



---

# Analytical working paper – Methodologies for valuing market access barriers

## 1. Introduction

The Department for Business and Trade (DBT) produces indicative valuation estimates for a range of market access barriers. DBT defines barriers as the presence or absence of any legal, regulatory or administrative practice by another government or regulator that can impede a business exporting or investing overseas. This analysis draws upon several methodological approaches developed by DBT to estimate the potential value associated with either the imposition or removal of a barrier to inform decision making such as which barriers should be prioritised for removal by the government.

The estimates, presented over a five-year period after the given barrier has been resolved, are expressed in ‘order of magnitude’ ranges<sup>1</sup>. These broad ranges reflect the inherent uncertainty involved in producing more specific estimates of the potential value. To help mitigate against this, sensitivity analysis is carried out to assess the robustness of the order of magnitude ranges by changing relevant assumptions and/or input data used when calculating estimates. Nevertheless, the estimates produced are indicative and may contain varying degrees of uncertainty and should be used and interpreted as such.

The value of an opportunity posed by the resolution of a barrier will depend on several factors such as how the barrier was posing an impediment and how businesses or the market previously affected will respond. While the methodologies outlined represent an attempt to produce a suitably high-level indication, it is important to note that supply side changes, such as changes to productivity, business investment or indeed potential trade diversion effects, are not considered within the methodologies at present. It is assumed that benefits of a barrier being removed will start immediately after resolution and follow a consistent trajectory over the next five years, although the benefits may vary considerably and follow different time horizons. A fixed time horizon of five years has been chosen as the appraisal period to reflect that the benefits of barrier removal may not be limited to a short-term, single-year increase in exports/investment but equally would be unlikely to last permanently.

Further assumptions and limitations for each methodological approach are set out below. Analysis using the methodological approaches outlined here are corroborated with other available sources, such as commercial estimates, subject to availability and suitability.

In some cases, none of these methodologies below may be sufficient for producing an indicative valuation estimate. In such instances DBT may attempt to use a bespoke analytical approach specific to the barrier being assessed.

---

<sup>1</sup> There are 25 order of magnitude categories ranging from: ‘£ thousands’ (lowest) up to ‘£ tens of billions’ (highest).

## 2. Non-tariff measure ad-valorem equivalents for goods related barriers

### 2.1 Methodology

This methodology applies ad-valorem equivalents (AVEs) of non-tariff measures (NTMs)<sup>2</sup>, in combination with import elasticities, to trade flows in order to estimate how much an NTM affects costs, export demand and export value.

NTMs are policy measures, aside from tariffs, that can affect international trade by changing the price and/or quantity of traded goods and services. NTMs do not necessarily always have a negative impact, for example certification requirements and conformity assessments can provide a signal of quality, strengthening consumer confidence. However, when NTMs become an obstacle to trade, they are regarded as non-tariff barriers (NTBs).

This method is used to value goods NTMs related to restrictive technical measures such as sanitary and phytosanitary checks; labelling requirements; and product testing, as well as non-technical barriers including quotas and price controls.

AVE estimates (sourced from a World Bank dataset<sup>3</sup>) are an indication of what the cost of an NTM would be if it were a tariff measure, allowing us to quantify the distortion imposed by a NTM (which otherwise is not quantitative in nature like tariffs are). The import elasticity of the exported good (sourced from The United Nations Economic and Social Commission for Asia and the Pacific<sup>4</sup> or where necessary from a dataset produced by Fontagné, Guimbard and Orefice<sup>5</sup>) can then be applied to observed trade flows. This estimates how export demand, and therefore export value, could change in response to the removal of NTM-associated costs and subsequent price changes.

The following formula outlines this:

$$Q^{(without\ barrier)} = \frac{Q^{(with\ barrier)}}{(Elasticity \times AVE) + 1}$$

The quantity exported without a barrier is equal to the quantity exported with a barrier, divided by the product of the elasticity and AVE, plus 1.

This methodology is applied to value trade distortions in three scenarios:

1. To value the effect of future NTMs on trade: In this case the methodology is adjusted slightly to show by how much trade could fall because of the NTM as opposed to how much it could increase.

---

<sup>2</sup> The ad valorem equivalent (AVE) of non-tariff measures (NTMs) is the uniform tariff that will result in the same trade impacts on the import of a product due to the presence of the NTMs. In other words, the AVEs represent the additional costs that the presence of NTMs have on imports.

<sup>3</sup> <https://datacatalog.worldbank.org/search/dataset/0040437>

<sup>4</sup> Chorthip Utoktham, Alexey Kravchenko, Yann Duval (2020), 'New global estimates of import demand elasticities'. <https://repository.unescap.org/handle/20.500.12870/4534>

<sup>5</sup> Lionel Fontagné, Houssein Guimbard and Gianluca Orefice, Journal of International Economics, 2022, vol 133. <https://data.mendeley.com/datasets/8v4579gnvc/2>

2. To value the effect of active NTMs on trade: In this case the observed traded value includes the cost of complying with the NTM<sup>6</sup>. The cost of the NTM is then removed from the product's price to estimate a new value of trade. For example, a product might have a price of £10 per unit; however, its price could be dropped to £9 if the exporter did not have to comply with a technical requirement which costs £1.
3. To value the effect of tariff or tax measures on trade: The observed traded unit value does not include the direct cost of the tariff. The cost of the tariff is then removed, so that the new value of trade at the product's original price can be estimated. For example, a product might have a price of £10 per unit; however, the importer has to additionally pay £2 in addition due to a 20% tariff. Without the tariff the importer would only have to pay £10 rather than £12.

The result is interpreted as the change in trade after removing the cost of the NTM, all else remaining constant. This is then multiplied by five to obtain a five-year figure.

## 2.2 Data sources

The World Bank database provides AVE estimates of technical and non-technical measures, by HS6 code<sup>7</sup>. This draws upon UNCTAD TRAINS data on NTMs and lists the impact of all broad NTM categories applied to a given product by partner countries. However, it cannot distinguish between individual measures and does not cover all countries. A range of academic papers are therefore also used to obtain AVE estimates. One paper commonly used is by Cadot, Gourdon & Van Tongeren (2018)<sup>8</sup>. This paper uses econometric methods to estimate the AVEs for around 5,000 goods and 80 countries and focuses on the trade cost impact of NTMs. Additionally, affected businesses can provide AVE estimates if known.

Tariff data can be obtained from the International Trade Centre's (ITC) Market Access Map.

ITC Trademap is used to obtain trade flow data over a period of 3 years including quantity and value traded, in terms of both imports and exports for the UK and the partner country. The use of mirror data allows the methodology to take averages and account for reporting differences.

Elasticities are obtained from a United Nations Economic and Social Commission for Asia and the Pacific dataset<sup>9</sup>. It contains import demand elasticities for over 5,000 HS6 product lines in 185 countries. If elasticities for any country-product pairs are not found in this dataset an alternative source - Fontagné, Guimbard and Orefice (2022)<sup>10</sup> - is used which also provides elasticities at HS6-level but these are not country-specific.

---

<sup>6</sup> It's assumed that the cost of complying with a NTM refers to technical specifications for the good which affects how it's manufactured/grown and becomes part of the cost of production. By contrast tariffs are additional to the value of the goods.

<sup>7</sup> <https://datacatalog.worldbank.org/search/dataset/0040437>. HS (Harmonised system) codes is a system used to classify traded goods which can be applied with multiple levels of granularity.

<sup>8</sup> [Cadot, O., J. Gourdon and F. van Tongeren \(2018\), "Estimating Ad Valorem Equivalents of Non-Tariff Measures: Combining Price-Based and Quantity-Based Approaches", OECD Trade Policy Papers, No. 215, OECD Publishing, Paris](#)

<sup>9</sup> [Chorthip Utoktham, Alexey Kravchenko, Yann Duval \(2020\), 'New global estimates of import demand elasticities'](#).

<sup>10</sup> Lionel Fontagné, Houssein Guimbard and Gianluca Orefice, Journal of International Economics, 2022, vol 133.

## 2.3 Assumptions

This approach assumes that the additional business costs of an NTM are directly reflected in the price. This is an implicit assumption that results from only having demand elasticity estimates, quantity data and inferred importers' price (or unit value) data – and no data on the elasticity of exporters' supply.

It is assumed that the impact on UK exports will be in line with what would happen to the partner's imports from the world. This is because the sources of AVE and elasticity estimates are not specific to UK exports and instead reflect changes to the partner's import demand from the world.

## 2.4 Limitations

AVE estimates are usually not specific to the NTM or precise good affected in question. They give an approximate guide of the impact that could be expected but may reflect an upper bound. However, the estimates used are provided/endorsed by the World Bank, cover 40 importing countries plus the European Union, and unlike other similar estimates, provide AVEs split by 'technical' and 'non-technical' NTMs allowing for a greater level of accuracy in the resulting valuations.

Some elasticity estimates may be outliers, returning higher than expected values. However, a distributional analysis carried out when determining which elasticity estimates to use found that the two preferred datasets (see section 2.2 above) were more evenly distributed when compared to another comparable dataset.

Additionally, there can be gaps in the trade flow data provided by ITC Trademap. When entire years are missing, the year is omitted from the data used and the remaining years provide an average. In these cases, it is likely that reporting errors are responsible for this rather than observed 'zero' trade. If occasional values are missing, they are considered to be zero. ITC Trademap is the preferred data source for trade flow data given its substantial country (220 countries and territories) and product (5,300) coverage, as well as it being regularly updated.

## 3. Services trade modelling for services related barriers

### 3.1 Methodology

This method uses a [gravity model](#)<sup>11</sup> (*the model*) to estimate the effect of restrictions to trade in services and simulating their impact on bilateral trade flows between the United Kingdom and trading partners. Restrictions could include a lack of a process for recognising qualifications gained abroad, nationality or citizenship required to offer certain services, and data transfer prohibitions.

Specific policy changes are proxied by the [OECD Services Trade Restrictiveness Index \(STRI\)](#), a database of the regulatory environment for services trade covering 22 sectors in 50 countries. Each country-sector pair is assigned a score on an index of restrictiveness from 0 to 1, where 0 is an open trading environment and 1 is completely closed. The OECD's STRI tool simulates the impact of changing a policy measure on a country's overall STRI score, with the resulting change in score used as an input to the model.

---

<sup>11</sup> 'Services Trade Modelling', DIT Analysis Working Paper, Fraser (2021)

A gravity model is an econometric framework for estimating the determinants of international trade. It uses known drivers of trade including Gross Domestic Product, geographic distance between countries, and presence of a common language among other variables to estimate the trade impacts of various trade-related policies. To estimate the trade impact of specific services policy changes, the gravity model is configured as per the following specification:

$$x_{ij} = \exp (\beta_1 \log(DIST_{ij}) + \beta_2 CNTG_{ij} + \beta_3 CLN_{ij} + \beta_4 LANG_{ij} + \beta_5 STRI_{ij,t} + \beta_6 WATER_{ij,t} + \beta_7 INTER \times IMPORTER_j + \pi_{i,t} + \chi_{j,t})(\epsilon_{ij,t})$$

Where:

- $x_{ij}$  denotes exports
- $DIST_{ij}$  is bilateral distance
- $CNTG_{ij}$  is a dummy for contiguity
- $CLN_{ij}$  is a dummy for a past colonial relationship
- $LANG_{ij}$  is a dummy for a common language
- $STRI_{ij,t}$  is our bilateralised version of the STRI
- $WATER_{ij,t}$  is the difference between applied and bound commitments
- $INTER$  is a dummy for international trade observations
- $IMPORTER_j$  is an importer indicator variable
- $\pi_{i,t}$  is an exporter-year fixed effect
- $\chi_{j,t}$  is an importer-year fixed effect

The model produces an estimated percentage change to UK exports based on the simulated changes in restrictiveness, which is then applied to observed trade flows and multiplied by five to obtain a five-year figure.

### 3.2 Data sources

The restrictiveness scores used in the STRI simulator are drawn from an OECD database reflecting the laws, policies, and regulations of each individual country in the sample.

Observed services trade flow is obtained from [The International Trade and Protection Database for Estimation \(ITPD-E\)](#). Secondary sources used include the Office for National Statistics [UK Trade in Services](#) and [International Trade in Services \(ITIS\)](#).

Additional data sources used in the construction of the model itself are given in the Department for International Trade's [working paper](#).<sup>12</sup>

---

<sup>12</sup> 'Services Trade Modelling', DIT Analysis Working Paper, Fraser (2021)

### 3.3 Assumptions

The core STRI is only published on a Most Favoured Nation basis – it does not take the preferential terms from free trade agreements (FTA) into account. However, the model incorporates official OECD coding of recent services FTAs from [Benz and Rozensteine \(2021\)](#), which cover 93% of the preferential services trade flows in our final dataset. This allows us to more fully capture the variation in trade flows associated with given bilateral levels of restrictiveness.

Further assumptions made in the construction of the model can be found in the Department for International Trade's [working paper](#).<sup>13</sup>

### 3.4 Limitations

The OECD simulator holds STRI data for 50 countries and 22 sectors so can only be applied directly to non-tariff measures affecting those covered. However, these countries and sectors represent [over 80% of global trade in services](#).

Additionally, data limitations mean that the model cannot provide estimates for nine out of the 50 countries covered by the STRI. In instances where a given country faces a barrier to services trade, and that country is not included in the model and/or the simulator, a suitable proxy country is chosen in the STRI simulator and/or model. The results are applied to trade flow data for the country to which the given barrier applies.

The policy measures listed in the simulator can be broad, whereas the barrier being analysed can be specific. There are also likely to be instances where the policy controls on the simulator cannot match the policy resolution in practice, i.e. a reduction in the policy measure rather than elimination. This means results should be seen as an upper bound estimate.

Furthermore, the model maps, and in certain cases aggregates, the sectors given in the STRI to match the taxonomy of the ITPD-E trade flow dataset. For example, the STRI sectors 'Accounting,' 'Engineering,' 'Architecture,' and 'Legal,' are aggregated into the single sector called 'Other Business Services' within the model. As a result, the number of sectors on which the model can be run is set to seven.

## 4. International Trade Centre (ITC) Export Potential Indicator for estimating unrealised export potential due to effective import bans

### 4.1 Methodology

The [ITC Export Potential Indicator](#)<sup>14</sup> is a publicly available tool that, for a given good, compares actual exports to an expected potential level of exports to give an unrealised level of exports. This can be done for bilateral relationships up to HS6 level for 226 countries and territories and 4,658 products.

This method is best suited to valuing the effect of removing an effective ban to imports that is affecting a set of UK goods exports. This is because it is reasonable to assume that a substantial proportion of the unrealised potential is down to the ban.

---

<sup>13</sup> Ibid

<sup>14</sup> <https://exportpotential.intracen.org/en/>

The relevant HS codes are identified to obtain an unrealised level of potential exports. The figure is multiplied by five to obtain a five-year estimate, before [Bank of England average annual spot rates](#) are used to convert them to GBP.

The level of potential exports is calculated using a gravity-type calculation which considers supply, demand, and ease of trade. The supply variable considers an exporter's share of the global import market for a given good based upon their GDP growth, the world tariff preference faced by the exporter compared to its competitors and the exporter's import/export ratio. The demand variable considers the importer's growth in GDP per capita and population, relative tariffs applied by the importer and relative distance between importer and exporter. The easiness to trade index compares the UK's (exporter's) actual exports and what exports would be if the UK (exporter) had their world average market share in the partner country's (importer's) market.

## 4.2 Data sources

The underlying data used in the ITC Export Potential Indicator is drawn from the International Trade Centre Trade Map database, which in turn sources statistics from UN Comtrade, the world's largest database of trade statistics, maintained by the United Nations Statistics Division (UNSD), and complemented with national sources. Data consists of direct and mirror reports of weighted average exports.

## 4.3 Assumptions

The primary assumption using this approach is that if all barriers were to be removed, actual trade would increase to the expected potential trade figure.

It is also assumed that perfect competition exists within each country, and that preferences reflecting the allocation of imports among supplying countries are CES (Constant Elasticity of Substitution) functions and are the same across all markets.

Bilateral trade costs are assumed to be ad valorem.

The average import price is assumed to change across markets by the same proportion for all products.

The structure of market demand by product as perceived by any given country does not differ from the structure of world demand.

## 4.4 Limitations

It is unlikely that the unrealised trade value is entirely due to the presence of barriers. The export potential figure reflects a frictionless scenario, whereas removing a barrier may leave residual frictions. It is therefore important to note that estimates produced using this approach are likely to be upper bound estimates.

On some occasions the simulator can return no unrealised potential or exceeding potential, despite there being a trade-inhibiting barrier in place, in these instances this methodological approach is redundant.

Further explanation of the approach and possible limitations is covered in the [ITC export potential methodology paper](#) (PDF download).

## 5. Foreign Direct Investment Regulatory Restrictiveness Index for investment related barriers

### 5.1 Methodology

The Foreign Direct Investment Regulatory Restrictiveness Index (FDI RRI) approach uses coefficients from [OECD Mistura & Roulet \(2019\)](#)<sup>15</sup> to estimate how the removal of regulatory restrictions might affect UK foreign direct investment (FDI) stocks. From this, an estimate of how UK earnings may change in a partner country is attained. FDI restrictions could include equity caps, pre-screening and approval required for FDI or new acquisitions, and restrictions of key foreign personnel.

The approach uses the change in the partner country's FDI RRI score (reflecting information on restrictions) in combination with the coefficients from the OECD paper and data on UK investment positions and earnings in the partner country.<sup>16</sup>

$$\Delta Stocks_{UK\ in\ Partner} = Stocks_{UK\ in\ Partner} \times \Delta FDIRRI_{partner} \times Coefficient_{For\ relevant\ category}$$

Here, the change in the UK's FDI stocks in the partner country because of a barrier is equal to the UK's current FDI stocks, multiplied by the absolute change in the FDI RRI and the relevant coefficient. This is then multiplied by five to obtain a five-year figure.

### 5.2 Data sources

Coefficients for 60 countries, with both advanced and emerging economies, are obtained from an OECD FDI RRI paper (Mistura & Roulet 2019).

[OECD Regulatory Restrictiveness Index](#) gives the relevant RRI scores for 39 sectors across 84 countries, including all OECD and G20 countries.

[ONS Outward Direct Investment](#) (positions and earnings data from 2019 to 2021 and [ad-hoc 2020 and 2021](#)) and IMF positions data give current positions.

### 5.3 Assumptions

It is assumed that the coefficients taken from the OECD paper are an accurate measure of the impact of regulatory restrictions on FDI.

It is assumed that the earnings ratio between investment positions and earnings does not change as a result of removing an investment restriction. Therefore, any change in investment stocks (as estimated by the paper) is directly transmitted to earnings based on historic investment and earnings patterns.

The FDI RRI coefficients represent the impact on total foreign direct investments into a country. We therefore assume that the impact to UK investment positions (sometimes at individual sector levels) will mirror what happens to total investment positions in the partner country when a restriction is eased.

---

<sup>15</sup> [Mistura, F. and C. Roulet \(2019\), "The determinants of Foreign Direct Investment: Do statutory restrictions matter?", OECD Working Papers on International Investment, No. 2019/01, OECD Publishing, Paris](#)

<sup>16</sup> 'Positions' refers to holdings of stocks whilst 'earnings' refers to profits or losses on these.



The OECD paper uses a Poisson Pseudo Maximum Likelihood model assuming a linear impact. Thus, for a one-unit change in the predictor variable the response variable will always change by a fixed amount according to the value of the coefficient.

## 5.4 Limitations

Not all countries have a score within the FDI RRI Index. Similarly, the FDI restrictions can be quite broad whereas the barrier in scope can be quite specific. As such, results should be seen as an upper bound. There are also issues of data availability for earnings in many countries and sector specific UK investments. This has been remedied with the availability of more granular data from the ONS where possible.

## 6. Trade Facilitation Index for goods barriers related to border procedures

### 6.1 Methodology

Trade facilitation refers to the border procedures that affect the movement of goods between countries. These include measures relating to:

- governance
- border agency co-operation
- formal procedures
- administrative processes
- information availability

The TFI methodology is based on OECD trade facilitation indicators, an index created by the OECD scoring the restrictiveness of a range of customs procedures for each country. It also makes use of the [OECD TFI simulator](#) to change the various procedures and examine the resulting impact on restrictiveness scores. Coefficients obtained with gravity regressions in Moïsé & Sorescu (2013) and Moïsé (2011) reflect how trade changes in response to a given change in trade facilitation measures.

This method is typically used for NTMs which are related to restrictive trade facilitation measures.

Initial data reflecting the current trade facilitation indicators of both the UK and the partner country are observed. After the relevant restrictions representing the specific barrier are identified, the simulator can be used to ‘turn off’ these restrictions. This has the effect of removing the restrictive effect of those specific trade facilitation measures.

The adjusted TFI data can then be observed. Trade data consisting of UK to partner exports and partner imports from the UK are also observed. Finally, the partner country, relevant sector and coefficient, given in Moïsé & Sorescu (2013)<sup>17</sup> or Moïsé (2011)<sup>18</sup>, is selected in order to calculate the

---

<sup>17</sup> [Moïse, E and S. Sorescu \(2013\), “Trade Facilitation Indicators: The Potential Impact of Trade Facilitation on Developing Countries’ Trade”, OECD Trade Policy Papers, No. 144, OECD Publishing, Paris](#)

<sup>18</sup> [https://www.wto.org/english/tratop\\_e/tradfa\\_e/case\\_studies\\_e/oecd\\_paper\\_e.pdf](https://www.wto.org/english/tratop_e/tradfa_e/case_studies_e/oecd_paper_e.pdf)

change in exports. This is then multiplied by five to obtain a five-year figure. Coefficients can be chosen based on region, income group or economic partnership.

The following formula is used to calculate the change in exports after a change in customs procedures and therefore a change in the TFI:

$$\% \Delta \text{ exports} = e^{((TFI^{adjusted} - TFI^{original}) * coefficient)} - 1$$

The percentage change in exports is equal to 'e' to the power of the adjusted TFI minus the original TFI. The power is then multiplied by the coefficient. Finally, 1 is subtracted.

The formula can be adjusted if more than one restriction category is changed.

The percentage change in exports is then multiplied by the initial export value. The difference between the original and new export values gives the gain from removal of the NTM.

## 6.2 Data sources

OECD Trade Facilitation Indicators identify the strengths and weakness in trade facilitation across 11 categories comprising of 133 variables and compares a given country's performance relative to others.

International Trade Centre Trademap provide export and import data of goods in terms of quantities and values (GBP). This draws on UN Comtrade data.

Moïse and Sorescu (2013) provide coefficients, produced by gravity model-based regressions, for 60 countries. Moïse (2011) also provides coefficients for OECD countries.

## 6.3 Assumptions

There are cases where multiple trade facilitation measures can be affected by a single barrier. The interactions between different measures on the TFI are not clear. Therefore, if multiple TFI categories are changed, it is assumed that there are no interactions between each category in our calculation. The methodology cannot disentangle the effects of changes to multiple categories, so it is recommended only a single TFI category is considered at any given time if possible.

It is assumed that the marginal rate of change with respect to value of trade, expressed by the coefficient, is constant.

## 6.4 Limitations

This approach is inappropriate for use in cases where the relevant coefficients are insignificant or negative. These cannot be used as this would suggest that a reduction in restrictiveness decreases trade which contradicts traditional economic theory.

Where country specific data is not available, proxy data is used for a country with similar region/income levels to enable valuation.