vehicle is 20 percent above the factory value, then the equivalent number of employees would be 20,950. This calculation suggests that every £1 million of auto exports supports one job, which is probably too high.
- 39 KentLive. Sandwich, the small Kent town forced to rebuild after Pfizer left and took thousands of jobs. November 2019. [Link](#)
- 40 The Central Statistics Office. Irish Industrial Production per sector 2016. [Link](#)
- 41 IDA: Biopharmaceuticals Industry Ireland. Accessed August 2020. [Link](#)
- 42 PwC: Why Ireland for Pharma and Life Sciences. [Link](#).
- 43 Irish Times: Biden's Global Minimum Tax Rate carries big dangers for Ireland. [Link](#)
- 44 France24. Biden Global Tax proposals faces setback after Ireland objects. [Link](#)

- 45 Note: These manufacturing totals exclude most trade in energy, with the exception of refined petroleum. However, trade in primary energy goods is almost entirely un-impacted by either the Customs Union or the Single Market. Trade in refined petroleum is subject to modest tariffs (3.5%-4.7%), but these *are* incorporated into manufacturing data.
- 46 David Blake: The UK is the Eurozone's Dumping Ground. Review of Economics and Finance (pp124-141) [ref]: vol.19.2021[Link](#)
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- 48 Tilford, Centre for European Reform. Germany's Euro Advantage. [Link](#).
- 49 Reuters: Exclusive: Germany ran world's largest current account surplus in 2019: Ifo.
- 50 DW News. IMF blames German trade surplus for trade tensions. [Link](#)
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- 55 The other countries being China, the US and Switzerland. Eurostat, International Trade in Goods. 'Extra EU trade in Goods by main trading partners, 2010-2020. [Link](#)
- 56 Adam Smith. *The Wealth of Nations*. Oxford, 1998. Page 296. Book IV, Chapter II.

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During the UK's departure from the European Union, debate about UK trade policy was dominated by two assertions:

- (i) that seamless, tariff-free trade with the EU was the optimal outcome for UK manufacturing;
- (ii) that trade grows fastest with countries that are nearest.

In this report, trade analyst Phil Radford performs two correlations on UK trade data to scrutinise the evidence for these two assertions.

By comparing the performance of the UK's 14 largest manufacturing export sectors in EU and non-EU markets from 2000-2019, the author finds there is a mild-to-medium *inverse* relationship between the comparative benefit enjoyed by a sector in the EU – in terms of tariffs and seamless access – and its comparative performance in EU markets over the past 20 years. In other words, there is no positive connection between the supposed benefits of seamless, tariff-free trade with the EU, and the export performance of UK manufacturing sectors.

This research shows that over the past two decades, UK manufacturing exports to the EU performed best where the effect of the Customs Union and Single Market were weakest or absent. In so far as the EU-UK Trade and Cooperation Agreement replicates the terms of the UK's previous trading relationship, Radford concludes, 'it may turn out to be a very bad deal for the UK'.

The author also finds that for 94.1 per cent of UK goods exports, there is a mild inverse relationship between geographical proximity and export growth for the period 2000-2019. In short, the further a trade partner is from the UK, the faster exports grow – *after* the GDP growth rates of partner countries are taken into account.

The conclusions in this report support the repeated assertions of liberal, free trade economists: that the benefits of seamless, tariff free trade with neighbouring economies in the EU are overstated in the economic models used in official trade forecasts.

