Global dairy distortions

Database development

30 March 2022

Contents

1. Documenting data scope and sources

This report documents the scope and sources of a database developed as the first stage in a project to build a model of distortions to international dairy production and trade (Global dairy distortions model).

1.1. Database scope

The objective of the first stage of the project was to construct a database, using publicly available data[1], for describing dairy product:

- production

- consumption

- trade

- prices

- policies.

The starting point for the scope of the database is to include data for all countries and as many years as possible. Acknowledging that there will be substantial gaps in the data for smaller countries and developing economies.

At this stage only publicly available and reasonably up-to-date data sources are considered for inclusion in the database, to prioritise data that can be freely shared and distributed with the model.

1.2. This report is mundane

This report is a technical reference document for internal use and as a technical document it describes often mundane but important details such as product classifications and concordances. The intent here is not to describe the data itself but rather its scope and relevant nomenclatures or grouping variables. As such, it will be of limited interest to a non-technical audience.

Documentation of these details will guard against project continuity risks and ensure that the database can be accurately updated or replicated by others. These details are also important because data on dairy product classifications vary depending on data sources or activity being measured and thus decisions need to be made about how these different product classifications are mapped onto one another, and gaps or issues identified. FAO production

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[1] We define publicly available data as data that can be freely downloaded even if the sources include limits on the amount of data that can be downloaded at any one time and if bulk downloads require a paying subscription to a data service.

data, for example, focusses on farm production and thus has good information about dairy production by animal (cattle, sheep, goats camels), but limited detail on processed dairy products. Trade data has reasonably detailed breakdowns of processed dairy products but little or no information about origin of milk inputs by animal.

1.3. The database will evolve

With the base database now established, the project focus will move towards phase 2, model development. However, additions to the data base will be required in future to answer specific questions and to improve the model/modelling. Refinements could include:

- additional product or country detail, including variation in yields within countries

- new variables such as commodities futures prices as a measure of traders' and producers' expectations

- higher frequency information, such as traded commodity prices at monthly intervals

- wider scope for policy information such as climate policy or energy policy where such policy is relevant to distortions affecting global dairy trade.

We may also expand parts of the database to include proprietary data. However, proprietary data will be avoided unless necessary so that the model can be interrogated and used by others without incurring potentially high costs of accessing data.

2. Trade data

Trade data has been chosen as the spine for the database – the reference categories for dairy products that all production and consumption and policy data links back to.

This choice was made because:

- trade data is generally the most detailed data source

- trade data is reasonably complete, geographically and over time

- trade data describes global interconnections between dairy producers and consumers

- most readily available policy information is recorded using commodity trade classifications.

Thus, trade data will be used as a key input into data models[2] used in stage 2 of the project.

The trade data in the database is annual data by origin and destination country from UN Comtrade.[3] The data is at an HS 6 digit classification level.

Comtrade data is available for the years 1962 to 2021. However, data is most complete for the past two decades. Thus, we chose to use a data spanning 22 years from 1999 to 2020.

The dairy products included in the database are listed in Table 1. Product names have been added to the data to give a simple description of the products typically traded in each classification.[4] We do this to make the database more user friendly and comprehensible. The actual technical descriptions in the harmonised system (HS) classification are often incomprehensible.

The six digit (HS6) classification codes shown in Table 1 are for current HS codes. Notably there are some codes that are now defunct which have been included in database lookup tables for trade under older nomenclatures.[5]

Most of the products in Table 1 are exclusively or primarily dairy products. There are some exceptions to this, however, and these are flagged in the database as being only partly dairy e.g. 'Margarine', 'Cocoa preparations' and 'Food preparations nes [not elsewhere specified]'.

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[2] Data models are, as the name suggests, models that are used to estimate data. These will be important in stage 2 of the project for e.g. estimating the proportions of processed products, by product, produced domestically (of which a subset is exported).
[3] United Nations, http://comtrade.un.org/.
[4] Product names used here are based on guidance from Fonterra.
[5] The defunct codes included in the lookup tables are: 040130, 040500, 170210,

TABLE 1: TRADED PRODUCTS BY HS CLASSIFICATION
Name and description are for internal use, not official HS descriptions.

HS 6	Name	Description
40110	Skim milk	Fresh and UHT Skim Milk
40120	Whole milk	Fresh and UHT Whole Milk
40140	Low fat cream	Fresh and UHT Low Fat Cream
40150	Cream	Fresh and UHT Cream
40210	SMP	Skimmed Milk Powder (SMP)
40221	WMP	Whole Milk Powder (WMP) Cream Powders / Partially Skimmed Milk Powder (PSPM)
40229	Sweetened powder	Sweetened milk powders >1.5% milkfat
40291	Evaporated milk	Evaporated Milk – not sweetened
40299	Sweetened evaporated milk	Sweetened Evaporated / Condensed Milk
40310	Yoghurt	Yoghurt
40390	BMP	Buttermilk / Butter Milk Powder (BMP)
40410	WPC	Whey Powder / WPC < 80% protein / Hi-Fat Whey
40490	MPC	Milk Protein Concentrate (MPC) / Powder blends (all dairy)
40510	Butter	Butter
40520	Dairy spreads	Dairy Spreads (milkfat based only)
40590	Ghee	Anhydrous Milk Fat (AMF) / Ghee / Milkfat
40610	Fresh cheese	Fresh Cheese / Whey Cheese / Cream Cheese
40620	Grated and powdered cheese	Grated or Powdered Cheese
40630	Processed cheese	Processed Cheese, not grated or powdered
40640	Blue-veined cheese	Blue-Veined Cheese
40690	Other cheese	Other Cheese i.e. Cheddar, Colby, Gouda etc.
151710	Margarine, solid	Margarine (may contain vegetable and/or animal fat)
151790	Margarine, other	Margarine (may contain vegetable and/or animal fat)
170211	Lactose, raw	Lactose ≥99% lactose on an anhydrous basis
170219	Lactose, other	Lactose >95% but <99% on an anhydrous basis
180620	Cocoa preparations, bulk	Cocoa (≥5% on a defatted basis) Dairy Blends >2kg
180690	Cocoa preparations, other	Cocoa Dairy Blends (≥5% on a defatted basis) <2kg
190110	Infant Formula	Infant Formula
190190	Fat filled milk powders	Processed Powders with Fat / Flavouring, cocoa (<5% on a defatted basis), Growing Up Powders (GUMPS) / Fat Filled Milk Powders (FFMP).
210500	Ice cream	Ice Cream
210690	Food preparations, nes	Food Preparations, Fat blends
220299	Flavoured milk	Flavoured Milk Fresh or UHT

HS 6	Name	Description
230910	Feed	Preparations used in animal feed
230990	Feed minerals	Preparations used in animal feed
283526	Milk minerals	Milk Minerals / Alamin
320300	Colouring	Milkfat/Colour blends
320419	Synthetic colouring	Milkfat/Colour blends
330210	Flavouring	Dairy Flavour Concentrate
350110	Casein	Casein
350190	Caseinates	Caseinates
350220	WPI	Whey Protein Concentrates >80% (WPC) / Whey Protein Isolates (WPI) / Lacalbumin
350400	Lactoferrin	Lactoferrin / Hydrolysates

In some cases, the names given to the products will have imperfect connection to the actual tariff classification of a product – depending on the exact constituents of the products and where they are destined to go. This is particularly so for highly processed products such as protein powders and concentrates where tariff classification may vary quite a lot by jurisdiction. However, we believe that the advantages of common-sensical names outweighs slavish attention to details of tariff classification.

That said, there may be value in expanding the coverage of the database in future to include some data at the tariff line level for countries' with highly detailed or idiosyncratic tariffs e.g. the European common tariff classification which extends to 12 digits.

In this database we stop at 6 digit classifications because that is the level at which harmonisation of tariff codes ostensibly stops and is the most detail that is available from a single comprehensive and publicly available source. [6]

The data set includes 3.4 million records spanning 193 countries, 22 years, and the 45 HS codes listed in Table 1. Only 70 countries have complete data across all years (see Table 14 in the appendix). 100 countries have complete data if we exclude the most recent year of the database (2020).

Variables in the trade data are described in Table 2.

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[6] Alternative sources considered included World Trade Atlas which includes data at the country tariff-line level, however that requires paid subscription.

TABLE 2: VARIABLES IN TRADE DATA

Variable name	Description
Commodity Code	HS six-digit code, without leading zeros if any
Classification	HS version
Year	Calendar year
Trade Flow Code	1 = imports, 2 = Exports, 3 = Re-exports, 4 = Re-exports
Reporter ISO	Three digit alpha code of country reporting trade
Partner ISO	Three digit alpha code of country of origin or destination
Qty Unit Code	Quantity units: 1 = None, 5 = number of items, 7 = litres, 8 = kg, 10 = number of packages.
Qty	Quantity value
Netweight (kg)	Weight of trade in kg
Trade Value (US$)	Value of trade in US dollars, including insurance and freight for imports.
Product	Common product name

3. Production and consumption

The data source for production and consumption information is the *FAOSTAT Statistical Database*.[7]

We draw on seven of the seventeen FAOSTAT databases:

- Production: Crops and livestock products, identifier QCL

- Production: Value of Agricultural Production, identifier QV

- Food Balance: Supply Utilization Accounts, identifier SCL

- Food Balance: Food Balances (2014-), identifier FBS

- Food Balance: Food Balances (-2013, old methodology and population), identifier FBSH

- Land, Inputs and Sustainability: Land Use, identifier RL

- Prices: Producer Prices, identifier PP.

Where possible, we have regrouped or aggregated the data in the databases to ease connection between data sets and with the trade data which typically does not recognize the animal from which a dairy product is produced. For example, we limit sheep and goats to a single 'Sheep and goats' category while the data sets do in some cases separately identify sheep and goats.

In all of the FAO databases country and product coverage is variable, although the FAO does infer some values in attempt to construct complete data series.

More recent data is of higher quality, particularly data on stock changes. Improvements to the FAO data since 2013 means that there is a reasonably complete and robust set of accounts for food production for the years 2010 to 2019. For longer time series we have data on production volumes (1961-2020) and production values (1961-2019).

3.1. Production

The high-level scope of the production data is summarised in Table 3 with counts of number of countries and years of observations.

The scope shown in Table 3 is high-level in the sense that it excludes a break down in products by animal type.

In terms of dairy production, there are four animal categories in our database: 'Cattle' (including cows and buffaloes), 'Sheep and goats', 'Camels', and 'Any' for aggregates where production of a product does not specify the animal from which the milk/product comes.

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[7] UN Food and Agriculture Organisation https://www.fao.org/faostat/en/.

Meat production is included in the database to capture substitution from one form of livestock production to another. In meat production animal categories in the database are: 'Camels', 'Cattle', 'Horses', 'Mules', 'Pigs','Poultry', and 'Sheep and goats'.

The scope of dairy products shown Table 3 contains only a subset of dairy production reflected in the trade data. This is because the production data is focused on upstream (less processed) products so some processed dairy products do not appear in the FAO production data (e.g. Casein, Lactose, Cocoa preparations and food preparations nes). Where possible, those products are picked up in the FAO utilization data. Where mappings between production and processed products and trade are incomplete the gaps will be filled with data models in stage 2.

Country coverage is patchy at a product level. However, this reflects that many countries have little or no dairy processing. In terms of total farmgate milk production (i.e. product 'Milk') almost all countries have data across all years in the database.

TABLE 3: SCOPE OF PRODUCTION DATA
Excludes animal category for simplicity. Source, FAOSTAT.

Group	Flow	Product	Unit	Countries	Years
Dairy	Production	BMP	tonnes	12	59
Dairy	Production	Butter	tonnes	119	59
Dairy	Production	Butter and ghee	tonnes	124	59
Dairy	Production	Cheese	tonnes	109	59
Dairy	Production	Cream	tonnes	69	59
Dairy	Production	Evaporated and condensed milk	tonnes	79	59
Dairy	Production	Ghee	tonnes	23	59
Dairy	Production	Margarine	tonnes	102	59
Dairy	Production	Milk	tonnes	191	60
Dairy	Production	Skimmed condensed milk	tonnes	13	59
Dairy	Production	Skimmed evaporated milk	tonnes	7	59
Dairy	Production	Skimmed milk	tonnes	127	59
Dairy	Production	SMP	tonnes	60	59
Dairy	Production	Whole condensed milk	tonnes	67	59
Dairy	Production	Whole evaporated milk	tonnes	61	59
Dairy	Production	WMP	tonnes	64	59
Dairy	Production	WPC	tonnes	47	59
Dairy	Production	Yoghurt	tonnes	20	59
Dairy	Yield	Milk	hg/An	191	60
Livestock	Herd	Any	Head	201	60
Livestock	Herd	Dairy	Head	191	60
Livestock	Slaughter	Any	Head	202	60
Livestock	Yield	Any	hg/An	202	60
Meat	Production	Any	tonnes	202	60

The 'Product' categories shown in Table 3 are bespoke names used to align with the trade data where possible and in some cases these are aggregates of FAO product (item) categories. A

correspondence between the FAO products and the products in our database is shown in Table 4.

TABLE 4: DAIRY PRODUCT PRODUCTION DATA SCOPE
Animal and Product categories are our database categories. Data from FAO production database (QCL), element 'production', units in tonnes.

Animal	Product	FAO_item
Cattle	Milk	Aggregate of FAO items: 951, 882
Sheep and goats	Milk	Aggregate of FAO items: 1020, 982
Other	Milk	Milk, whole fresh camel
Any	Milk	Milk, Total
Any	Butter and ghee	Butter and Ghee
Sheep and goats	Butter and ghee	Aggregate of FAO items: 983, 1022
Cattle	Butter	Aggregate of FAO items: 952, 886
Cattle	Ghee	Aggregate of FAO items: 953, 887
Any	Margarine	Margarine, short
Any	Yoghurt	Yoghurt
Any	Cheese	Cheese (All Kinds)
Cattle	Cheese	Aggregate of FAO items: 955, 904, 901
Sheep and goats	Cheese	Aggregate of FAO items: 1021, 984
Any	Cream	Cream fresh
Any	BMP	Milk, dry buttermilk
Any	SMP	Milk, skimmed dried
Cattle	Skimmed milk	Milk, skimmed cow
Any	Skimmed evaporated milk	Milk, skimmed evaporated
Any	Skimmed condensed milk	Milk, skimmed condensed
Any	Evaporated and condensed milk	Evaporat&Condensed Milk
Any	WMP	Milk, whole dried
Any	Whole evaporated milk	Milk, whole condensed
Any	Whole condensed milk	Milk, whole evaporated
Any	WPC	Aggregate of FAO items: 890, 900

3.2. Land use

The database includes high level data on land use from FAOSTAT. The intent at this stage is to capture variables that can be used to help explain significant structural differences in and constraints on agricultural production across countries, rather than describing detailed aspects of land use, so high-level aggregates suffice.

The land use types included in the database are shown in Table 5 with counts of number of countries and years of observations.

Note that grouping variable 'Flow' is used throughout the database tables to describe what is being measured (aside from animal or product).

TABLE 5: SCOPE OF LAND USE DATA

Flow	Product	Unit	Countries	Years
Agriculture	Any	1000 ha	203	59
All	Any	1000 ha	204	59
Crop	Any	1000 ha	203	59
Forest	Any	1000 ha	201	30
Other	Any	1000 ha	199	30
Permanent pasture	Any	1000 ha	192	59
Temporary pasture	Any	1000 ha	57	19

3.3. Product use

We draw on the FAOSTAT supply utilization data to give a more complete picture of the dairy production value chain i.e. uses of milk in processing, feed, exports, an food supply.

This data includes trade, although we defer to the Comtrade data for trade values and keep the utilization data only as a cross check.

The product use data table contains the same animal[8] and product scope as the production data with the following exceptions:

- the use data includes product categories not found in the production data (e.g. Casein, Lactose, Cocoa preparations and food preparations nes)

- the use data only counts chicken meat production and not all poultry. This was done to simplify database construction and is of little consequence given our dairy focus.

The use data does, however, span a much shorter time period than the production data, with 10 years of data for 2010 to 2019.

Table 6 provides a summary of the scope of the variables ('Flow' group) in the use datatable. Country coverage is reasonably good, even if the time span is short relative to the production data.

The short time span of the use data does limit our ability to measure activity such as changes in stocks, which will be considered as part of data modelling in stage 2. We also make use of

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[8] There is one minor exception to this claim, which is that the use data only counts chicken meat production and not all poultry. This was done to simplify database construction and is of little consequence given our dairy focus.

food balance data on aggregate consumption of dairy products to obtain a lengthy time series, even if product detail is not available.[9]

TABLE 6: SCOPE OF SUPPLY USE DATA

Flow	Unit	Countries	Years	Countries	Years
Exports	tonnes	178	10	48	10
Fats	tonnes	178	10	154	10
Feed	tonnes	177	10	140	10
Food	g/capita/day	178	10	174	10
Imports	tonnes	178	10	150	10
Loss	tonnes	177	10	140	10
Non food uses	tonnes	97	10	161	10
Opening stocks	tonnes	178	10	169	10
Processed	tonnes	176	10	147	10
Production	tonnes	178	10	166	10
Proteins	tonnes	178	10	139	10
Residuals	tonnes	178	10	2	4
Stock variation	tonnes	178	10	55	10

3.4. Food balances and consumption data

Food balance data has been used to construct a long run data table of milk consumption measures. To do this we combine the now defunct historical food balance data set from FAOSTAT along with the new revised (and improved) food balance data.

The scope of the long run food supply data is summarised in Table 7. Note the high-level product categories with most traded dairy products falling within a single 'Milk, ex butter' category.

The long run dairy food supply table includes a range of variables, similar to that of the supply use data, however the principle focus is on food and non-food uses and aggregates.

TABLE 7: LONG RUN DAIRY FOOD DATA SCOPE

Flow	Product	Unit	Countries	Years
Calories	Butter	kcal/capita/day	181	59
Calories	Cream	kcal/capita/day	179	59
Calories	Infant food	kcal/capita/day	172	59
Calories	Milk, ex butter	kcal/capita/day	181	59
Exports	Butter	1000 tonnes	174	59
Exports	Cream	1000 tonnes	146	59
Exports	Infant food	1000 tonnes	168	59

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[9] High level aggregates will still be useful for picking up broad trends and where modelling is best served by a long time series for consumption such as structural gravity models.

Exports	Milk, ex butter	1000 tonnes	181	59
Fats	Butter	g/capita/day	181	59
Fats	Cream	g/capita/day	179	59
Fats	Infant food	g/capita/day	172	59
Fats	Milk, ex butter	g/capita/day	181	59
Food	Butter	1000 tonnes	181	59
Food	Cream	1000 tonnes	179	59
Food	Infant food	1000 tonnes	172	59
Food	Milk, ex butter	1000 tonnes	181	59
Imports	Butter	1000 tonnes	181	59
Imports	Cream	1000 tonnes	180	59
Imports	Infant food	1000 tonnes	181	59
Imports	Milk, ex butter	1000 tonnes	181	59
Non food uses	Butter	1000 tonnes	34	59
Non food uses	Cream	1000 tonnes	8	59
Non food uses	Infant food	1000 tonnes	2	59
Non food uses	Milk, ex butter	1000 tonnes	180	59
Processed	Cream	1000 tonnes	50	59
Processed	Infant food	1000 tonnes	1	3
Processed	Milk, ex butter	1000 tonnes	180	59
Production	Butter	1000 tonnes	133	59
Production	Cream	1000 tonnes	104	59
Production	Infant food	1000 tonnes	2	38
Production	Milk, ex butter	1000 tonnes	181	59
Protein	Butter	g/capita/day	181	59
Protein	Cream	g/capita/day	179	59
Protein	Infant food	g/capita/day	172	59
Protein	Milk, ex butter	g/capita/day	181	59

4. Prices

4.1. Farmgate prices

FAOSTAT includes a limited amount of data on the value of production and prices. Consequently, we defer to other data sources for measures of price or value of many traded products. However, the FAOSTAT data on farmgate milk prices is useful in terms of its country coverage and time span (see Table 8).

In addition to FAOSTAT farmgate price information, we are also likely to make use of product- and country- and region-specific farmgate price information, such as that provided by the USDA and European Commission's Eurostat, in the course of the model design. However, that data does not currently form part of the database, per se, because the data is not readily available for a sufficiently wide number of countries.

TABLE 8: SCOPE OF DATA ON AVERAGE FARMGATE PRICES

Group	Animal	Flow	Product	Unit	Countries	Years
Dairy	Camels	Price	Milk	USD	6	29
Dairy	Cattle	Price	Milk	USD	141	30
Dairy	Sheep and goats	Price	Milk	USD	53	30
Meat	Camels	Price	Meat	USD	16	30
Meat	Cattle	Price	Meat	USD	128	30
Meat	Horses	Price	Meat	USD	40	30
Meat	Mules	Price	Meat	USD	4	19
Meat	Pigs	Price	Meat	USD	109	30
Meat	Poultry	Price	Meat	USD	126	30
Meat	Sheep and goats	Price	Meat	USD	118	30

4.2. International benchmark prices

The database follows the approach the FAO and OECD in relying principally on trade values and volumes to infer prices of international traded commodities.[10] The benchmark prices currently in the database are listed in table Table 9.

The database contains only annual prices, for the period 1999-2019. Additional sources of higher frequency and regional price information will be considered as part of stage 2 (model design). However such data does tend to be proprietary.

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[10] See OECD, FAO, 2015. Aglink-Cosimo Model Documentation: A partial equilibrium model of world agricultural markets. OECD, Paris.

We expect to engage more with industry and other stakeholders to identify useful additional data sources and test the utility of those data sources in terms of modelling global dairy distortions.

TABLE 9: BENCHMARK DAIRY PRICES

Product	Benchmark market price
Butter	F.o.b. export price, butter, 82% butterfat, Oceania
Cheese	F.o.b. export price, cheddar cheese, 39% moisture, Oceania
Skim milk powder	F.o.b. export price, non-fat dry milk, 1.25% butterfat, Oceania
Whole milk powder	F.o.b. export price, WMP 26% butterfat, Oceania
Whey powder	Dry whey, West region, United States (USDA)
Casein	Export price, New Zealand

5. Policies

Scope of policy information included in the database includes:

- Tariffs

- Non-tariff measures

- Producer and consumer support.

Policy data for the past 15 years is generally quite good, in terms of the scope of measures included and countries covered. For earlier years the data can be patchy. This does pose a problem of bias in the data because as country and policy coverage increases it may appear as if increasing numbers of measures are being applied when they may have applied for a long time. Case studies and modelling in later phases of the project will enable us to identify bona fide distortions.

5.1. Tariffs

Tariff data has been sourced from the World Integrated Trade Solution (WITS) hosted by the World Bank.[11]

The data spans default Most Favoured Nation (MFN) tariffs and preferential tariffs under free trade agreements.

The data spans the years 1998 to 2019 with 190 countries' tariffs included, although country coverage is patchy and is quite poor up until the late 1990s as summarised in Figure 1.

The tariff data is at the HS 6 digit level, however it does contain measures of maximum, minimum and average tariffs at the tariff level applied by a reporting country (typically ranging from 6 to 12 digits). The variables included in the tariff data tables are listed in Table 10.

The WITS data includes estimates of the ad valorem (percent of value) equivalent of specific tariffs (dollar per unit tariffs). It does not, however include a measure of the tariff equivalence of tariff rate quotas which apply to dairy product imports in some countries. Tariff rate quotas, which apply one tariff for imports up to certain quantity and a higher tariff for imports beyond that quantity, combine both quotas that are recorded in non-tariff measure data and the tariff component. As the higher tariff in a tariff-rate quota is often prohibitively high, we treat tariff-rate quotas as quotas (non-tariff measures). This treatment may need to be revisited during model design or case studies.

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[11] https://wits.worldbank.org/

TABLE 10: VARIABLES IN TARIFF DATA TABLES

Variable	Description
Product	Product name
HS6	Numerical HS 6 digit codes
HS	Version of HS
Reporter.ISO	3 digit alpha (ISO) code of country/region applying a tariff
Partner.ISO	3 digit alpha (ISO) code of country/region facing a tariff, only applicable for the preferential tariff data tables
Year	Year
Min	Minimum tariff rate
Max	Maximum tariff rate
Mean	Average tariff rate

FIGURE 1: COVERAGE OF TARIFF DATA OVER TIME

Preferences count each country in a preferential arrangement. Counts of countries treats customs unions as a single country.
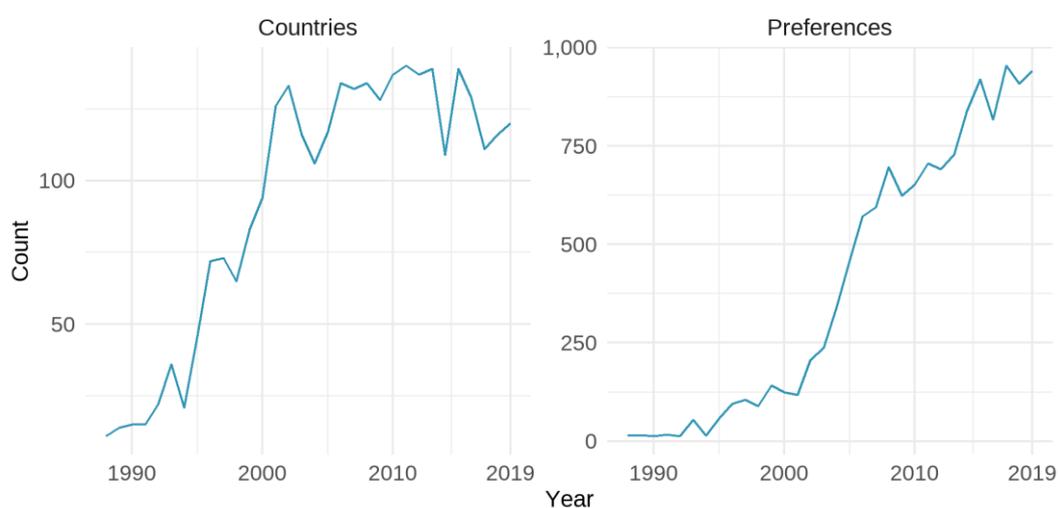
5.2. Non-tariff measures

Non-tariff measures are policy measures, other than customs tariffs, that can have an economic effect on international trade in goods, changing quantities traded, or prices, or both.[12]

Conceptually non-tariff measures are so broad as to cover virtually any measure including producer support programmes. However, we prefer to distinguish producer NTMs from producer support measures when discussing data because of the existence of data sets specifically measuring producer support and because it is not always clear that producer support measures have economic effects on international trade, this being a central issue we want the model to be able to examine.

Our data on NTMs comes from three sources:

- TRAINS**:** researcher database, by UNCTAD[13]

    – the most comprehensive source of data on the global stock of NTMs

- WIIW**:** Vienna Institute for International Economic Studies (WIIW) database on NTMs

    – based on NTMs notified to the WTO, collated in the WTO's integrated trade intelligence portal (I-TIP) and

    – temporary trade barriers collated by the World Bank[14]

    – collected, cleaned and augmented with information on affected products[15]

- GTA: Global Trade Alert[16]

    – the most comprehensive source for analysing new NTMs and other interventions since 2008.

The coverage of the data sets is summarised in Table 11. In general, the GTA data is the most comprehensive in terms of recent distortions. It is also the source that best captures producer support measures or similar related distortions. That being so, we make use of the GTA data for measuring producer support related NTMs. For other NTMs we rely mainly on the TRAINS data.

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[12] Non-tariff measures do not include de facto procedures and practices that impact on trade costs, such as slow processing of administrative approvals or port capacity, though these factors can have a material effect on trade costs.

[13] https://trainsonline.unctad.org/home

[14] https://www.worldbank.org/en/data/interactive/2021/03/02/temporary-trade-barriers-database

[15] Grübler, J., & Reiter, O. (2020). "Characterising Non-tariff Trade Policy" (Research Report No. 449; Wiiw Research Report). The Vienna Institute for International Economic Studies. https://wiiw.ac.at/characterising-non-tariff-trade-policy-p-5375.html

[16] https://www.globaltradealert.org

The NTM data table in the data base consists of counts of the occurrence of policy measures that are considered NTMS grouped by:

- country or region applying the NTM (Reporter.ISO, 3 character alpha/ISO code)

- product to which the measure is applied (with Product name and HS6 code)

- the country or region affected by the measure (Partner.ISO, 3 character alpha/ISO code, with a category of World (WLD), where the measure is applied on an MFN basis)

- MAST level 2 NTM classification ('NTM', see Appendix Table 13 for a list of codes)

- The year in which a measure entered into force (StartDate) and the year that the measure ended or is scheduled to end (EndDate)

TABLE 11: COVERAGE OF NTM DATA SOURCES

Blank indicates no data. "X" indicates good coverage. "o" indicates poor coverage.

Measure	TRAINS	WIIW	GTA
Sanitary and phytosanitary (SPS) measures	X	X	o
Technical barriers to trade (TBT)	X	X	o
Pre-shipment inspections and other formalities	X		
Contingent trade-protective measures		X	X
Non-automatic licensing, quotas, prohibitions and quantity-control measures	X	X	X
Price-control measures, including additional taxes and charges	X		X
Finance measures	X		X
Measures affecting competition	X	X	
Trade-related investment measures	X		X
Distribution restrictions			
Restrictions on post-sales services			
Subsidies (excluding export subsidies)			X
Government procurement restrictions			X
Intellectual property			X
Rules of origin			
Export-related measures	X		X
Countries implementing NTMs	92	148	190
Time period	2010-2018	1995-2019	2008-2020

5.3. Producer and consumer support

Data on producer support or related behind-the-border measures (such as measures affecting competition) has been sourced from GTA (as in the NTM data) and from the OECD producer and consumer support estimates database.[17]

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[17] https://stats.oecd.org/viewhtml.aspx?QueryId=84839&vh=0000&vf=0&l&il=&lang=en

The GTA data in the database has the same structure as the TRAINS-based NTM data with each record or row in the data counting a measure that is potentially affecting trade, with the measures grouped by the same variables as described above for NTMs. The GTA data also has an additional variable labelled 'Alert' which contains an assessment of whether a measure is expected to have trade restrictive or distortionary effects. The 'Alert' variable takes values of: green for a measure that reduces distortions; amber for possible measures under consideration that would introduce distortions; and red for distortionary measures already in place.

The OECD database provides includes of a range of indicators of measures of support to agricultural production and consumers of agricultural products. These indicators include both distortionary and non-distortionary measures from the perspective of international trade.

Given our dairy sector focus, we include in our database only those producer and consumer support estimates that relate specifically to milk production. The indicators included in the database are[18]:

- Milk - Producer SCT: Single commodity transfer (SCT). The annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policy measures directly linked to the production of a single commodity such that the producer must produce the designated commodity in order to receive the transfer.

- Milk - Percentage SCT: Producer SCT as a share of gross farm receipts for the specific commodity

- Milk - Consumer SCT: Single commodity transfer (SCT). The annual monetary value of gross transfers from (to) consumers of agricultural commodities, measured at the farm gate level, arising from policy measures directly linked to the production of a single commodity.

- Milk - Producer NPC: Nominal protection coefficient (NPC). The ratio between the average price received by producers at farm gate (including payments per tonne of current output), and the border price (measured at farm gate).

- Milk - Consumer NPC: Nominal protection coefficient (NPC). The ratio between the average price paid by consumers (at farm gate) and the border price (measured at farm gate).

The producer and consumer support data spans more than two decades, however the country scope of this data is limited to OECD countries plus a selection of large developing countries (see Table 12).

This is nonetheless a good starting for data on impacts of producer and consumer support policies as it covers a majority of global agricultural production by value.

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[18] Descriptions are from the OECD producer support estimates manual.

TABLE 12: COVERAGE OF PRODUCER AND CONSUMER SUPPORT ESTIMATES

Country	Years
Argentina	1997-2020
Australia	1986-2020
Brazil	1995-2020
Canada	1986-2020
Chile	1995-2020
China (People's Republic of)	1995-2020
Colombia	1995-2020
Costa Rica	1995-2020
European Union	1986-2020
Iceland	1986-2020
India	2000-2020
Indonesia	1995-2020
Israel	1995-2020
Japan	1986-2020
Kazakhstan	1995-2020
Korea	1986-2020
Mexico	1991-2020
New Zealand	1986-2020
Norway	1986-2020
Russia	1995-2020
South Africa	1995-2020
Switzerland	1986-2020
Turkey	1986-2020
Ukraine	1995-2020
United Kingdom	2017-2020
United States	1986-2020

6. Appendix tables

TABLE 13: NTM CLASSIFICATIONS[19]

Level	Type	Code	Group	Description
1	Technical measures	A	TBT	SPS
2	Technical measures	A1	Restrictions	Prohibitions
2	Technical measures	A2	Regulations	Tolerance limits
2	Technical measures	A3	Regulations	Labelling
2	Technical measures	A4	Regulations	Hygiene
2	Technical measures	A5	Regulations	Treatments
2	Technical measures	A6	Regulations	Processes
2	Technical measures	A8	Conformity	Conformity
2	Technical measures	A9	Conformity	Other
1	Technical measures	B	TBT	TBT
2	Technical measures	B1	Restrictions	Prohibitions
2	Technical measures	B2	Regulations	Tolerance limits
2	Technical measures	B3	Regulations	Labelling
2	Technical measures	B4	Regulations	Processes
2	Technical measures	B6	Regulations	Identity
2	Technical measures	B7	Regulations	Performance
2	Technical measures	B8	Conformity	Conformity
2	Technical measures	B9	Conformity	Other
1	Technical measures	C	BCM	Border control measures
1	Technical measures	C1	Regulations	Pre-shipment
2	Technical measures	C2	Restrictions	Direct
2	Technical measures	C3	Restrictions	Port
2	Technical measures	C4	Regulations	Monitoring
2	Technical measures	C9	Regulations	Other
1	Non-technical measures	D	Safeguards	Contingent protection
2	Non-technical measures	D1	Safeguards	Antidumping
2	Non-technical measures	D2	Safeguards	Countervailing
2	Non-technical measures	D3	Safeguards	Safeguard
1	Non-technical measures	E	QCM	Quantitative controls
2	Non-technical measures	E1	Limits	Licensing
2	Non-technical measures	E2	Limits	Quotas
2	Non-technical measures	E3	Restrictions	Prohibitions
2	Non-technical measures	E5	Restrictions	Export restraint
2	Non-technical measures	E6	Limits	TRQ
2	Non-technical measures	E9	Limits	Other
1	Non-technical measures	F	Prices	Taxes and charges
2	Non-technical measures	F1	Prices	Customs value
2	Non-technical measures	F2	Prices	Export prices
2	Non-technical measures	F3	Prices	Variable charges
2	Non-technical measures	F4	Prices	Customs surcharge
2	Non-technical measures	F5	Prices	Seasonal duties
2	Non-technical measures	F6	Prices	Service charges
2	Non-technical measures	F7	Prices	Internal taxes
2	Non-technical measures	F8	Prices	Decreed value
2	Non-technical measures	F9	Prices	Other

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[19] https://unctad.org/topic/trade-analysis/non-tariff-measures/NTMs-classification

Level		Type	Code	Group	Description
	1	Non-technical measures	G	Payments	Finance
	2	Non-technical measures	G1	Payments	Advance payment
	2	Non-technical measures	G2	Payments	Currency
	2	Non-technical measures	G3	Payments	Forex controls
	2	Non-technical measures	G4	Payments	Terms
	2	Non-technical measures	G9	Payments	Other
	1	Non-technical measures	H	Competition	Competition
	2	Non-technical measures	H1	Competition	State trader
	2	Non-technical measures	H2	Competition	Specified services
	2	Non-technical measures	H9	Competition	Other
	1	Non-technical measures	I	TRIMS	Investment measures
	2	Non-technical measures	I1	TRIMS	Local content
	2	Non-technical measures	I2	TRIMS	Trade balance
	2	Non-technical measures	I9	TRIMS	Other
	1	Non-technical measures	J	Distribution	Distribution restrictions
	2	Non-technical measures	J1	Distribution	Location
	2	Non-technical measures	J2	Distribution	Reseller
	1	Non-technical measures	K	Post-sale	Post-sale restrictions
	1	Non-technical measures	L	Subsidies	Subsidies
	1	Non-technical measures	M	Procurement	Government procurement
	1	Non-technical measures	N	IP	Intellectual property
	1	Non-technical measures	O	ROO	Rules of origin
	1	Export-related measures	P	Exports	Export measures
	2	Export-related measures	P1	Restrictions	Quantity restrictions
	2	Export-related measures	P2	Restrictions	State trader
	2	Export-related measures	P3	Prices	Price control
	2	Export-related measures	P4	Restrictions	Re-export
	2	Export-related measures	P5	Prices	Taxes
	2	Export-related measures	P6	Regulations	Technical
	2	Export-related measures	P7	Subsidies	Export subsidies
	2	Export-related measures	P8	Prices	Export credits
	2	Export-related measures	P9	Regulations	Other

TABLE 14 COUNT OF DAIRY PRODUCTS OBSERVED IN IMPORT DATA IN DATABASE BY COUNTRY AND YEAR

ISO	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
ALB	5	7	11	5	7	7	5	8	6	16	10	11	12	17	16	5	5	9	1	3	3	3
AND	2	4	0	2	2	6	5	6	5	3	4	3	2	6	4	4	5	6	5	2		
ARG	37	37	36	37	36	36	37	37	36	34	35	35	35	37	36	35	35	35	35	25	26	25
ARM	4	7	9	11	9	6	8	15	20	14	17	12	14	19	18	15	23	19	24	21	21	25
ATG	6	19						7		7		5	6	13	8	7	9	7	5	12	10	13	
AUS	39	39	39	39	39	39	39	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
AUT	38	38	38	38	38	38	39	38	38	38	38	38	38	40	40	40	40	40	40	40	40	40
AZE	9	3	4	5	8	8	8	9	10	9	9	11	7	9	10	11	14	21	22	21	17	16
BEL	39	39	39	39	39	39	39	39	39	39	38	38	38	40	40	40	40	40	40	41	41	41
BFA	6	6	5	3	7	4	6			6	4	7	3	3	5	4	7	7	11	9	4	5	
BGR	30	36	34	33	38	36	35	37	38	38	35	37	37	39	39	41	40	40	41	40	41	
BHS	7	7	12	13	10	12	2	7	7	12	6	7	3	2	6	3	3	5	5	7		
BLR	37	35	35	36	35	37	36	34	34	36	36	36	38	39	40	40	39	41	40	41	41	41
BLZ	13	8	1		10	5	8	6	11	1	1	1	5	3	4	9	5	4	8	5	6	8
BOL	9	10	13	12	14	8	10	10	10	10	8	12	14	15	13	12	11	12	11	8	9	11
BRA	37	35	37	36	38	38	38	39	38	39	37	35	37	39	39	38	36	37	38	41	40	40
BRB	19	22	19	21	18	20	25	20	19	18	15	16	17	18	14	14	15	17	21	17	14	14
BTN	2						5	10	6	1	5	6	5	8								
CAN	39	39	39	39	38	38	39	38	39	39	39	39	39	41	41	40	40	41	41	41	41	41
CHE	36	37	36	37	37	37	38	38	38	39	38	39	39	41	41	41	41	41	41	41	40	40
CHL	33	35	34	33	35	36	36	36	35	32	34	32	32	33	31	36	34	35	35	34	31	
CHN	36	37	36	36	35	32	35	34	36	32	35	36	37	37	36	37	37	37	38	39	39	38
CIV	21	25	24	22	20	23	21	20	18	20	26	23	20	22	22	26	27	26	30	26	31	
COL	29	33	37	35	35	35	34	36	33	37	35	35	33	37	37	36	34	37	37	35	35	36
CPV	2	12	3		2	3	18	16	20		13	16	15	12	6	3	5	2	2	2	1	
CRI	30	30	31	29	31	34	32	30	33	34	34	32	31	37	36	34	34	35	34	36	35	

ISO	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CUB	3	3	15	11	8	9	2	6														
CYP	20	21	24	21	23	23	19	17	19	21	22	24	24	24	23	22	24	21	20	20	21	18
CZE	37	39	38	38	38	39	39	39	38	39	39	38	38	41	41	41	41	41	41	41	41	41
DEU	39	39	38	38	38	39	39	39	39	38	39	39	39	41	41	41	41	41	41	41	41	41
DMA	7	6	5	3	4	4	3	4	4	2	5	6		5								
DNK	35	35	35	37	37	37	37	37	37	36	36	37	36	39	38	39	38	39	38	39	39	39
DZA	4	6	4	19	18	13	16	18	19	12	11	13	13	15	18	12	16	18	20			
ECU	18	21	18	18	20	20	23	24	26	19	21	23	22	26	27	21	26	25	24	23	25	
EGY	22	28	25	28	27	26	24	25	32	38	35	35	36	38	36	38	38	37	38	34	36	37
ESP	39	39	39	39	39	39	39	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
EST	34	36	37	38	38	37	36	35	35	36	36	36	37	40	40	40	40	40	39	38	38	40
ETH	5	3	6	4	10	6	17	1	11	7	7	7	11	13	13	10	13	9	9	7		
FIN	35	37	35	34	35	36	35	36	36	35	34	34	34	38	39	39	37	38	39	39	40	39
FRA	39	39	39	39	39	39	39	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
FRO	2	3	1	1	1	1	3	1	3	2	1											
GAB	4	4	5	4	3	4	5	4	4	11	8											
GBR	39	39	39	39	39	39	39	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
GEO	10	13	15	10	11	26	23	24	15	12	15	21	22	24	22	18	19	20	22	20	26	24
GHA	12	17	13		19		19	21	21	20	20	20	25	20	25	21	25	24	28	24	29	
GIN	1	2	6	2		2	5	4	5	6					5	6	5	3				
GMB	3	4	2	4	1	1	1	2	2	1	12	14	15	14	13	12	10	5	7	3	5	9
GRC	36	37	36	36	38	39	39	38	39	39	39	38	39	41	41	41	41	41	41	41	41	41
GRD	3	5	3	4	4	4	6	4	4	4		5	4	8	12	5	5	4	7	6	5	3
GTM	31	30	35	33	34	35	35	39	33	38	36	35	34	33	33	34	30	28	32	31	30	30
GUY	15	23	17	16	19	20	18	19	22	22	21	26	21	17	16	19	18	17	18	21	18	16
HKG	35	36	36	36	35	35	36	36	36	37	37	36	36	38	40	38	38	37	37	36	35	36
HND	22	20	25	30	28	26	25	24	26		27	27	24	26		28	26	23	28	26	23	

ISO	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HRV	35	38	34	37	34	33	33	36	37	35	34	33	32	35	39	38	39	39	41	41	40	40
HUN	34	29	30	30	29	35	33	31	33	33	35	39	38	41	41	41	41	41	41	40	41	41
IDN	33	34	35	35	39	36	36	36	35	35	36	36	34	39	39	37	37	37	37	40	40	39
IND	33	32	35	38	37	37	39	38	38	39	39	38	39	37	40	38	40	39	41	40	39	40
IRL	38	39	39	39	39	39	38	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
IRN	15	18	19	28	25	26	33	36				27	29		28	32	37	36	37	35		
ISL	16	20	15	20	18	21	15	18	20	22	21	21	21	27	22	21	22	24	24	25	25	29
ISR	29	24	21	21	22	13	27	23	26	30	30	30	28	30	30	32	31	30	31	32	33	25
ITA	39	39	39	39	39	39	39	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
JAM	16	16	19	23	23	24	21	24	21	25	25	27	30	28	26	29	21	26	23	25	27	
JOR	21	24	20	22	25	26	27	28	24	26	26	24	25	22	24	23	27	29	32	27	28	26
JPN	36	35	36	35	36	37	36	35	35	37	39	34	35	34	35	37	35	38	36	36	36	37
KEN	29	34	29	33	33	33	35	34	37	36	36	39			36		37	39	38	36	32	37
KNA	6	17	10	12	13	15	10	12	6	9	12	8	8	9	11	8	7	5	7			
KOR	30	28	31	30	30	31	32	33	35	33	36	36	38	38	38	39	39	39	38	37	38	40
LBN	25	29	31	32	34	31	31	33	31	33	32	35	35	38	34	36	33	37	36	36		33
LCA	6	8	11	16	13	12	11	10	11	13	15	14	10	7	15	13	12	13	9	9	13	
LKA	28	34	32	33	32	31	32	33	30	32	28	28	29	31	32	33	31	35	36		38	33
LTU	32	35	35	35	38	37	39	38	38	39	39	39	39	41	41	41	41	41	41	40	41	39
LUX	29	34	35	35	35	36	35	37	36	35	37	35	37	40	40	39	39	39	37	38	38	38
LVA	31	35	31	29	31	36	37	38	37	38	35	38	38	41	41	41	40	41	40	40	40	40
MAC	17	18	18	13	14	15	16	17	17	22	23	4	3	5		4	5	1		5	5	4
MAR	14	14	11	17	17	17	22	25	21	24	22	28	26	30	24	26	32	32	30	32	30	
MDA	12	18	16	14	12	16	16	17	18	16	17	13	16	12	16	21	24	20	20	21	15	19
MDG	4	10	12	11	5	10	10	12	12	18	14	12	14	13	14	14	12	13	11	7	8	
MEX	37	36	37	37	38	36	38	38	37	38	38	38	38	38	39	29	29	30	33	30	28	28
MKD	22	20	20	15	23	22	21	21	21	15	25	22	25	25	25	25	27	29	23	26	28	30

ISO	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
MLI	5	3	4	4	5	6	10	9	3	10		10	11	12				14	9			
MLT	16	22	6	18	12	15	12	13	16	25	18	16	20	24	15	13	16	13	19	16	17	
MNG	2	1	6	4	7	9	10	7	8						11	8	12	16	16	15	11	
MUS	14	25	28	26	26	29	27	28	25	26	30	30	27	28	31	31	28	30	26	26	27	24
MWI	5	12	5	6	7	10	7	10	10	11	13	17	16	16	13	11	11	11	16	19	10	
MYS	36	37	37	35	36	35	37	38	36	38	37	37	37	38	39	39	40	39	40	40	40	40
NCL	13	12	18	19	21	16	18	19	21	22	23	20	21	16	15	15	20					
NER	12	18	17	15	14	10	15	14	11	11	12	11	11	10	9	12	13	12	17	14		
NGA	5	5	7	8	8			3	17	12	12	13	27	18	24	15	14	11	11	15	13	
NIC	22	25	24	28	23	25	25	27	27	27	26	27	24	14	12	26	23	27	25	29	26	
NLD	37	37	37	39	39	39	39	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
NOR	27	33	28	29	34	35	33	33	32	32	30	32	31	33	33	33	35	34	35	37	32	34
NPL	16	6			20							15	13	16	18	17	23	15	17	26		
NZL	38	37	39	39	39	39	39	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
OMN	17	26	23	21	14	22	21	15	17	21	22	25	21	30	29	26	27	28	31	35		
PAN	12	12	13	12	9	9	8	22	20	23	24	21	23	23	28	25	19	35	30			
PER	17	17	27	34	29	28	30	24	26	30	27	32	28	30	26	29	30	29	31	32	32	
PHL	20	23	24	23	23	24	26	25	21	23	30	28	26	33	31	33	29	30	34	35	31	34
POL	31	31	32	30	31	38	39	39	39	39	39	39	39	41	41	41	41	41	41	41	40	40
PRT	35	38	35	37	37	37	37	36	38	38	38	38	39	41	41	41	41	41	41	41	41	41
PRY	4	4	6	10	13	13	15	13	15	13	12	16	15	18	16	19	20	16	15	17	15	
PYF	3	3	4	4	6	5	3	11	7	3	4	7	5	5	5	4	5	3				
ROU	24	25	25	26	23	28	33	30	34	37	37	39	39	39	40	41	41	41	41	41	41	41
RUS	37	38	38	37	38	38	39	38	38	38	38	38	38	41	41	41	41	41	41	41	41	
SAU	3	28	26	31	30	31	31	30	29	30	30	31	32	33	34	32	32	32	34	38	34	
SCG	23	26	28	34		31																
SDN	4	5	2	2	2	4	2	4	1	5	5	3	2	4	5	9	6	5	6	10		

27

ISO	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
SEN	14	15	8	14	23	19	21	19	20	25	24	22	24	23	27	26	27	25	25	28	30	27
SGP	39	39	38	39	38	38	38	38	38	38	38	38	39	41	41	41	41	41	41	41	41	41
SLV	27	34	29	28	33	30	31	29	27	28	29	27	30	29	33	34	36	36	35	34	35	38
SUR	1	10	10	9	10	9	10	10	11	14	19	13	18	18	14	21	1	4	2	2	2	
SVK	33	33	33	35	36	37	29	32	35	33	37	37	38	39	41	40	39	39	39	40	39	40
SVN	34	35	34	31	31	35	34	35	35	34	36	37	37	39	41	41	40	41	41	41	41	41
SWE	39	39	39	39	39	38	38	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
SYC	2	19	12	9	10	7	7	8	18	15		4	2	1	2		1	1	1	1	1	
TGO	18	11	11	11	16	18	13		12	16	17	15	14	10	13	12	14	16	15	15	14	
THA	35	35	35	35	36	38	34	36	37	37	37	37	37	40	40	40	39	39	40	41	40	41
TKM	1	1																				
TTO	24	28	32	28	34	32	29	27	27	32	33	28	31	29	28	29	35					
TUN	16	26	25	23	23	25	26	27	26	20	20	21	29	30	29	26	30	24	26	29	28	
TUR	36	35	34	34	35	38	36	37	39	39	39	38	38	41	40	41	41	41	40	40	41	41
TZA	11	11	15	18	18	24	23	26	22	24	19	22	23	29	21	19	16	17	11	13		
UGA	8	14	17	16	19	18	18	18	24	25	24	28	26	27	29	33	36	33	33	32		33
UKR	27	31	34	35	37	35	36	36	37	38	37	37	38	36	35	37	40	38	38	39	39	38
URY	23	24	24	25	23	25	23	24	25	24	26	27	25	24	28	28	25	27	30	29	32	30
USA	39	39	39	39	39	39	39	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
VCT	5	7	9	9	6	4	8	6	3	3	5	5	3	7	5	6	6	5	4	5	5	
VEN	24	27	28	31	30	34	31	24		18	12	11	11	2	10							
ZAF	37	39	39	39	39	39	39	39	39	39	39	39	39	41	41	41	41	41	41	41	41	41
ZMB	14	19	15	21	23	25	18	21	23	25	27	27	23	26	26	24	24	24	22	24	26	23
AIA		1	5	1	1	1			3	3												
BEN		2	4	2	5	3	4	3	3	7	6	5	4	5	8	15	12	18	15	11	10	
BGD		5	6	9	8	14	13	10	10	10	15	17	13	15	12		16					
BHR		12	17	21	18	21	22	20	21	21	23	24	23	28	28	29	26	31	33	30		

ISO	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BWA		22	28	23	27	28	29	24	26	30	32	28	28	30	32	33	34	35	34	34	33	28
CAF		4	1	1			1	1				2		1				2	3			
CMR		17	17	20	22	20	25	14	13	22	19	17	19	18	18	21	13	16	16			
KAZ		3	18	18	22	24	26	26	29	24	28	22	23	27	30	29	35	36	36	36	36	
KGZ		21	26	22	22	22	27	25	23	20	23	22	23	22	19	21	19	20	23	22	23	25
KHM		5	4	4	3	1	2		2	2	4	4	4	7	2	5	5	8	13	8	6	
KWT		16	15	13	14	17		32	27	27	25	23	25		32	37	29	32	34	31	28	
LSO		6	13	20	16	17				12	10	14	8	11	9	23	19	22	19			
MOZ		4	3	8	15	5	5	9	10	8	9	5	3	5	10	8	10	15	18	19	25	
MRT		1													1					1	1	
MYT		3	14	4	8	5	9	12	8	6	6											
NAM		35	37	37	36	35	35	33	31	33	34	36	31	35	38	38	34	28	33	32	33	33
PNG		6	2	8	10	8							6	7								
QAT		12	4	13	9	12	19	16	22	1	25	1	1	1	1	1	1	1	1	1	1	1
SLE		1														11	1	7	5	11		
STP		1			1	1	0	0	2	2	1	1	0			1	2	2	0	1	1	
SWZ		33	35	34	33	33	31	32	28	29	28	27	33	33	32	36	29	30	21	21	19	
VNM		11	18	23	21	19	23	27	25	26	26	25	32	34	34	35	35	37	38	37	35	37
ZWE		29	22	34	29	26	26	25	25	23	18	14	12	17	23	20	22	18	18	15	21	19
BDI			1		1	2	2	2	9	4	1	2	3	3	8	6	4	5	10	14	10	
BRN			11	7	7	14		12	16	16	20	22	17	24	24	24	26	22	18	26	23	
DOM			11	12	13	18	15	13	17	16	15	17	20	33	35	34	34	32	35	34		
GRL			1	1				2				1					1			1		
MSR			2	2	1			1		0		1			1	1	1					
RWA			5	3	4	5	7	4	8	9	5	11	15	12	18	22	24	19	25	24	26	
SYR			5	7	29	16	23	30	20	20	32	34										
TON			1						1	1			3	1	3	3						

ISO	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
WSM			19	17	15	15	19	15	16	8	6	5	3	1	12	10	11	12	18	19	21	
FJI				22	23	29	29	26	26	24	29	30	31	32	35	31	31	28	28	28	31	
FSM				1	1	1	1	1	1	1	1	1	1	1	1							
BIH					21	22	25	25	30	29	26	27	28	30	32	30	29	31	32	29	30	29
ERI					4																	
PAK					19	20	25	26	29	30	28	30	27	35	29	30	24	28	27	28	29	31
GNB						1																
TLS						3	3													2		
YEM						19	19	22	22	22	24	22	22	23	15	23	21			1	1	
ANT							18	15	17	16												
ARE							38		38	38						41	41	41	41	40	41	41
COM							1			2		1	1			1					1	
MDV							7										1					
MNE								13	9	8	8	8	11	21	20	19	21	19	13	15	17	14
SRB								36	35	36	37	34	35	37	39	40	41	40	40	41	39	39
VUT								3	1		1	3	5									
COG									8	8	6	6	6	7	6	11	5	9	6	10	9	
PSE									21	21	21	22	20	19	21	20	21	21	21	20	20	
AFG												1	1	1	1			2	2		3	4
LBY											1	2	2						4	4	5	
ABW											15	11	19	11	18	10	1	1			3	1
DJI												10										
SLB												5		4	5	4	5	2	2	5	4	
LAO													1	2	3	3	8	13	6	11	7	8
MMR												2	5	10	5	3	4	8	10	9	12	8
BMU														6	7	8	6	6	3	10	7	7
PLW																1	1					

ISO	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AGO																	28	28	26	26		
COD																	8	9	16	18	15	12
KIR																	1					
TJK																		9				
UZB																			23	21	24	26

TABLE 15: COUNTRY CODES

Country	Numerical code	ISO, alpha code
Afghanistan	2	AFG
Albania	3	ALB
Algeria	4	DZA
Angola	7	AGO
Antigua and Barbuda	8	ATG
Argentina	9	ARG
Armenia	1	ARM
Australia	10	AUS
Austria	11	AUT
Azerbaijan	52	AZE
Bahamas	12	BHS
Bahrain	13	BHR
Bangladesh	16	BGD
Barbados	14	BRB
Belarus	57	BLR
Belgium	255	BEL
Belgium-Luxembourg	15	
Belize	23	BLZ
Benin	53	BEN
Bhutan	18	BTN
Bolivia (Plurinational State of)	19	BOL
Bosnia and Herzegovina	80	BIH
Botswana	20	BWA
Brazil	21	BRA
Brunei Darussalam	26	BRN
Bulgaria	27	BGR
Burkina Faso	233	BFA
Burundi	29	BDI
Cabo Verde	35	CPV
Cambodia	115	KHM
Cameroon	32	CMR
Canada	33	CAN
Central African Republic	37	CAF
Chad	39	TCD
Chile	40	CHL
China	351	CHN
China, Hong Kong SAR	96	HKG
China, Macao SAR	128	MAC
China, mainland	41	
China, Taiwan Province of	214	TWN
Colombia	44	COL
Comoros	45	COM
Congo	46	COG
Cook Islands	47	COK

Country	Numerical code	ISO, alpha code
Costa Rica	48	CRI
C?te d'Ivoire	107	CIV
Croatia	98	HRV
Cuba	49	CUB
Cyprus	50	CYP
Czechia	167	CZE
Czechoslovakia	51	
Democratic People's Republic of Korea	116	PRK
Democratic Republic of the Congo	250	COD
Denmark	54	DNK
Djibouti	72	DJI
Dominica	55	DMA
Dominican Republic	56	DOM
Ecuador	58	ECU
Egypt	59	EGY
El Salvador	60	SLV
Equatorial Guinea	61	GNQ
Eritrea	178	ERI
Estonia	63	EST
Eswatini	209	SWZ
Ethiopia	238	ETH
Ethiopia PDR	62	
Faroe Islands	64	FRO
Fiji	66	FJI
Finland	67	FIN
France	68	FRA
French Guyana	69	GUF
French Polynesia	70	PYF
Gabon	74	GAB
Gambia	75	GMB
Georgia	73	GEO
Germany	79	DEU
Ghana	81	GHA
Greece	84	GRC
Grenada	86	GRD
Guadeloupe	87	GLP
Guatemala	89	GTM
Guinea	90	GIN
Guinea-Bissau	175	GNB
Guyana	91	GUY
Haiti	93	HTI
Honduras	95	HND
Hungary	97	HUN
Iceland	99	ISL
India	100	IND

Country	Numerical code	ISO, alpha code
Indonesia	101	IDN
Iran (Islamic Republic of)	102	IRN
Iraq	103	IRQ
Ireland	104	IRL
Israel	105	ISR
Italy	106	ITA
Jamaica	109	JAM
Japan	110	JPN
Jordan	112	JOR
Kazakhstan	108	KAZ
Kenya	114	KEN
Kiribati	83	KIR
Kuwait	118	KWT
Kyrgyzstan	113	KGZ
Lao People's Democratic Republic	120	LAO
Latvia	119	LVA
Lebanon	121	LBN
Lesotho	122	LSO
Liberia	123	LBR
Libya	124	LBY
Lithuania	126	LTU
Luxembourg	256	LUX
Madagascar	129	MDG
Malawi	130	MWI
Malaysia	131	MYS
Maldives	132	MDV
Mali	133	MLI
Malta	134	MLT
Marshall Islands	127	MHL
Martinique	135	MTQ
Mauritania	136	MRT
Mauritius	137	MUS
Mexico	138	MEX
Micronesia (Federated States of)	145	FSM
Mongolia	141	MNG
Montenegro	273	MNE
Morocco	143	MAR
Mozambique	144	MOZ
Myanmar	28	MMR
Namibia	147	NAM
Nauru	148	NRU
Nepal	149	NPL
Netherlands	150	NLD
New Caledonia	153	NCL
New Zealand	156	NZL

Country	Numerical code	ISO, alpha code
Nicaragua	157	NIC
Niger	158	NER
Nigeria	159	NGA
Niue	160	NIU
North Macedonia	154	MKD
Norway	162	NOR
Oman	221	OMN
Pakistan	165	PAK
Palestine	299	PSE
Panama	166	PAN
Papua New Guinea	168	PNG
Paraguay	169	PRY
Peru	170	PER
Philippines	171	PHL
Poland	173	POL
Portugal	174	PRT
Puerto Rico	177	PRI
Qatar	179	QAT
Republic of Korea	117	KOR
Republic of Moldova	146	MDA
R?union	182	REU
Romania	183	ROU
Russian Federation	185	RUS
Rwanda	184	RWA
Saint Kitts and Nevis	188	KNA
Saint Lucia	189	LCA
Saint Vincent and the Grenadines	191	VCT
Samoa	244	WSM
Sao Tome and Principe	193	STP
Saudi Arabia	194	SAU
Senegal	195	SEN
Serbia	272	SRB
Serbia and Montenegro	186	SCG
Seychelles	196	SYC
Sierra Leone	197	SLE
Singapore	200	SGP
Slovakia	199	SVK
Slovenia	198	SVN
Solomon Islands	25	SLB
Somalia	201	SOM
South Africa	202	ZAF
South Sudan	277	SSD
Spain	203	ESP
Sri Lanka	38	LKA
Sudan	276	SDN

Country	Numerical code	ISO, alpha code
Sudan (former)	206	
Suriname	207	SUR
Sweden	210	SWE
Switzerland	211	CHE
Syrian Arab Republic	212	SYR
Tajikistan	208	TJK
Thailand	216	THA
Timor-Leste	176	TLS
Togo	217	TGO
Tokelau	218	TKL
Tonga	219	TON
Trinidad and Tobago	220	TTO
Tunisia	222	TUN
Turkey	223	TUR
Turkmenistan	213	TKM
Tuvalu	227	TUV
Uganda	226	UGA
Ukraine	230	UKR
United Arab Emirates	225	ARE
United Kingdom of Great Britain and Northern Ireland	229	GBR
United Republic of Tanzania	215	TZA
United States of America	231	USA
Uruguay	234	URY
USSR	228	
Uzbekistan	235	UZB
Vanuatu	155	VUT
Venezuela (Bolivarian Republic of)	236	VEN
Viet Nam	237	VNM
Yemen	249	YEM
Yugoslav SFR	248	
Zambia	251	ZMB
Zimbabwe	181	ZWE