ALIGNING FOR GROWTH?

THE BENEFITS OF AN EU-UK MUTUAL RECOGNITION AGREEMENT

Joseph Sassoon and **Holger Breinlich**

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SUMMARY

Since Britain left the EU, thousands of products that are made in the UK have to be tested and certified by EU bodies before they can be exported. This adds significant trade costs, dampening exports and hurting businesses.

This paper examines a solution to this problem in the form of a mutual recognition agreement (MRA): an agreement that would allow Europe to recognise UK testing bodies as fit to certify products for the EU market.

We find an MRA could boost UK exports by between £3.7 billion and £6.5 billion. This is equivalent to about 0.1 or 0.18 per cent of GDP. Most of these gains would be concentrated in automobiles, pharmaceuticals, and electronics.

In an economy where growth has been very low this level of impact is significant. The OBR expects UK GDP growth to be 1.5 per cent each year over the next five years (OBR 2026). Against this benchmark, increasing growth by 0.18 per cent is substantial. This could generate substantial benefits for businesses and households.

Finally, we find that an MRA with dynamic alignment, whereby the UK keeps it laws in place with the EU, would provide the greatest economic benefits and be the most palatable to the EU.

INTRODUCTION

The UK is currently pursuing a reset with the EU based on **dynamic alignment**: the commitment to keep UK rules aligned to the EU's in exchange for access to European markets. Under the 'reset' the UK is already working on dynamic alignment deals on agricultural sanitary and phytosanitary standards (SPS), emissions schemes, and energy trading (HM Government 2026).

There is every indication this is only the beginning. Andy Burnham told the FT he wants to "add percentage points" of growth through closer ties with the EU (Parker 2026). Hamish Falconer, the new EU relations minister wants to make it easier for manufactures to trade with Europe, especially in formerly ignored constituencies like Lincoln and Makerfield (Elgot 2026).

In this paper, we analyse the next frontier of the UK-EU dynamic alignment agenda: a mutual recognition agreement (MRA) between the UK and the EU.

An MRA is a deal between two countries, where they **mutually recognise** each other's testing and certification, so that goods don't need to have *extra* testing once they are exported. This is potentially a significant barrier. 28 per cent of all exports by value require testing before they can be sold on the EU market, including products (but not limited to) such as automobiles, medical devices, and machinery.

Not all MRAs involve the same degree of alignment.

At the one end of the spectrum, are **MRAs of conformity assessment** which don't require any alignment at all. This kind of MRA would allow UK **notified bodies** (organisations who test goods) to certify goods for the EU market, as opposed to the good having to be sent to an EU notified body for testing.

At the other end of the spectrum are **enhanced MRAs** which *are* predicated on alignment. These are currently the EU's preferred choice of MRA with third countries. In this scenario because laws are the same (due to alignment), a test result certifying a good for the UK market **is deemed equivalent to a test result for the EU market.**

Enhanced MRAs also affect goods that don't require notified body testing. Some lower risk goods just require self-certification. Even with an MRA of conformity assessment, a producer would need to self-certify that their goods meet EU standards in addition to UK standards if they want to sell in both markets. An enhanced MRA would mean that the producer would only need to self-certify once, as a UK self-certification would be deemed equivalent to the EU standards.

MRAs can also cover a wide range of sectors, such as the Swiss-EU enhanced MRA, or be narrower and just cover a single one, such as the Israeli-EU MRA on pharmaceuticals.

This paper explores whether MRAs can generate the growth in every postcode that the UK government is seeking. It examines the different impacts of the different forms of MRA that the UK could pursue – including dynamic alignment - alongside other options. And it looks at specific sectors, exploring where mutual recognition would make the greatest economic sense for the UK. In doing so it scopes the potential next frontier of a deepening relationship between the UK and the EU.

1. WHAT THE TRADE AND COOPERATION AGREEMENT (TCA) LEFT OUT

When the UK was in the single market, a good could be exported tariff free from the UK to the EU with no extra checks, frictions, ifs, or buts. Brexit largely upended this convenience. On the 1 of January 2021, the TCA came into effect.

It secured zero tariffs and quotas on EU-UK goods trade, but it could not prevent a host of non-tariff barriers (NTBs) from coming into effect, notably:

- agricultural goods exported from the UK will have to face sanitary and phytosanitary (SPS) checks to ensure they meet EU standards[1]
- goods now need to meet rule-of-origin (ROO) requirements (prove that a certain proportion of a goods components originate in the EU or UK) just to enjoy the tariff free access the TCA provides
- exporters need to deal with additional VAT compliance paperwork and customs declarations (AXA 2021)
- a lack of MRA means certain goods need to go through additional conformity checks to prove EU compliance.

This slew of NTBs is particularly concerning for the UK, as it has been empirically shown that NTBs can reduce trade more than tariff barriers (UNCTAD 2025). Homing in on the MRA NTB, it's easy to see why.

Imagine you are a UK firm that produces pacemakers. Your pacemakers are certified for the UK market, previously this meant you could export it to the EU, but now to sell that product to the EU you can't use the same certification. You need to do it all again. This includes having your designs reviewed (European Union 2017), quality control practices audited (including a potential audit of your factory) (European Union 2017), the appointment of an EU representative to handle the process (MHRA 2020), and the export of your device to the notified body for review. This is potentially expensive and timely.

In fact, this process is so onerous, that one UK medical device firm, 3P based in Warwick, threw in the towel completely. They described a "fraught few months" trying to navigate conformity assessment from outside the EU. Eventually realising it was not viable, they were forced to open an office in the Netherlands (Reuters 2023).

An MRA would relieve 3P of this hassle, though it would not resolve other the other NTBs imposed by Brexit, namely ROO, VAT compliance, and customs checks.

So, if an MRA would only solve part of the NTBs imposed by the TCA, is it worth it? Existing evidence seems to suggest yes.

1 The EU and UK have recently signed an SPS agreement, which is due to be ratified by parliament. This will alleviate checks on agricultural goods but is not in place yet.

Numerous studies examining MRAs have found positive effects. Many of these results are relevant for a potential UK-EU MRA. For instance, it's been shown that MRAs are positive when countries have a similar technological base and level of development (Jang 2018). Homing in on specific sectors, MRAs are said to have positive effects on electronics (Blyde 2023) and medical devices (Baller 2007).

Even studies that don't find positive effects on trade volumes, do find positive effects on the number of firms choosing to export (Baller 2007), which can make markets more competitive by allowing smaller firms to enter the market. A study on the Swiss-EU MRA, for example, while not finding positive effects on the volume of goods exported from Switzerland to the EU after the EU-Swiss MRA, did find an increase in the number of different products being exported to the EU (Schwarzer 2017). This can have benefits for the industrial makeup of an economy.

An MRA could also act as a potential signalling device to Brexit weary firms. Trade uncertainty can reduce a firm's willingness to make the required investments to export goods (Handley and Limão 2015). We know that Brexit uncertainty reduced investment in the UK (Bloom et al 2019), therefore it is plausible that an MRA with the EU could signal much needed certainty to UK firms.

These benefits make sense when considering the costs of Brexit. There is ample evidence that Brexit reduced UK exports to the EU (ECB 2023). The estimates are large and varied, with drops in exports ranging from 6.4 per cent to 29 per cent. One paper even found that the reason exports dropped was because smaller firms exited the market (Freeman et al 2024). This makes sense with our earlier 3P example. Not all firms can setup an office in the Netherlands.

A compelling policy narrative is starting to emerge. Prior to Brexit the UK was part of the single market, so it had a de facto MRA with the EU.[2] Once the TCA was signed and the Brexit transition period ended it lost the mutual recognition over a range of goods. Exports to the EU decreased after Brexit, and the number of firms exporting decreased. MRAs are shown to increase exports, or at the very least increase the number of firms choosing to export. Could we therefore conclude that the *lack* of MRA in the TCA hurt UK exports to the EU, and securing an MRA would increase exports?

In the next section we test this narrative, asking what would have happened if the EU and UK had signed an MRA when the TCA came into effect 2021. For a headline description of our methodological approach please see the box below. For more details on how we run our hypotheticals, our data, as well as how we classify MRA relevant goods, please see the annex.

METHOD

To figure out what kind of MRA would provide the greatest benefit, we model a series of hypotheticals asking: what would have happened if the UK had signed an MRA when Brexit was finalised in 2021.

To do so, we need to first identify the goods that require duplicate testing and certification to be exported to the EU. These are our MRA-relevant goods. This is done by feeding individual goods into an Large Language Model (LLM) as well as EU import requirements. The LLM then classifies the good as MRA relevant or not, and also checks if it needs self-certification or notified body testing.

Next we need to see how exports of these MRA-relevant goods changed after Brexit. If they fell, we could say that a lack of MRA has meant our

2 This is an understatement; it had free movement of goods and mutual recognition.

exports to the EU decreased. Unfortunately, it's not so easy. Many things happened at the same time as Brexit: a global pandemic, shifting supply chains, a disastrous mini budget, and a collapsing pound. How can we be sure that it was the lack of MRA that caused the drop?

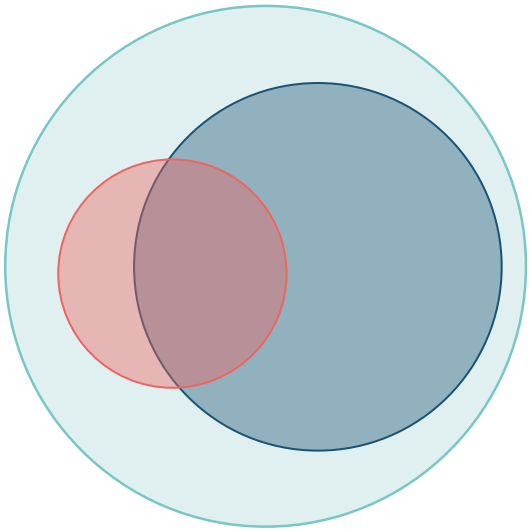
To strip these other shocks out, we use a triple comparison or more formally 'triple difference in differences'. The first comparison is over time: we compare the UK's exports of goods to the EU before and after Brexit. The second is across products: did MRA-relevant goods fare worse after Brexit than non MRA goods? This nets out anything that affected both goods equally, such as border delays and customs paperwork. The third is across countries: we compare how UK exports of the same products to the EU vary by exporting country. This nets out anything that affected MRA-relevant goods on a global scale such as pandemic supply chain disruptions. What's left after these three comparisons is what we attribute to conformity assessment barriers.

This is the first time an attempt has been made to causally quantify the effects of losing mutual recognition after Brexit. Also, by building our list of MRA relevant goods from the ground up (see technical annex for more details), as opposed to applying blanket rules to whole sectors, we are also able to identify the effect accurately. Despite employing a granular approach, one limitation is that we do not have data on how other non-tariff barriers affected different goods after Brexit. This could potentially influence our results.

2. THE IMPACT OF AN MRA ON THE UK ECONOMY

FIGURE 2.1: HOW THE THREE MRA SCOPES NEST

Nesting structure of HS6 product codes by type of MRA



Enhanced MRA
1,278 CN8 families

Swiss-EU enhanced MRA
1,103 CN8 families

MRA of conformity assessment
363 CN8 families

Product lines by region

In all three	263
Conformity, not Swiss	100
Swiss only	819
Enhanced only	72

Source: Authors' calculations from the fixed classification results from Access2Markets.
Notes: Counts are corrected CN8 regression families under the two-stage 50 per cent rule. Conformity and Swiss scopes sit inside enhanced coverage but do not perfectly nest inside one another; unresolved conformity classifications remain excluded. Circle sizes are schematic.

In our analysis we test the impact of three different MRAs.

1. **An MRA of conformity assessment**. This is an MRA that only covers goods that require notified body testing (third party testing). This MRA does not cover goods that require self-certification and in theory does not require any dynamic alignment. By testing this, we can see what an MRA without dynamic alignment would do.
2. **An enhanced MRA**. This covers all the goods that require notified body testing (so all goods in our MRA of conformity assessment) and covers goods that require self-certification. An enhanced MRA requires dynamic alignment. Testing this allows us to see what an MRA with dynamic alignment would do. It is also the EU's preferred kind of MRA so it is a realistic model.
3. **A Swiss-EU MRA.** The Swiss-EU MRA is an enhanced MRA between the EU and Switzerland. It is sector specific and includes (but not limited to) radio equipment, toys, machinery, and motor vehicles. This MRA covers all notified

body and self-certification goods that fall under the Swiss-EU MRA sectors.[3] By testing this we can see how an agreement that the EU already signed would work for the UK.

Figure 2.1 provides a visualisation of the number of products covered by each MRA. You can see that an MRA of conformity assessment covers the fewest goods as it only hits items that require notified body testing. The Swiss and enhanced MRAs also cover goods that require self-certification, so they naturally cover more goods.

Table 2.1 presents our headline results. For each type of MRA there is a large and statistically significant increase in exports to the EU with an MRA signed. A narrow MRA of conformity assessment could increase exports by up to 4.7 billion pounds per year. Whereas a enhanced MRA or Swiss deal could increase exports by up to 6.5 and 4.2 billion pounds respectively.

TABLE 2.1: INCREASE IN EXPORTS BY TYPE OF MRA

Scope of mutual recognition	Annual £ uplift (central)	Lowest - highest case
MRA of conformity assessment (notified-body testing only)	£4.7bn +29% uplift	£2.2bn to £7.6bn +13% to +46%
Enhanced MRA (self-certification and notified-body goods)	£6.5bn +18% uplift	£3.3bn to £10.0bn +9% to +28%
Swiss–EU enhanced MRA (goods covered by the Swiss–EU MRA)	£6.2bn +20% uplift	£3.2bn to £9.5bn +10% to +30%

Source: Authors' analysis of HMRC, Comtext, and Access2Markets.
Notes: see technical annex for more details on model spec.: The percentage effect is a single pooled estimate for 2021–2024 relative to 2015–2019; 2020 is omitted. Pound values apply that effect to the arithmetic mean of covered UK–EU exports in 2021, 2022, 2023 and 2024. The first line is the mean annual pound uplift and the second is the mechanical percentage uplift. Ranges are 95 per cent confidence intervals.

Enhanced and Swiss style MRAs causing potentially higher exports than a narrow MRA of conformity assessment makes sense as they cover a wider range of goods. Crucially, the extra self-certification goods that they do cover do not receive same level of upliftment that notified body goods receive in the narrower MRA of conformity assessment.

Is this finding robust? Our analysis suggests it stands up in the face of alternative explanations.

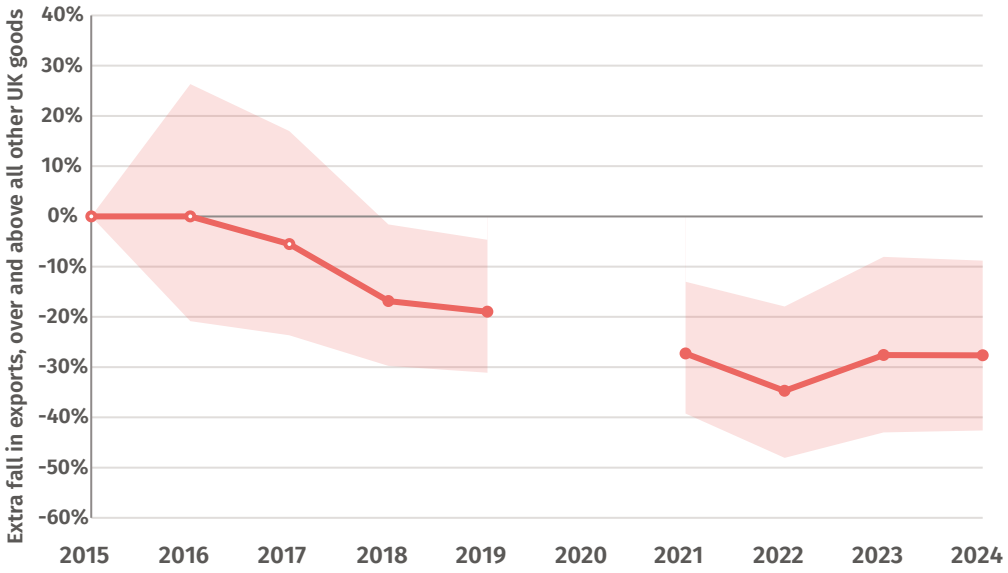
We first explore whether the impact might be driven by a pure business confidence effect. If exports drop substantially in MRA-relevant goods prior to Brexit, it could imply that Brexit uncertainty is driving our results.

3 A full list: machinery and safety components, low-voltage electrical equipment, electromagnetic compatibility, radio equipment, personal protective equipment, toys, pressure equipment and simple pressure vessels, equipment and protective systems for potentially explosive atmospheres (ATEX), lifts, passenger cableway installations, household gas appliances, measuring instruments (meters, material measures of length, and automatic and non-automatic weighing instruments), construction products, explosives for civil use, outdoor equipment subject to environmental-noise limits, motor vehicles, and medicinal products subject to GMP inspection and batch certification (medicines for human use, veterinary medicines, and active substances).

Figure 2.2 shows that from 2016 to 2017 there is no extra penalty for MRA-relevant goods. However, a small gap does open in 2018, suggesting small anticipation effects. However, this gap widens substantially after the TCA was passed, implying the Brexit deal itself seems to have reduced the exports of MRA-relevant goods.

FIGURE 2.2: GOODS REQUIRING CONFORMITY ASSESSMENT FELL FURTHER AFTER BREXIT

Event study of the general UK export effect and the additional conformity-assessment differential, relative to 2015



Source: Authors' analysis of HMRC, Comtext, and Access2Markets.
Note: The line shows the estimated percentage change in UK exports to the EU since 2015, measured relative to those comparison exporters; the shaded band is the 95 per cent confidence range for the red line — the range the true effect is likely to fall within. Where it sits entirely below the zero line, MRA-relevant goods fell significantly further than other UK goods; where it crosses zero, the difference cannot be distinguished from none. Solid markers are statistically significant, hollow markers are not.

Second, we test our three hypothetical MRAs, but with certain countries and goods removed from our model in case they are driving the results erroneously. We try dropping China from our control group as it recently had a surge in value-added exports to the EU that may have happened with or without Brexit. We drop Russia, as sanctions would affect EU-Russian trade flows and have nothing to do with Brexit. We also drop liquid natural gas (LNG) exports and broader energy exports, as these would be affected by sanctions on Russia as well as the sabotage of Nord Stream, which is also independent of Brexit. These results can be seen in table (3) 2.2.

TABLE 2.2: MRA RESULTS WITH EXCLUSION RESTRICTIONS

Mean annual uplift in £ billion using 2021–2024 covered trade; percentage uplift beneath

Comparison-country sample	MRA of conformity assessment	Enhanced MRA	Swiss–EU enhanced MRA
All comparison countries (main estimate)	£4.7bn*** +29%	£6.5bn*** +18%	£6.2bn*** +20%
Excluding China	£4.6bn*** +28%	£6.5bn*** +18%	£6.4bn*** +20%
Excluding Russia	£4.0bn*** +24%	£4.8bn** +14%	£4.8bn*** +15%
Excluding LNG	£4.1bn*** +25%	£5.1bn*** +14%	£5.0bn*** +16%
Excluding all energy transit	£4.0bn*** +24%	£4.9bn*** +14%	£4.8bn*** +15%
Excluding China, Russia & LNG together	£3.4bn** +20%	£3.7bn** +10%	£3.9bn** +12%

Source: Authors' analysis of HMRC, Comtext, and Access2markets data. . Notes: Each cell gives the pooled percentage effect applied to the arithmetic mean of covered trade in 2021–2024, with the corresponding percentage beneath. Stars report two-sided significance: *** p<0.001, ** p<0.01, * p<0.05, + p<0.10.

These exclusions do affect our headline results, but they remain statistically and economically significant, yielding between £3.4 billion and £3.9 billion of export uplift depending on the type of MRA.

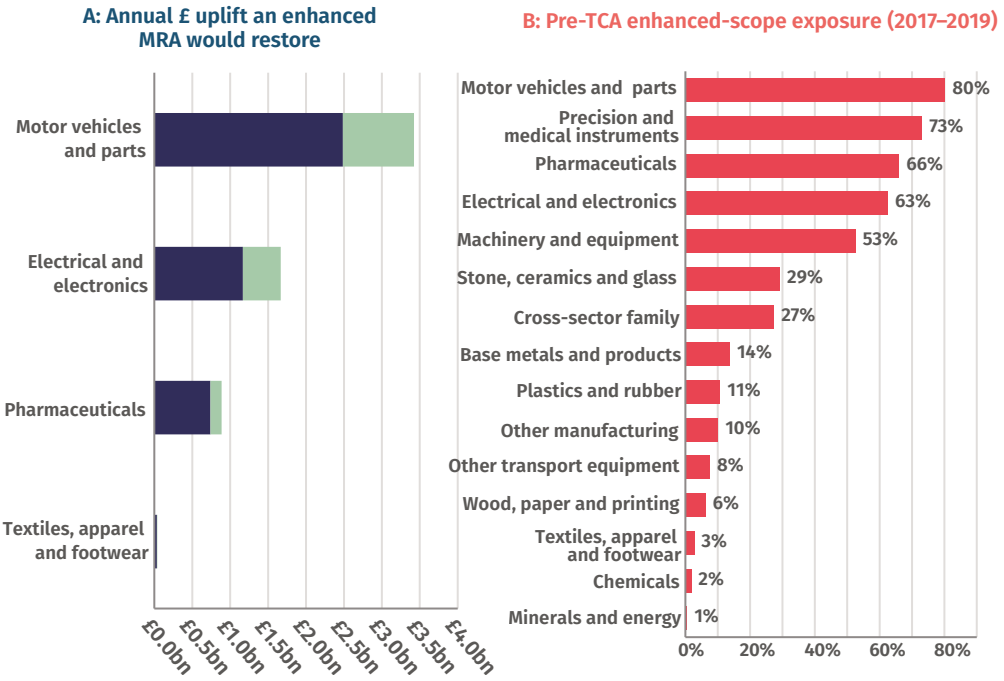
3. WHICH SECTORS BENEFIT MOST?

Finally, we look at which sectors would benefit the most from an MRA. This is important, as it is possible to sign a sector specific MRA rather than an economy-wide version.

To do this, we run our enhanced MRA model with a decomposition by sector. This tells us the uplift in MRA relevant goods by sector. These results can be seen in figure 3.1a. We only report sectors with statistically significant results.

FIGURE 3.1: MOTOR VEHICLES AND PHARMACEUTICALS HAVE THE MOST TO GAIN FROM AN MRA

A: estimated additional UK exports to the EU each year that a mutual recognition agreement would restore, by sector, applied to 2024 trade (£)
B: share of each sector's UK-to-EU exports in goods that required notified-body certification before the TCA, pooled 2017–19 (per cent)



Source: Authors' analysis of HMRC, Comtext, and Access2markets data.
Notes: Panel A includes sectors significant at p<0.05 in either the main or country-and-energy-exclusion sample and with a positive estimated uplift; the darker bar applies the exclusions. Pound values apply each pooled sector effect to the arithmetic mean of its covered trade in 2021–2024. Sector effects are measured against a common unaffected group and do not sum to the headline. Panel B is the share of 2017–2019 UK–EU exports by trade value that are enhanced MRA relevant.

Our results indicate that automobiles (3.5 billion), electronics (1.6 billion),[4] and pharmaceuticals (0.98 billion) would all benefit significantly from an enhanced MRA.

These sectors also exhibit an equitable geographic distribution, passing the important Makerfield and Lincoln tests. Autos is largely concentrated in the Midlands and the North, electronics is dominated by the South East and East, and finally pharmaceuticals is in both the North and South.

Still, our largest result (automobiles) needs to be qualified. Based on conversations with industry insiders, the main channel through which a lack of MRA bites is not necessarily through the cost of testing itself.[5] Rather, not having an MRA with the EU signals to manufacturers that there could be future regulatory divergence which could undermine the UK's ability to export to the EU. Furthermore, our model cannot account for other non-tariff barriers that may differentially impact the automobile sector.[6] Consequently, we think an MRA would be an important boon for the sector, but our estimate on autos should be treated as an upper bound.

We also look at the proportion of each sectors' exports that were in MRA relevant goods that require notified body testing prior to the TCA. This is because certain product lines or firms may still be negatively affected even when we find no statistically or economically significant effect for the industry as a whole. These results can be seen in figure 3.1b. We find MRA exposure in precision and medical instruments, machinery and equipment, plastics and rubber, electrical and electronic equipment, and stone, ceramics and glass. An MRA could potentially reduce costs in those sectors even if our model does not find a statistically significant effect.

4 Interestingly, electronics seem to be the only industry that benefits substantially more under an enhanced MRA than a narrow MRA of conformity assessment.

5 In fact, the Society of Motor Manufacturers and Traders estimates that the maximum cost for a automotive model to be certified would be around 1 million pounds (SMMT 2021).

6 This is only a huge cause for concern in autos as virtually the entire sector is MRA relevant by trade value.

CONCLUSION

We set out to examine the potential next frontier of the UK's dynamic alignment push: a mutual-recognition agreement with the EU.

We asked three questions.

1. How much higher would UK exports to the EU be if we had included an MRA in the trade and cooperation agreement?
2. What type of mutual recognition agreement is needed?
3. Which sectors would benefit the most?

First, depending on the type of MRA, trade could potentially increase exports to the EU between 3.7 and 6.5 billion pounds – a major impact on trade, businesses, jobs, and household incomes.

Second, we find that an enhanced MRA (one that includes dynamic alignment) would provide the largest benefit. An enhanced MRA is also the preferred choice of Brussels, with the bloc indicating they are no longer interested in narrower MRA's of conformity assessment.

Finally, on sectors, we find that Automobiles (with some qualifications), electronics, and pharmaceuticals would all benefit from an MRA. Importantly, these manufacturing intensive industries all pass the Makerfield and Lincoln tests.

An MRA should be the next step on the government's dynamic alignment agenda. Finding the right shape of agreement that can benefit both sides will be a crucial next step.

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ANNEX

DEFINING MRA RELEVANT GOODS

A good can be considered MRA-relevant if an MRA would remove duplicative testing and certification before it can be sold on a European market. This can be done through either notified body testing or self-certification. MRAs of conformity assessment only cover notified body testing, whereas enhanced MRAs cover both.

We are interested in both kinds of MRAs. To classify goods as belonging to either type of MRA or not being MRA-relevant at all, we rely on the EU's Access2Markets web portal which displays the import requirements for all goods that can be exported from the UK to the EU. There are 155 unique import requirements, and a good could be subjected to any number of them. Import requirements can range from *endangered species handling* to *technical standards for explosive devices*. So for a given good we check its import requirements and see how it can be ameliorated by a type of MRA.

For example, suppose you want to want to export an inflatable raft to the EU. On Access2Markets there will be an inflatable rafts page, with some list of specific import requirements. In the case of our raft (European Commission, no date), there is only one: *Technical standards for marine equipment*.

In the requirement text it mentions "The intervention of a third party (Notified Body) in the process is mandatory". This implies that inflatable rafts would fall under an MRA of conformity assessment and enhanced MRA. Unfortunately, not all mappings are so simple.

Both pacemakers and reading glasses frames are considered medical devices. They both have the import requirement *Technical standards for medical devices*. The requirement states that: "in case of medium or high risk classes… the intervention of a Notified Body is needed". Despite both having the import requirement, only the pacemaker would require notified body conformity assessment as it is considered a high-risk device. Reading glasses frames will only require some basic self-certification.

These ambiguities persist across a range of products and import requirements. Toys, PPE, machinery, and drones to name a few, all have mixed route import requirements. Meaning in some cases you can self-certify and in others you genuinely require a notified body. Around 4300 products have mixed route import requirements, making MRA classification difficult by hand.

Automobiles and their parts also confuse things. The EU and UK agreed to follow UN approval standards on motor vehicles and motor vehicle parts, meaning certain UK vehicle exports would not need to be retested upon entering EU markets. This is still only a limited carveout as UN approvals typically cover parts and have less focus on whole vehicles (VCA 2024). Unfortunately, Access2Markets does not recognise this nuance, and slaps the *Technical standards for motor vehicles* requirement on all automobile-related products, even if it is not binding.

Furthermore, the granularity at which Access2Markets applies import requirements is not sufficient. Despite the website providing data at the TARIC10 level, import requirements only vary at the HS6 level. This is problematic because it means that some product codes will have an import requirement applied to them, despite the import requirement not binding at all, for both self-certify or notified

bodies. For example TARICS under HS6 code 621132 have the import requirement *Technical standards for personal protective equipment*. Yet, the requirement is only binding for one TARIC underneath it, as seen in table A1 below.

TABLE A1: ILLUSTRATIVE — TARIC-LEVEL CONFORMITY SCREENING (PPE EXAMPLE)

Worked example: 'listed' under a technical-standards requirement does not mean conformity assessment is actually required

Product code (TARIC10)	Description	'Technical standards for PPE'	Conformity assessment actually required?
6211 32 10 00	Industrial and occupational clothing	listed	Yes: self-certification (category I PPE)
6211 32 31 00	Garments with an outer shell of a single identical fabric	listed	No: ordinary clothing, out of scope
6211 32 41 00	Upper parts	listed	No: ordinary clothing, out of scope
6211 32 42 00	Lower parts	listed	No: ordinary clothing, out of scope
6211 32 90 00	Other	listed	No: ordinary clothing, out of scope

Source: Illustrative example based on the European Commission's Access2Markets database and EU legislation. Notes: Codes are 10-digit TARIC lines under the PPE technical-standards requirement; being listed does not by itself mean conformity assessment is required.

There is also the issue of two other TCA carveouts: pharmaceuticals and aviation. The TCA removed the need for GMP inspections for pharmaceutical products. Yet, the import requirement, *Import and marketing requirements for medicinal products*, has two stages of mandatory testing: GMP and batch testing. The TCA only solves GMP not the batch testing component, so we classify all of these goods as MRA-relevant goods. Aviation is simpler. All aviation goods in Access2Markets have the import requirement *technical standards for civil aircraft*. This appears to be an MRA-relevant import requirement; however, we know that the TCA made a carveout for aviation goods designed before 2021 (CAA 2011). Given the long lag times in new aviation parts going from design to market, we classify these goods as not MRA-relevant.

To resolve all of these ambiguities we us an LLM (Anthropic's Claude) to classify the goods. For each product, the model is given the verbatim classification rules from relevant EU regulation. For example, in the case of medical devices, the risk-class rules are found in Medical Devices Regulation's Annex VIII (European Union 2017). The model then makes a judgement on where that product belongs.

Importantly, our trade data is at the eight-digit product level (CN8/TARIC8), however we classify goods at the most granular level possible, which is often at the 10-digit level (TARIC10). This can be problematic if a given TARIC8 has a mixture of MRA relevant and non MRA relevant underlying TARIC10 codes. To account for this, we only consider a product as MRA relevant if at least half[7] of the underlying TARIC10 codes are MRA relevant.[8]

7 Results are also robust to a specification where we require a TARIC8 to be unanimously MRA relevant.

8 This also applies to the type of route. If a TARIC8 code is 51 per cent self-certification and 49 per cent notified body, we classify it as a self-certification good.

OUR MRA TAXONOMY

After classification we are able to construct three separate MRA definitions. The first is an MRA of conformity assessment, which just considers goods that have notified body requirements. Second, we consider a Swiss-EU MRA. This is an enhanced MRA for both self-certification and notified body goods that are covered by the Swiss-EU deal. Third, we consider a maximal enhanced MRA which covers all goods that require either notified body or self-certification conformity assessment.

TABLE A2: MRA TAXONOMY – REQUIREMENTS, TARIC/HS6 LINES, 2019 UK-EU EXPORTS

Export values in € billion (2019); share of total UK->EU goods exports

MRA definition	Treated CN8 families	Control families	Excluded or unresolved	2019 UK–EU exports (€bn)	Share of retained exports
MRA of conformity assessment	363	7,503	24	22.547	14.6%
Enhanced MRA	1,278	6,612	0	43.075	28.0%
Swiss-EU enhanced MRA	1,103	6,787	0	38.298	24.9%

Source: Authors' analysis of the fixed classification results and 2019 trade data. Notes: Counts are corrected CN8 regression families, not TARIC requirement counts. Incomplete or unresolved families are excluded rather than reassigned to control.

Table A2 presents our taxonomy by number of relevant import requirements, TARIC lines, HS6 codes and 2019 UK to EU exports. Unsurprisingly the narrower the MRA definition, the fewer goods and trade value it covers. MRA of conformity assessment goods account for 14.6 per cent of total UK-EU exports, a Swiss deal would cover 24.9 per cent and a enhanced MRA would cover 28 per cent.

CONTROL AND TREATMENT GROUPS

Remember we can't simply compare the UK's exports of MRA goods versus non MRA goods to the EU before and after Brexit. This could lead to a misleading conclusion as the composition of MRA vs non MRA goods are fundamentally different. MRA goods are mainly industrial manufactured goods, whereas non MRA goods contain food, fuel, chemicals, and raw materials. The global chip shortage of 2021 will show up as reduced MRA exports to the EU, even though the chip shortage had nothing to do with Brexit. We need a control group to account for this.

There are two main approaches to choosing a control group to study Brexit trade effects. The first is to look at the UK's exports to the rest of the world as a comparator. If exports drop to the EU, but increase to the rest of world, it could imply that Brexit is the cause. This is what Freeman et al (2022) did, but they found that exports actually remained stable after Brexit. However, Kren and Lawless (2024) argue that this is not a suitable control group. Trade with the EU makes up nearly half of UK trade. Therefore, Brexit could affect supply chains, alter transportation costs, and create uncertainty over UK non-EU country trade deals. All of which would affect the UK's trade with the rest of the world.

So instead, Kren and Lawless use the rest of the world's exports to the EU as a control group. So if the UK's exports decline after Brexit relative to the rest of the world's exports after Brexit, this would imply Brexit is the culprit. Note, rest of the world includes intra EU trade. This is exactly what they do find, noting a 20 per cent drop in exports.

Interestingly, Freeman et al came out with another paper in 2024 using firm level data (Freeman et al 2024). Here they tried to account for contamination by controlling for a firm's exposure to the EU prior to Brexit. Once they did this, they found exports did decrease to Europe, however less than what Kren and Lawless found. Their decrease was almost entirely due to smaller firms exiting the market after the TCA was signed – which is congruent with an MRA story.

We are concerned about MRA vs non MRA goods, so we are going to use product level data as opposed to firm level data, meaning we cannot control for a firm's existing exposure to Europe. So we follow Kren and Lawless's design and use the rest of the world's exports to the EU as our control group. We also include intra-EU trade within the rest of world comparison group. This follows what Kren and Lawless do and makes sense for our purposes. For example, we want to pick up potential situations where a country like Germany is exporting more to other EU countries as a result of the UK losing mutual recognition.

One important caveat is that the Kren and Lawless approach cannot account for UK sector specific shocks (shocks that aren't global). If a shock happened at the same time as the TCA that only affected MRA goods exports from the UK we would not be able to control for this.

DATA

We also adopt our choice of product level data from Kren and Lawless, as well as make a few novel additions.

Prior to 2021, all goods exported from the UK to Europe counted as UK exports. This included re-exports. When the UK left the EU, Europe stopped counting re-exports as exports. This sharp discontinuity could bias our results. If reexports were mainly in MRA goods, it might appear that MRA good exports dropped to the EU, when really, we only had a change in the way data was collected. Kren and Lawless show that HMRC kept their export data consistent before and after Brexit, this allows us to use HMRC data for UK exports to the EU. For intra EU trade and the rest of the world's exports to the EU, we use European Comext data.

However, there is one additional problem that Kren and Lawless do not resolve. Actual re-exports from the UK to the EU also decline after Brexit (McBride 2024). For example, apparel and footwear exports declined dramatically after Brexit, however there was no change in UK production data. This indicates that what was really lost was apparel and footwear re-exports to Europe (Radford 2025). Using HMRC data will only solve issues of data consistency, it can't account for the fact that we had a drop in re-exports.

To resolve this issue, we match UK production data to UK export data. If for a given HS code total production is substantially lower than total exports prior to Brexit, we classify this as a "re-export good" and drop it from our sample. This is not a perfect method resolving the re-export issue as our UK production is not available for all products, and does not always map neatly to our trade data. This meant we could only accurately match 75 per cent trade codes to production data.

We also extend the period Kren and Lawless is looking at from 2022 to 2024. CN8 codes are not stable across time, and many have changed since the pre brexit period, especially with our longer window. To account for this, we create CN8 regression families. For example, if a code exists in 2016, it turns into different codes in 2023, then we refer to all those codes as a single CN8 family.

PUTTING IT ALL TOGETHER

To finally test the effect of losing an MRA on EU-UK trade and our triple difference-in-difference, we adopt a gravity model. This is what Kren and Lawless use in their 2022 paper and is one of the standard tools used by economists to estimate trade costs. The basic idea is that countries trade more when they are economically large and less when trading is costly. Costs can be anything from physical distance, language barriers, tariffs, customs, or regulatory divergence. They are often used to study the effects of free trade agreements and mutual recognition agreements (Yotov et al 2016).

We adopt a standard gravity model estimated using Poisson Pseudo-Maximum Likelihood (PPML), adding in an extra term for MRA goods. This can be seen in equation (1).

$$E[Xc_{ht}] = \exp[\beta_1(UKc \times Post_t) + \beta_2(UKc \times Post_t \times MRA_h) + \delta_{ht} + \alpha c_h] \quad (1)$$

In our equation Xc_{ht} represents from exports from country c to the EU of CN8 code h in year t. UKc is a dummy equal to one when the exporter is the UK. $Post_t$ is a dummy equal to one once the TCA comes into force in 2021. The coefficient β_1 therefore tell us the overall change of UK exports to the EU relative to the rest of the world's exports to the EU after Brexit. MRA_h is set to one, when a given good h is MRA ameliorable. The second coefficient β_2 is our main coefficient of interest. It captures whether UK exports of MRA goods relative to non MRA goods declined more than the rest of the world's exports for the same products. If β_2 is negative, then a lack of MRA would have harmed UK exports.

We also include fixed effects to control for other shocks. δ_{ht} is an CN8-year fixed effect which controls for anything affecting a particular product in a given year, such as the supply shock to semiconductors in 2021. αc_h is a partner product fixed effects and accounts for any non-time varying characteristics of EU partner trade relationships.

Finally, we test a secondary version of the model which also includes anticipation effects. Seen in Equation (2). Anticipation effects are represented by the term UKc × $PostRef_t$ × MRA_h which compares MRA goods with non MRA goods against the rest of world benchmarks before and after the 2016 Brexit referendum. The coefficient on this term is β_4. If it is negative, it would imply that Brexit anticipation and not only the TCA itself had disproportionate effect on MRA goods.

$$E[Xc_{ht}] = \exp[\beta_3(UKc \times PostRef_t) + \beta_1(UKc \times Post_t) + \beta_4(UKc \times PostRef_t \times MRA_h) + \beta_2(UKc \times Post_t \times MRA_h) + \delta_{ht} + \alpha c_h] \quad (2)$$

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