Summary of Yearly Comtrade Data, HS 2012

August 06, 2017

This analysis is for the full 2012-2016 yearly Comtrade data using the HS2012 classification.

Notes:

- *There are a lot of cases where country A has reported exports but country B has not reported anything. As much as half of the raw data becomes "missing" due to this. This seems consistent with Fisman/Wei (pg 4).*
- *The raw data contains re-exports and re-imports. These amounts are also included in a country's regular exports/imports as imports from one country to itself. For example, France has re-imports that are also included in France's imports as `Reporter` = France and `Partner` = France. This doesn't affect this analysis because there is no matched reporter/partner pair, but they might affect our trade gap measure if they're actually imports from an unforseen place. More on re-exports **at this link.***
- *Do we want to focus on the six-digit product code classifications? The two- and four-digit classifications should be, in theory, aggregates of the more detailed classifications.*

```
load(paste(DataPath,"Analysis Data/hs12_12.Rda", sep = "/"))
hs12_12 <- hs12_12[!is.na(Log_gap)]

load(paste(DataPath,"Analysis Data/hs12_13.Rda", sep = "/"))
hs12_13 <- hs12_13[!is.na(Log_gap)]

load(paste(DataPath,"Analysis Data/hs12_14.Rda", sep = "/"))
hs12_14 <- hs12_14[!is.na(Log_gap)]

load(paste(DataPath,"Analysis Data/hs12_15.Rda", sep = "/"))
hs12_15 <- hs12_15[!is.na(Log_gap)]

load(paste(DataPath,"Analysis Data/hs12_16.Rda", sep = "/"))
hs12_16 <- hs12_16[!is.na(Log_gap)]

hs12_value <- do.call("rbind", list(hs12_12, hs12_13, hs12_14, hs12_15, hs12_16))
rm(hs12_12, hs12_13, hs12_14, hs12_15, hs12_16)

save(hs12_value,file = paste(DataPath,"Analysis Data","hs12_value.Rda", sep = "/"))

rm(hs12_value)
```

Value Trade Gap

The difference between what the exporting country reports and what the importing country reports in US dollars.

Coverage

```
load(paste(DataPath,"Analysis Data/hs12.Rda", sep = "/"))
hs12 <- as.data.table(hs12)

options(digits=2)

#For each year, how many product*country pairs / all possible product*country pairs?
```

```r
load(paste(DataPath,"Analysis Data/hs12_value.Rda", sep = "/"))
hs12_value <- hs12_value[, .(Period, `Commodity Code`, Importer, Exporter, Log_gap)]

product <- hs12_value[, uniqueN(`Commodity Code`)]
product_year <- hs12_value[, uniqueN(`Commodity Code`), by=Period]
product_year <- rename(product_year, Products = V1)

pair <- unique(setDT(hs12_value), by = c("Importer", "Exporter"))
pair <- pair[, .N]
pair_year <- unique(setDT(hs12_value), by = c("Importer", "Exporter", "Period"))
pair_year <- pair_year[, .N, by=Period]
pair_year <- rename(pair_year, Pairs = N)

year_coverage <- merge(product_year, pair_year)
year_coverage$Total_products <- product
year_coverage$Total_pairs <- pair

year_coverage$Coverage <- (year_coverage$Products*year_coverage$Pairs)/
  (year_coverage$Total_products*year_coverage$Total_pair)

pander(year_coverage)
```

Period	Products	Pairs	Total_products	Total_pairs	Coverage
2012	6523	7684	6526	14948	0.5138
2013	6524	10262	6526	14948	0.6863
2014	6522	11721	6526	14948	0.7836
2015	6522	12741	6526	14948	0.8518
2016	6521	6741	6526	14948	0.4506

```r
rm(pair_year, product_year, year_coverage)

#For each product, how many year*country pairs / all possible year*country pairs?

year <- hs12_value[, uniqueN(`Period`)]
year_product <- hs12_value[, uniqueN(`Period`), by=`Commodity Code`]
year_product <- rename(year_product, Years = V1)

pair_product <- unique(setDT(hs12_value), by = c("Importer", "Exporter", "Commodity Code"))
pair_product <- pair_product[, .N, by= .(`Commodity Code`)]
pair_product <- rename(pair_product, Pairs = N)

product_coverage <- merge(year_product, pair_product)
product_coverage$Total_years <- year
product_coverage$Total_pairs <- pair

product_coverage$Coverage <- (product_coverage$Years*product_coverage$Pairs)/
  (product_coverage$Total_years*product_coverage$Total_pairs)

pander(product_coverage[order(Coverage)][1:10])
```

Commodity Code	Years	Pairs	Total_years	Total_pairs	Coverage
292424	2	2	5	14948	5.352e-05
292512	2	2	5	14948	5.352e-05
811252	2	2	5	14948	5.352e-05

Commodity Code	Years	Pairs	Total_years	Total_pairs	Coverage
030195	3	3	5	14948	0.0001204
252410	4	6	5	14948	0.0003211
810730	4	6	5	14948	0.0003211
811213	3	8	5	14948	0.0003211
261220	5	5	5	14948	0.0003345
290551	5	5	5	14948	0.0003345
293963	5	5	5	14948	0.0003345

```
pander(product_coverage[order(-Coverage)][1:10])
```

Commodity Code	Years	Pairs	Total_years	Total_pairs	Coverage
84	5	11409	5	14948	0.7632
85	5	11165	5	14948	0.7469
39	5	10223	5	14948	0.6839
90	5	9929	5	14948	0.6642
73	5	9414	5	14948	0.6298
94	5	8897	5	14948	0.5952
87	5	8864	5	14948	0.593
49	5	8858	5	14948	0.5926
48	5	8602	5	14948	0.5755
62	5	8518	5	14948	0.5698

```
rm(year_product, pair_product, product_coverage)

#For each country pair, how many year*product / all possible year*product?

product_pair <- hs12_value[, uniqueN(`Commodity Code`), by = c("Importer", "Exporter")]
product_pair <- rename(product_pair, Products = V1)

year_pair <- hs12_value[, uniqueN(`Period`), by = c("Importer", "Exporter")]
year_pair <- rename(year_pair, Years = V1)

pair_coverage <- merge(product_pair, year_pair, by = c("Importer", "Exporter"))
pair_coverage$T_products <- product
pair_coverage$T_years <- year

pair_coverage$Coverage <- (pair_coverage$Products*pair_coverage$Years)/
  (pair_coverage$T_products*pair_coverage$T_years)

pair_coverage$Exporter <- strtrim(pair_coverage$Exporter, 15)
pander(pair_coverage[order(Coverage)][1:10])
```

Importer	Exporter	Products	Years	T_products	T_years	Coverage
Albania	Bolivia (Plurin	1	1	6526	5	3.065e-05
Albania	Nepal	1	1	6526	5	3.065e-05
Algeria	Botswana	1	1	6526	5	3.065e-05
Algeria	Dominican Rep.	1	1	6526	5	3.065e-05
Algeria	Ghana	1	1	6526	5	3.065e-05
Algeria	Rep. of Moldova	1	1	6526	5	3.065e-05
Algeria	Zambia	1	1	6526	5	3.065e-05
Andorra	Bosnia Herzegov	1	1	6526	5	3.065e-05
Andorra	Cyprus	1	1	6526	5	3.065e-05

Importer	Exporter	Products	Years	T_products	T_years	Coverage
Angola	Bahamas	1	1	6526	5	3.065e-05

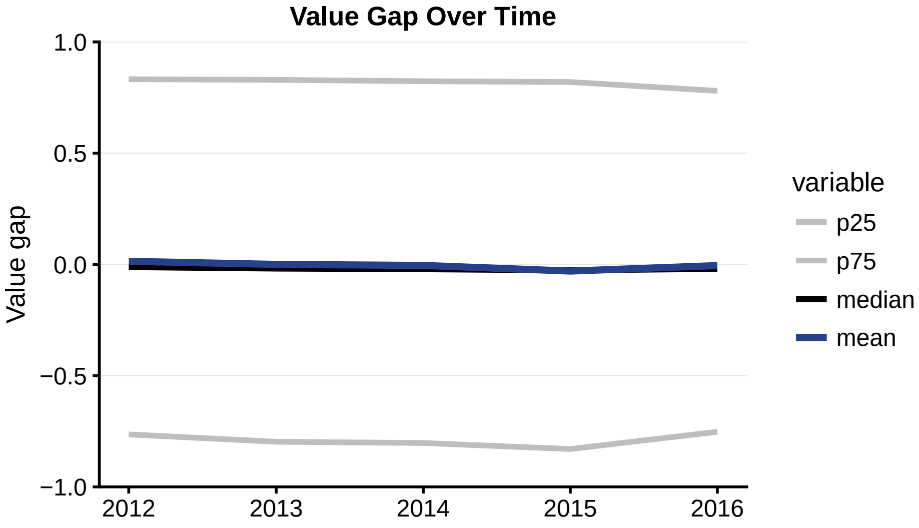
```r
pander(pair_coverage[order(-Coverage)][1:10])
```

Importer	Exporter	Products	Years	T_products	T_years	Coverage
Canada	USA	6400	5	6526	5	0.9807
France	Belgium	6138	5	6526	5	0.9405
Portugal	Spain	6116	5	6526	5	0.9372
Mexico	USA	6111	5	6526	5	0.9364
Switzerland	Germany	6101	5	6526	5	0.9349
USA	Canada	6073	5	6526	5	0.9306
France	Italy	6063	5	6526	5	0.9291
France	Germany	6059	5	6526	5	0.9284
Italy	Germany	6022	5	6526	5	0.9228
Poland	Germany	5987	5	6526	5	0.9174

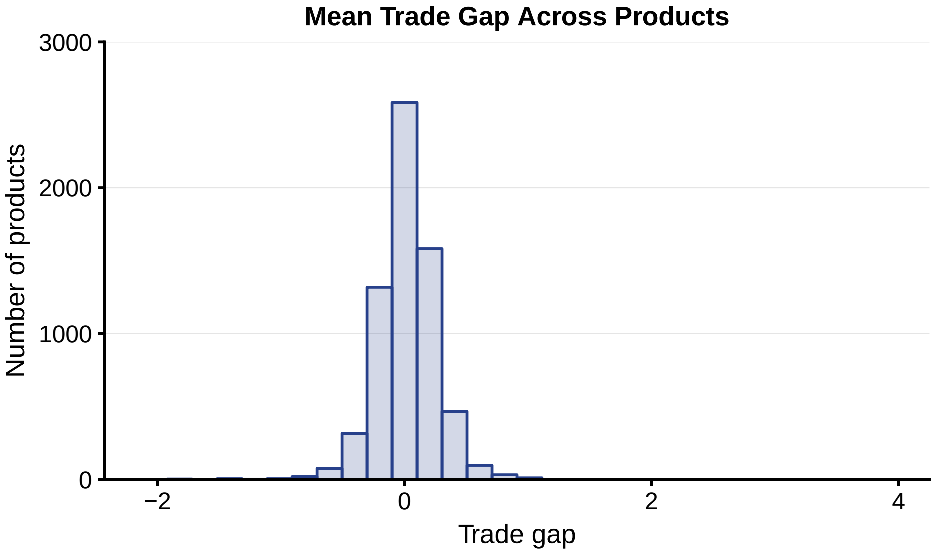
```r
rm(product_pair, year_pair, pair_coverage, pair, product, year, hs12_value)
```

Trade gap over time

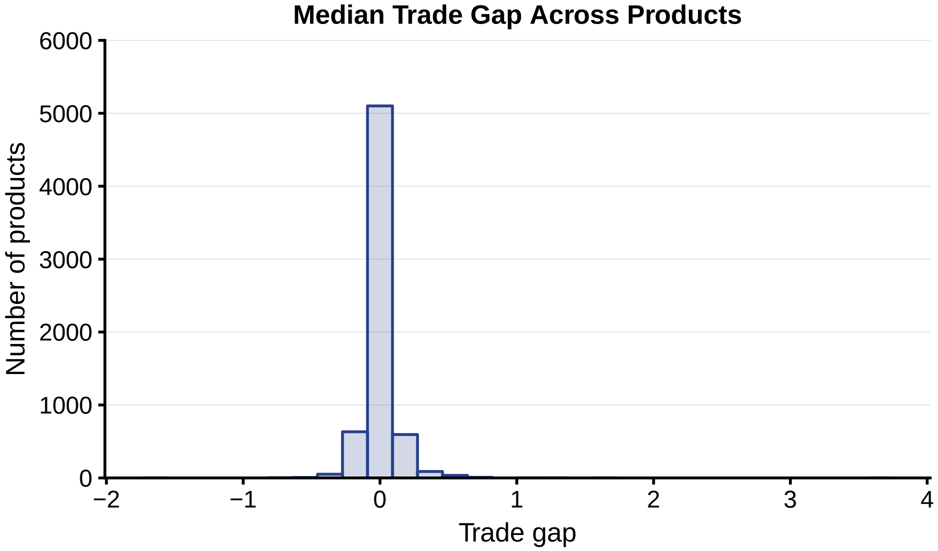
```r
load(paste(DataPath,"Analysis Data/hs12_value.Rda", sep = "/"))

hs12_value <- hs12_value[, .(Period, `Commodity Code`, Importer, Exporter, Log_gap)]

hs12_value$Period <- as.Date(hs12_value$Period, "%Y")
hs12_value$Period <- floor_date(hs12_value$Period,"year")

periods <- hs12_value[, .(mean = as.double(mean(Log_gap)),
                    median = as.double(median(Log_gap)),
                    p25 = as.double(quantile(Log_gap,.25)),
                    p75 = as.double(quantile(Log_gap,.75))
),
by=Period]

periods <- melt(periods, id = 'Period')
periods$variable <- factor(periods$variable, levels = c("p25","p75","median","mean"))

ggplot(data=periods ) +
  geom_line(data=periods, aes(x = Period, y = value, colour = variable, size=variable)) +
  scale_colour_manual(values=c("grey","grey","black","royalblue4")) +
  background_grid(major = 'y', minor = "none") +
  scale_size_manual(values = c(1,1,1.1,1.25)) +
  scale_y_continuous(expand = c(0, 0), limits = c(-1,1), minor_breaks = NULL) +
  xlab(label = "") +
  ylab(label = "Value gap") +
  labs(title="Value Gap Over Time")
```



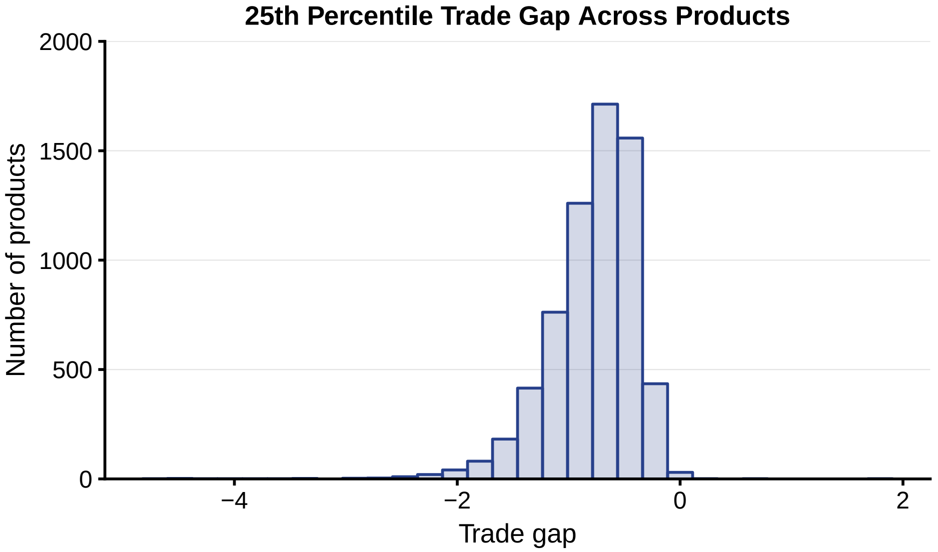
```
#Across products?
products <- hs12_value[, .(mean = as.double(mean(Log_gap)),
                          median = as.double(median(Log_gap)),
                          p25 = as.double(quantile(Log_gap,.25)),
                          p75 = as.double(quantile(Log_gap,.75))
),
by= `Commodity Code`]

ggplot(data=products, aes(mean)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), limits = c(0,3000), minor_breaks = NULL) +
  labs(title="Mean Trade Gap Across Products") +
  labs(x="Trade gap", y="Number of products")
```



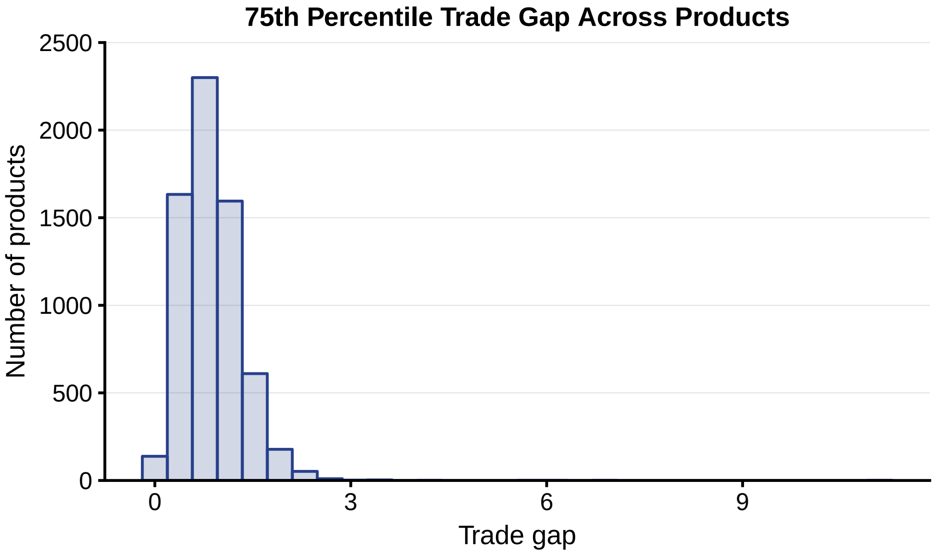
```
ggplot(data=products, aes(median)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), limits = c(0,6000)) +
  labs(title="Median Trade Gap Across Products") +
  labs(x="Trade gap", y="Number of products")
```



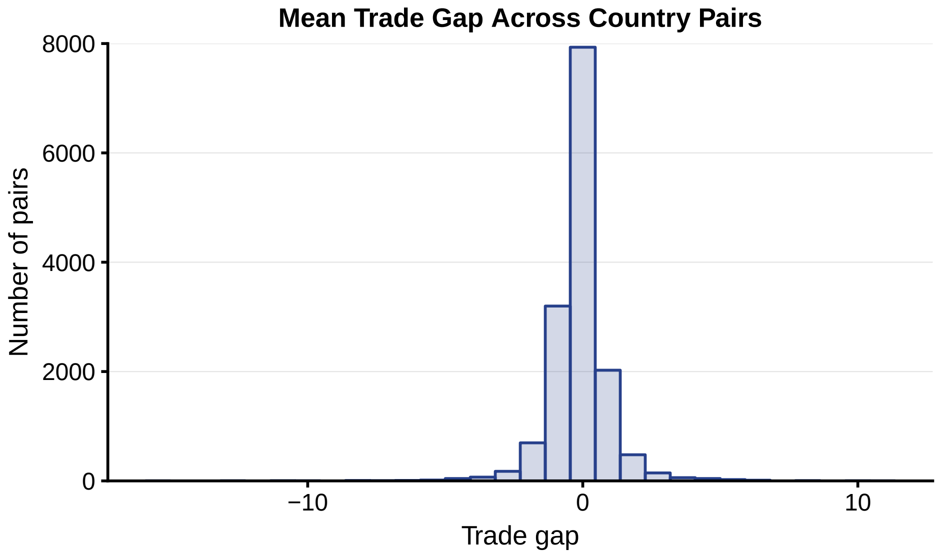
```
ggplot(data=products, aes(p25)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), limits = c(0,2000),  minor_breaks = NULL) +
  labs(title="25th Percentile Trade Gap Across Products") +
  labs(x="Trade gap", y="Number of products")
```



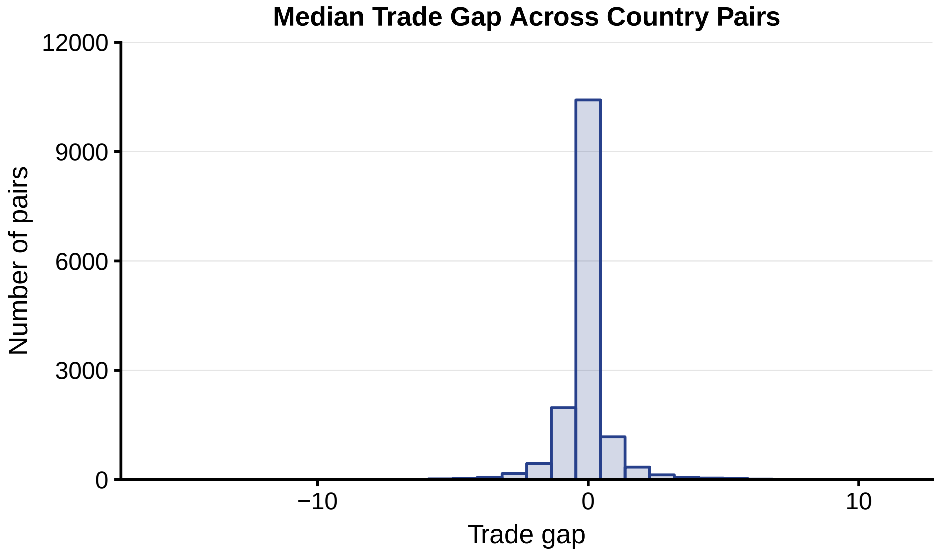
```
ggplot(data=products, aes(p75)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0),  limits = c(0, 2500), minor_breaks = NULL) +
  labs(title="75th Percentile Trade Gap Across Products") +
  labs(x="Trade gap", y="Number of products")
```



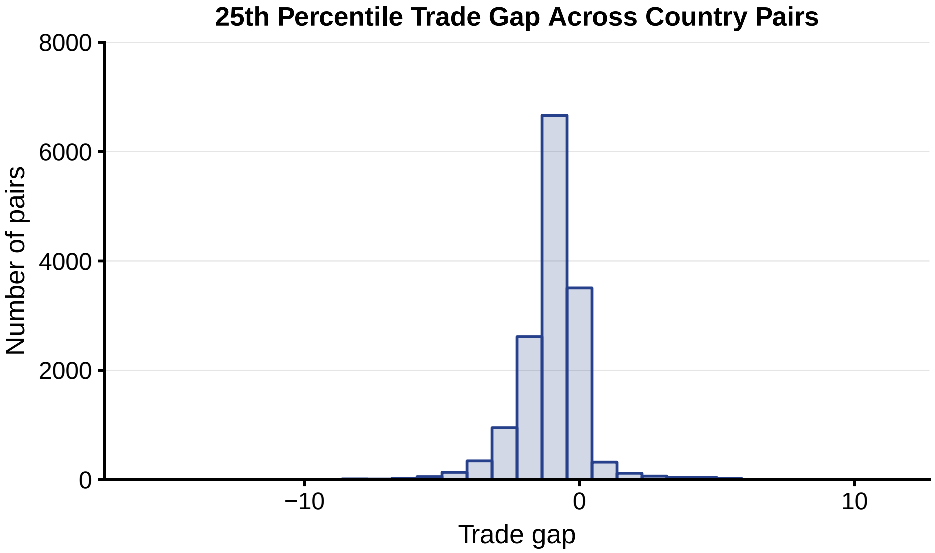
```
#Across countries?
countries <- hs12_value[, .(mean = as.double(mean(Log_gap)),
                            median = as.double(median(Log_gap)),
                            p25 = as.double(quantile(Log_gap,.25)),
                            p75 = as.double(quantile(Log_gap,.75))
),
by= c("Importer", "Exporter")]

ggplot(data=countries, aes(mean)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), limits = c(0, 8000),  minor_breaks = NULL) +
  labs(title="Mean Trade Gap Across Country Pairs") +
  labs(x="Trade gap", y="Number of pairs")
```



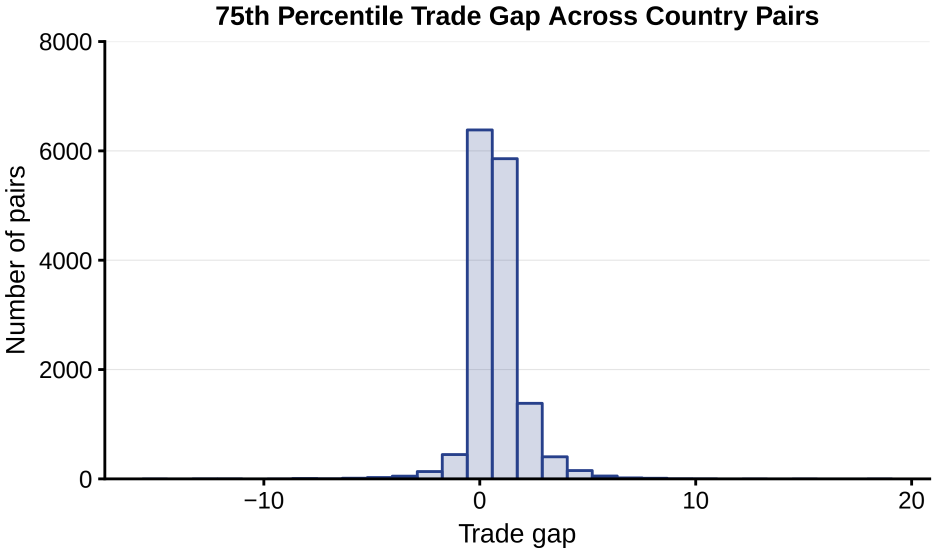
```
ggplot(data=countries, aes(median)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), limits = c(0, 12000),  minor_breaks = NULL) +
  labs(title="Median Trade Gap Across Country Pairs") +
  labs(x="Trade gap", y="Number of pairs")
```



```
ggplot(data=countries, aes(p25)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), limits = c(0, 8000),  minor_breaks = NULL) +
  labs(title="25th Percentile Trade Gap Across Country Pairs") +
  labs(x="Trade gap", y="Number of pairs")
```



```
ggplot(data=countries, aes(p75)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), limits = c(0, 8000),  minor_breaks = NULL) +
  labs(title="75th Percentile Trade Gap Across Country Pairs") +
  labs(x="Trade gap", y="Number of pairs")
```



```
rm(periods, products, countries, hs12_value)
```

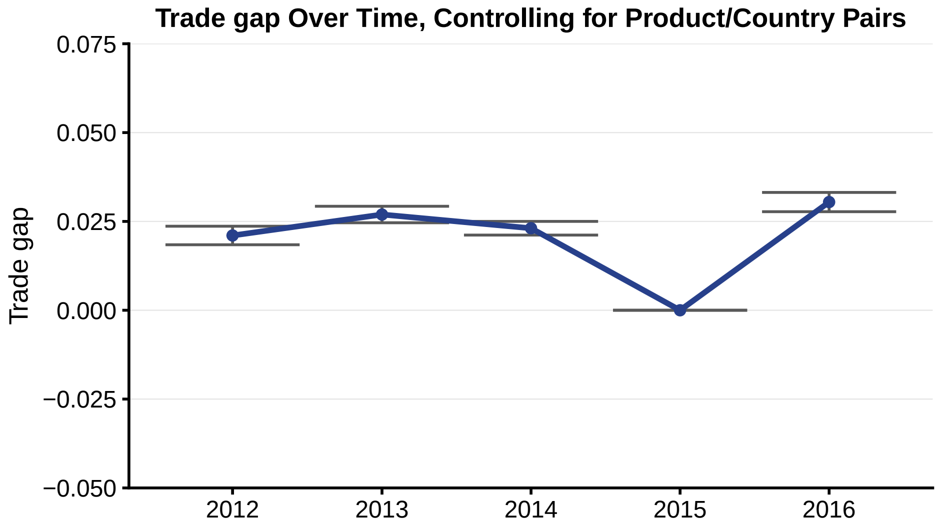
Year coefficients controlling for product codes and country pairs

```
load(paste(DataPath,"Analysis Data/hs12_value.Rda", sep = "/"))

hs12_value <- hs12_value[, .(Period, `Commodity Code`, `Reporter Code`, `Partner Code`, Log_gap)]

hs12_value$Period <- as.Date(hs12_value$Period, "%Y")
```

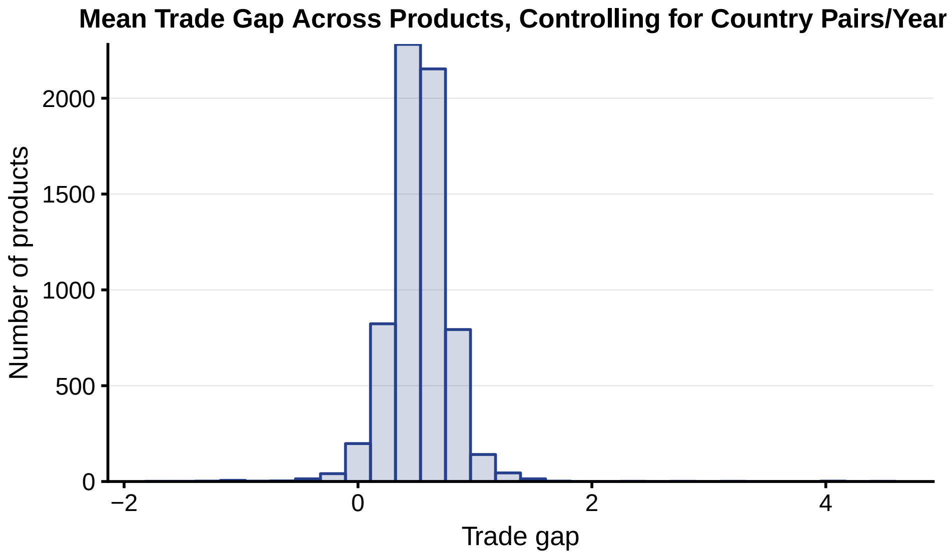
```
hs12_value$Period <- floor_date(hs12_value$Period,"year")

hs12_value$Period.f <- factor(hs12_value$Period)
hs12_value$Products.f <- factor(hs12_value$`Commodity Code`)

hs12_value$Importer.f <- factor(hs12_value$`Reporter Code`)
hs12_value$Exporter.f <- factor(hs12_value$`Partner Code`)
hs12_value$Pairs.f <- with(hs12_value, interaction(Importer.f, Exporter.f))

hs12_value <- hs12_value[, .(Period, Log_gap, Period.f, Products.f, Pairs.f)]

reg <- felm(Log_gap ~ 1 | Period.f + Products.f + Pairs.f,
            data = hs12_value,
            exactDOF = FALSE,
            keepX = FALSE,
            keepCX = FALSE)

fes <- getfe(reg,
             se=TRUE,
             bN = 50
)
```

```
## ...finished 16 of 56 vectors in 431 seconds
## ...finished 32 of 56 vectors in 775 seconds
## ...finished 48 of 56 vectors in 1099 seconds
```

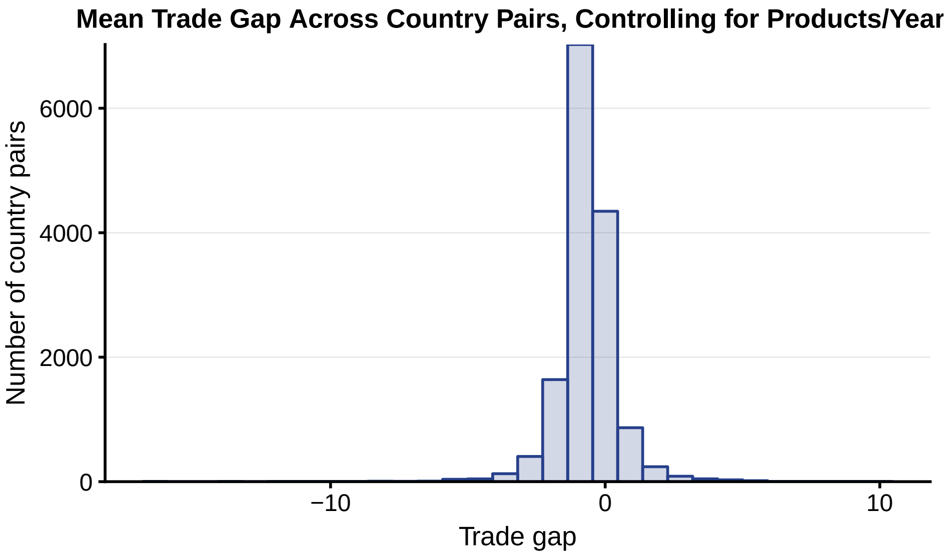
```
periodfes <- subset(fes,fe == "Period.f")

periodfes$ci_ub <- periodfes$effect + (1.96 * periodfes$se)
periodfes$ci_lb <- periodfes$effect - (1.96 * periodfes$se)
periodfes <- merge(periodfes,unique(hs12_value[,list(Period,Period.f)]),
                   by.x = "idx",by.y="Period.f")
periodfes <- rename(periodfes, period = Period)

ggplot(data = periodfes, aes(period,effect)) +
  geom_errorbar(aes(ymin = ci_lb, ymax = ci_ub), color = "grey35") +
  geom_line(color = "royalblue4", size = 1) +
  geom_point(color = "royalblue4") +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), limits = c(-.050,.075), minor_breaks = NULL) +
  xlab(label = "") +
  ylab(label = "Trade gap") +
  labs(title = "Trade gap Over Time, Controlling for Product/Country Pairs")
```



```
productfes <- subset(fes,fe == "Products.f")
productfes <- productfes[,c("effect","idx")]

ggplot(data=productfes, aes(effect)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), minor_breaks = NULL) +
  labs(title="Mean Trade Gap Across Products, Controlling for Country Pairs/Years") +
  labs(x="Trade gap", y="Number of products")
```



```
pairfes <- subset(fes,fe == "Pairs.f")
pairfes <- pairfes[,c("effect","idx")]

ggplot(data=pairfes, aes(effect)) +
  geom_histogram(col="royalblue4",
                 fill="royalblue4",
                 alpha=.2) +
  background_grid(major = 'y', minor = "none") +
  scale_y_continuous(expand = c(0, 0), minor_breaks = NULL) +
  labs(title="Mean Trade Gap Across Country Pairs, Controlling for Products/Years") +
  labs(x="Trade gap", y="Number of country pairs")
```



```
rm(fes, hs12_value, pairfes, periodfes, productfes, reg)
```

What data is missing?

The first table looks at how many product x year x partner combinations each country reported as exports (`Reported Exports`), relative to the number of combinations that the same country was reported as a partner (`World Imports`). The second table repeats the first, but looking at imports.

```
#yearXproduct exports reported by country, relative to imports to country reported by world

load(paste(DataPath,"Analysis Data/imports_full12.Rda", sep = "/"))

imports_full12 <- rename(imports_full12, "Import Value" = "Trade Value (US$)")
imports_full12 <- imports_full12[, .(Period, Reporter, Partner, `Commodity Code`, `Import Value`)]

load(paste(DataPath,"Analysis Data/exports_full12.Rda", sep = "/"))

exports <- rename(exports, "Export Value" = "Trade Value (US$)")
exports <- exports[, .(Period, Reporter, Partner, `Commodity Code`, `Export Value`)]

rep_ex <- exports[!is.na(`Export Value`), unique(`Commodity Code`),
                  by = c("Reporter", "Period", "Partner")]
rep_ex <- rep_ex[, .N, by = "Reporter"]
rep_ex <- rename(rep_ex, "Reported Exports" = "N")

rep_ex2 <- imports_full12[!is.na(`Import Value`), unique(`Commodity Code`),
                          by = c("Partner", "Period", "Reporter")]
rep_ex2 <- rep_ex2[, .N, by = "Partner"]
rep_ex2 <- rename(rep_ex2, "World Imports" = "N")

rep_ex <- merge(rep_ex, rep_ex2, by.x = c("Reporter"), by.y = "Partner", all = T)

rep_ex[is.na(rep_ex)] <- 0
```

```
rep_ex$Share_Present <- rep_ex$`Reported Exports` / rep_ex$`World Imports`

rep_ex <- rep_ex[order(Share_Present)]
rep_ex$Reporter <- strtrim(rep_ex$Reporter, 15)
print(rep_ex, nrow=245)
```

```
##             Reporter Reported Exports World Imports Share_Present
##   1:     Afghanistan                0         30993         0.000
##   2:  American Samoa                0         10984         0.000
##   3:        Anguilla                0          4485         0.000
##   4:      Antarctica                0          2407         0.000
##   5: Antigua and Bar                0         10500         0.000
##   6:      Areas, nes                0        301245         0.000
##   7:        Barbados                0         17804         0.000
##   8:         Bonaire                0          1249         0.000
##   9:   Bouvet Island                0           892         0.000
##  10: Br. Indian Ocea                0          3048         0.000
##  11: Br. Virgin Isds                0         17534         0.000
##  12:         Bunkers                0          6704         0.000
##  13:     Cayman Isds                0         10282         0.000
##  14: Central African                0          7562         0.000
##  15:            Chad                0          8336         0.000
##  16:  Christmas Isds                0          3910         0.000
##  17:      Cocos Isds                0          4939         0.000
##  18:         Comoros                0          5628         0.000
##  19:       Cook Isds                0          5418         0.000
##  20:            Cuba                0         26316         0.000
##  21:        CuraÃ§ao                0         22458         0.000
##  22: Dem. People's R                0         66318         0.000
##  23: Dem. Rep. of th                0         26271         0.000
##  24:        Djibouti                0          8074         0.000
##  25:        Dominica                0         12983         0.000
##  26: Equatorial Guin                0          7789         0.000
##  27:         Eritrea                0          6473         0.000
##  28:   FS Micronesia                0          2671         0.000
##  29:     Faeroe Isds                0         13499         0.000
##  30: Falkland Isds (                0          3145         0.000
##  31: Fr. South Antar                0          1718         0.000
##  32:      Free Zones                0         40904         0.000
##  33:           Gabon                0         24187         0.000
##  34:          Gambia                0          9103         0.000
##  35:       Gibraltar                0         11810         0.000
##  36:         Grenada                0          5743         0.000
##  37:            Guam                0         10721         0.000
##  38:   Guinea-Bissau                0          2838         0.000
##  39:          Guyana                0         13166         0.000
##  40:           Haiti                0         24098         0.000
##  41: Heard Island an                0           742         0.000
##  42: Holy See (Vatic                0          3694         0.000
##  43:            Iran                0        150760         0.000
##  44:            Iraq                0         23220         0.000
##  45:           Kenya                0        131478         0.000
##  46:        Kiribati                0          3524         0.000
##  47:       LAIA, nes                0          2339         0.000
##  48: Lao People's De                0         35046         0.000
##  49:         Lesotho                0         19066         0.000
##  50:         Liberia                0         11493         0.000
##  51:           Libya                0      15508         0.000
##  52:            Mali                0      25123         0.000
##  53:   Marshall Isds                0       4913         0.000
##  54:         Mayotte                0       1475         0.000
##  55:      Montserrat                0       4246         0.000
##  56:      Mozambique                0      33611         0.000
##  57: N. Mariana Isds                0       2946         0.000
##  58:           Nauru                0       6666         0.000
##  59:         Nigeria                0      83629         0.000
##  60:            Niue                0       4657         0.000
##  61:    Norfolk Isds                0       1284         0.000
##  62: North America a                0        357         0.000
##  63:    Oceania, nes                0        960         0.000
##  64: Other Africa, n                0       2733         0.000
##  65: Other Europe, n                0     168332         0.000
##  66:     Philippines                0     378901         0.000
##  67:        Pitcairn                0       2618         0.000
##  68: Saint BarthÃ©le                0       2227         0.000
##  69:    Saint Helena                0       5398         0.000
##  70: Saint Kitts and                0       6396         0.000
##  71:     Saint Lucia                0       6107         0.000
##  72:   Saint Maarten                0       4037         0.000
##  73: Saint Pierre an                0       2177         0.000
##  74: Saint Vincent a                0       4869         0.000
##  75:      San Marino                0      27196         0.000
##  76: Sao Tome and Pr                0       5630         0.000
##  77:      Seychelles                0      20627         0.000
##  78:    Sierra Leone                0      33630         0.000
##  79:         Somalia                0       7716         0.000
##  80: South Georgia a                0        655         0.000
##  81:     South Sudan                0       1966         0.000
##  82: Special Categor                0       1899         0.000
##  83:        Suriname                0      19920         0.000
##  84:       Swaziland                0      59942         0.000
##  85:           Syria                0      68012         0.000
##  86:      Tajikistan                0      14945         0.000
##  87:     Timor-Leste                0       5369         0.000
##  88:         Tokelau                0      12711         0.000
##  89: Trinidad and To                0      31242         0.000
##  90:    Turkmenistan                0      15565         0.000
##  91: Turks and Caico                0       7754         0.000
##  92:          Tuvalu                0       2662         0.000
##  93: United States M                0       7322         0.000
##  94:      Uzbekistan                0      33899         0.000
##  95:         Vanuatu                0       6772         0.000
##  96:       Venezuela                0      77686         0.000
##  97: Wallis and Futu                0       1720         0.000
##  98:  Western Sahara                0       1446         0.000
##  99:           World                0    3222936         0.000
## 100:          Angola              572      27535         0.021
## 101:      Mauritania             1282      15657         0.082
## 102:          Panama            15997     158341         0.101
## 103:        Maldives             2611      13899         0.188
## 104:         Myanmar            13065      67603         0.193
## 105:           Sudan             4346      20530         0.212
## 106: China, Macao SA            13102      58219         0.225
## 107: Papua New Guine             5726      21830         0.262
## 108:          Bhutan             1714           6425         0.267
## 109:           Congo             5981          20590         0.290
## 110:    Burkina Faso             4723          15882         0.297
## 111:           Nepal            27561          80276         0.343
## 112:           Qatar            33622          85528         0.393
## 113:           Ghana            26139          66076         0.396
## 114:        Honduras            37536          93599         0.401
## 115:      Bangladesh            78393         190837         0.411
## 116:         Morocco            99295         235718         0.421
## 117:        Cambodia            50135         118749         0.422
## 118:           Niger             8039          18562         0.433
## 119:         Albania            36262          78833         0.460
## 120:            Togo            10608          21662         0.490
## 121:           Egypt           144052         289277         0.498
## 122: Rep. of Moldova            37926          76098         0.498
## 123:         Ukraine           171856         340313         0.505
## 124:    Saudi Arabia           110924         211368         0.525
## 125: State of Palest             5235           9717         0.539
## 126:    Solomon Isds             3242           5789         0.560
## 127:          Belize            12752          22033         0.579
## 128:         Burundi             5337           8970         0.595
## 129: Bolivia (Plurin            29999          50416         0.595
## 130:          Guinea            10524          17383         0.605
## 131:         Tunisia           132290         210765         0.628
## 132:  CÃ´te d'Ivoire            28716          45639         0.629
## 133:        Cameroon            32536          51078         0.637
## 134:        Viet Nam           368095         549192         0.670
## 135:           Benin             9150          13176         0.694
## 136:        Pakistan           242017         336475         0.719
## 137:        Malaysia           489828         666501         0.735
## 138:         Senegal            35882          47987         0.748
## 139:       Nicaragua            45450          60402         0.752
## 140:          Cyprus            95011         125433         0.757
## 141:         Andorra            18970          24747         0.767
## 142:           Japan           881706        1144100         0.771
## 143:       Greenland             5818           7548         0.771
## 144: Other Asia, nes           823782        1019417         0.808
## 145:          Israel           362606         446507         0.812
## 146:        Zimbabwe            33547          41159         0.815
## 147:          Malawi            16212          19318         0.839
## 148:           Tonga             3811           4513         0.844
## 149:           Malta            87424         102834         0.850
## 150: China, Hong Kon           713042         831375         0.858
## 151:   New Caledonia            15606          18003         0.867
## 152:         Algeria            27377          31574         0.867
## 153:      Kyrgyzstan            19255          21998         0.875
## 154:         Iceland            81411          92452         0.881
## 155:         Ecuador           107878         122436         0.881
## 156:       Sri Lanka           203451         230469         0.883
## 157:        Slovenia           422051         475035         0.888
## 158:      Azerbaijan            31479          35260         0.893
## 159:         Finland           513623         565603         0.908
## 160:         Uruguay            86544          94914         0.912
## 161:        Ethiopia            40053          43881         0.913
## 162:         Ireland           411436         449163         0.916
## 163:          Mexico           618046         654968         0.944
## 164:         Bahamas            16609          17496         0.949
## 165:       Australia           637813        668846         0.954
## 166:       Indonesia           616563        645405         0.955
## 167:        Bulgaria           424244        443865         0.956
## 168:        Mongolia            23420         24187         0.968
## 169:        Slovakia           463920        465508         0.997
## 170:        Thailand           852227        850288         1.002
## 171:           India          1286293       1273828         1.010
## 172:             USA          2054324       1989690         1.032
## 173:         Austria           995135        956815         1.040
## 174:         Romania           518827        496617         1.045
## 175:           Chile           245693        234619         1.047
## 176:          Jordan           113943        108767         1.048
## 177:         Hungary           643149        613874         1.048
## 178:          Greece           480241        458110         1.048
## 179:   Rep. of Korea          1057268       1008392         1.048
## 180:       Argentina           322732        307562         1.049
## 181:         Armenia            40755         38754         1.052
## 182:         Bermuda             8972          8519         1.053
## 183:          Norway           469872        424978         1.106
## 184: Bosnia Herzegov           165882        147614         1.124
## 185:          Kuwait            74655         66230         1.127
## 186:          Sweden           992889        879496         1.129
## 187:  United Kingdom          1826485       1613023         1.132
## 188:          Canada           949745        838226         1.133
## 189:         Estonia           310602        273892         1.134
## 190:           Italy          1985093       1750429         1.134
## 191:      Madagascar            75151         66145         1.136
## 192:        Colombia           290169        254707         1.139
## 193:     Switzerland          1154941       1001929         1.153
## 194:  Dominican Rep.           121799        105498         1.155
## 195:           Aruba            15194         13058         1.164
## 196: TFYR of Macedon           144360        122350         1.180
## 197:        Paraguay            47572         40168         1.184
## 198:          Brazil           745071        628173         1.186
## 199:       Guatemala           153286        128957         1.189
## 200:          Serbia           338720        283297         1.196
## 201:     Netherlands          1620224       1352706         1.198
## 202:            Peru           263760        219924         1.199
## 203:         Lebanon           184169        152772         1.206
## 204:           China          2695005       2222918         1.212
## 205:          Zambia            49755         40850         1.218
## 206:     El Salvador           117447         96113         1.222
## 207:         Jamaica            38490         31153         1.236
## 208:         Czechia           997443        805314         1.239
## 209:      Luxembourg           313990        252124         1.245
## 210:         Croatia           346930        276484         1.255
## 211:            Oman            88998         70585         1.261
## 212:          France          2067794       1637265         1.263
## 213:          Poland          1181009        929179         1.271
## 214:         Denmark          1075653        844109         1.274
## 215:        Portugal           776477        604931         1.284
## 216:     New Zealand           454658        353274         1.287
## 217: Russian Federat           640637        496814         1.289
## 218:           Spain          1786945       1384347         1.291
## 219:       Mauritius           121360         93638         1.296
## 220:         Germany          2606723       2003847         1.301
## 221:          Latvia           330500        253740         1.303
## 222:         Georgia            94271         71900         1.311
## 223:          Turkey          1395489       1045428         1.335
## 224:       Lithuania           470291        349833         1.344
## 225:         Belarus           216802        160668         1.349
## 226: United Rep. of            88072         65114         1.353
## 227:      Costa Rica           201217        148751         1.353
## 228: United Arab Emi           801406        582887         1.375
## 229:        Botswana            58900         42355         1.391
## 230:         Bahrain            92262         65946         1.399
## 231:         Belgium          1701369       1208960         1.407
## 232:       Singapore           872528        612317         1.425
## 233:          Uganda            72715         50231         1.448
## 234:           Yemen            25442         17421         1.460
## 235:    South Africa           901371        559041         1.612
## 236: Brunei Darussal            33833         20967         1.614
## 237: French Polynesi            21886         12524         1.748
## 238:      Montenegro            53278         30449         1.750
## 239:           Samoa            14912          7567         1.971
## 240:      Cabo Verde            20478          9799         2.090
## 241:          Rwanda            26840         12310         2.180
## 242:      Kazakhstan           143843         62951         2.285
## 243:         Namibia           139658         60516         2.308
## 244:            Fiji            84308         36086         2.336
## 245:           Palau             4890          2021         2.420
##             Reporter Reported Exports World Imports Share_Present
```

```
rm(rep_ex, rep_ex2)

#yearXproduct imports reported by country, relative to exports to country reported by world

rep_im <- imports_full12[!is.na(`Import Value`), unique(`Commodity Code`), by = c("Reporter", "Period", "Pa
rep_im <- rep_im[, .N, by = "Reporter"]
rep_im <- rename(rep_im, "Reported Imports" = "N")

rep_im2 <- exports[!is.na(`Export Value`), unique(`Commodity Code`), by = c("Partner", "Period", "Reporter"
rep_im2 <- rep_im2[, .N, by = "Partner"]
rep_im2 <- rename(rep_im2, "World Exports" = "N")

rep_im <- merge(rep_im, rep_im2, by.x = c("Reporter"), by.y = "Partner", all = T)

rep_im[is.na(rep_im)] <- 0
rep_im$Share_Present <- rep_im$`Reported Imports` / rep_im$`World Exports`

rep_im <- rep_im[order(Share_Present)]
rep_im$Reporter <- strtrim(rep_im$Reporter, 15)
print(rep_im, nrow=245)
```

```
##             Reporter Reported Imports World Exports Share_Present
##   1:     Afghanistan                0        113988         0.000
##   2:  American Samoa                0         16717         0.000
##   3:        Anguilla                0         14604         0.000
##   4:      Antarctica                0         10512         0.000
##   5: Antigua and Bar                0         51417         0.000
##   6:      Areas, nes                0        156117         0.000
##   7:        Barbados                0         86114         0.000
##   8:         Bonaire                0         11855         0.000
##   9:   Bouvet Island                0           560         0.000
##  10: Br. Indian Ocea                0          2075         0.000
##  11: Br. Virgin Isds                0         41781         0.000
##  12:         Bunkers                0         68879         0.000
##  13: Central African                0         33513         0.000
##  14:            Chad                0         65697         0.000
##  15:  Christmas Isds                0          9237         0.000
##  16:      Cocos Isds                0          3068         0.000
##  17:         Comoros                0         37678         0.000
##  18:       Cook Isds                0         29554         0.000
##  19:            Cuba                0        160514         0.000
##  20:        CuraÃ§ao                0        101484         0.000
##  21: Dem. People's R                0         46564         0.000
##  22: Dem. Rep. of th                0        170473         0.000
##  23:        Djibouti                0         94086         0.000
##  24:        Dominica                0         35599         0.000
##  25: Equatorial Guin                0        115146         0.000
##  26:         Eritrea                0         36915         0.000
##  27:   FS Micronesia                0         18530         0.000
##  28:     Faeroe Isds                0         66520         0.000
##  29: Falkland Isds (                0         13086         0.000
##  30: Fr. South Antar                0          9998         0.000
##  31:      Free Zones                0         62652         0.000
##  32:           Gabon                0        142238         0.000
##  33:          Gambia                0         66478         0.000
##  34:       Gibraltar                0         66780         0.000
##  35:         Grenada                0         35118         0.000
##  36:            Guam                0         39209         0.000
##  37:   Guinea-Bissau                0         37070         0.000
##  38:          Guyana                0         73820         0.000
##  39:           Haiti                0         96296         0.000
##  40: Heard Island an                0           449         0.000
##  41: Holy See (Vatic                0          4346         0.000
##  42:            Iran                0        267478         0.000
##  43:            Iraq                0        236238         0.000
##  44:           Kenya                0        262962         0.000
##  45:        Kiribati                0         28725         0.000
##  46:       LAIA, nes                0          3115         0.000
##  47: Lao People's De                0         79503         0.000
##  48:         Lesotho                0         44329         0.000
##  49:         Liberia                0         99989         0.000
##  50:           Libya                0        193325         0.000
##  51:            Mali                0        107780         0.000
##  52:   Marshall Isds                0         33352         0.000
##  53:         Mayotte                0         16736         0.000
##  54:      Montserrat                0          7195         0.000
##  55:      Mozambique                0        169348         0.000
##  56: N. Mariana Isds                0         14257         0.000
##  57:           Nauru                0         14164         0.000
##  58:         Nigeria                0        312489         0.000
##  59:            Niue                0         10103         0.000
##  60:    Norfolk Isds                0         10660         0.000
##  61: North America a                0          1070         0.000
##  62:    Oceania, nes                0          5421         0.000
##  63: Other Africa, n                0         17712         0.000
##  64: Other Europe, n                0         23152         0.000
##  65:     Philippines                0        373889         0.000
##  66:        Pitcairn                0          1533         0.000
##  67: Saint BarthÃ©le                0         12850         0.000
##  68:    Saint Helena                0        18348         0.000
##  69: Saint Kitts and                0        32024         0.000
##  70:     Saint Lucia                0        46628         0.000
##  71:   Saint Maarten                0        37739         0.000
##  72: Saint Pierre an                0        22806         0.000
##  73: Saint Vincent a                0        34699         0.000
##  74:      San Marino                0        29893         0.000
##  75: Sao Tome and Pr                0        29828         0.000
##  76:      Seychelles                0       125137         0.000
##  77:    Sierra Leone                0        90295         0.000
##  78:         Somalia                0        51404         0.000
##  79: South Georgia a                0          992         0.000
##  80:     South Sudan                0        26720         0.000
##  81: Special Categor                0         2997         0.000
##  82:        Suriname                0        91550         0.000
##  83:       Swaziland                0        55268         0.000
##  84:           Syria                0       110985         0.000
##  85:      Tajikistan                0        87897         0.000
##  86:     Timor-Leste                0        49377         0.000
##  87:         Tokelau                0         4063         0.000
##  88: Trinidad and To                0       150617         0.000
##  89:    Turkmenistan                0       137979         0.000
##  90: Turks and Caico                0        26304         0.000
##  91:          Tuvalu                0        12864         0.000
##  92: United States M                0         5790         0.000
##  93:      Uzbekistan                0       169348         0.000
##  94:         Vanuatu                0        58670         0.000
##  95:       Venezuela                0       238406         0.000
##  96: Wallis and Futu                0        18876         0.000
##  97:  Western Sahara                0         1171         0.000
##  98:           World                0      2299797         0.000
##  99:     Cayman Isds             1848        47972         0.039
## 100:      Mauritania            17412       105600         0.165
## 101:           Congo            39328       170071         0.231
## 102:           Sudan            41767       162416         0.257
## 103:         Myanmar            40862       157530         0.259
## 104:    Burkina Faso            32261       101667         0.317
## 105:           Ghana            90357       250570         0.361
## 106:            Togo            43873       108945         0.403
## 107:  CÃ´te d'Ivoire            76355       187823         0.407
## 108: Papua New Guine            52274       127950         0.409
## 109:         Ukraine           213562       427676         0.499
## 110:           Benin            51204       102000         0.502
## 111:         Senegal           103170       183848         0.561
## 112:           Tonga            21421        35550         0.603
## 113:         Morocco           190755       311896         0.612
## 114:    Saudi Arabia           295835       478803         0.618
## 115:      Kyrgyzstan            85704       134641         0.637
## 116:           Egypt           252149       389965         0.647
## 117: Rep. of Moldova           139527       213513         0.653
## 118:          Angola           180713       268799         0.672
## 119:          Guinea            87696       122442         0.716
## 120:        Honduras           128216       177870         0.721
## 121:          Bhutan            17426        24013         0.726
## 122: China, Macao SA            82227       111701         0.736
## 123:         Burundi            39219        50277         0.780
## 124:         Lebanon           265650       316866         0.838
## 125:      Azerbaijan           203644        242537         0.840
## 126:           Niger            57591         66500         0.866
## 127:        Cambodia           129119        149025         0.866
## 128:          Panama           258529        298247         0.867
## 129:      Bangladesh           207760        233377         0.890
## 130:   New Caledonia           114636        128016         0.895
## 131: China, Hong Kon           507583        560700         0.905
## 132:         Bahamas            77995         85888         0.908
## 133:           Aruba            69588         76425         0.911
## 134:        Ethiopia           146397        158972         0.921
## 135:         Albania           178225        193414         0.921
## 136:        Viet Nam           397601        416473         0.955
## 137:           Japan           583713        605538         0.964
## 138:        Malaysia           463464        479043         0.967
## 139:          Malawi            79367         81659         0.972
## 140: State of Palest            35708         36237         0.985
## 141:           India           555513        558977         0.994
## 142:           Yemen           124721        123425         1.011
## 143:          Cyprus           318717        312573         1.020
## 144:             USA          1030318       1009078         1.021
## 145: Other Asia, nes           474406        460215         1.031
## 146:         Finland           492458        469767         1.048
## 147:        Mongolia           148613        138528         1.073
## 148:        Cameroon           179354        166749         1.076
## 149:    Solomon Isds            49132         45512         1.080
## 150:           Malta           278868        258261         1.080
## 151:          Jordan           309409        285492         1.084
## 152:          Greece           508029        468064         1.085
## 153:        Bulgaria           482635        441977         1.092
## 154:          Latvia           432701        396144         1.092
## 155:  United Kingdom           936930        848143         1.105
## 156: United Arab Emi           703149        633508         1.110
## 157:          Kuwait           352737        316527         1.114
## 158:        Pakistan           325072        290501         1.119
## 159:       Australia           688778        615364         1.119
## 160:         Andorra            81290         71047         1.144
## 161:           Italy           924641        799653         1.156
## 162:         Jamaica           133815        115237         1.161
## 163:           Qatar           372614        319721         1.165
## 164:          Israel           488577        417213         1.171
## 165:         Hungary           573623        488737         1.174
## 166:       Lithuania           507067        428834         1.182
## 167:         Germany          1202175       1002639         1.199
## 168:        Slovenia           492815        410366         1.201
## 169: Russian Federat           784800        648608         1.210
## 170:         Tunisia           309070        255429         1.210
## 171:           China           879183        724493         1.214
## 172:         Austria           677922        557435         1.216
## 173:          Sweden           694543        571099         1.216
## 174:            Oman           323153        259168         1.247
## 175:          Turkey           678441        542214         1.251
## 176:         Ecuador           318015        253359         1.255
## 177:        Portugal           541380        431293         1.255
## 178:          Brazil           583276        461011         1.265
## 179:       Argentina           391003        308855         1.266
## 180:           Nepal           120039         94650         1.268
## 181:         Algeria           321695        251633         1.278
## 182:         Romania           649130        506860         1.281
## 183:         Belgium           845090        659168         1.282
## 184:       Guatemala           300538        232886         1.290
## 185: Brunei Darussal           156444        121198         1.291
## 186:     Netherlands           970831        744860         1.303
## 187:        Thailand           626715        476703         1.315
## 188:          Poland           815989        613984         1.329
## 189:      Cabo Verde            91218         68038         1.341
## 190:           Spain           938577        698773         1.343
## 191:       Sri Lanka           328299        243900         1.346
## 192:         Estonia           522611        385629         1.355
## 193:          Serbia           546146        398624         1.370
## 194:         Ireland           537144        391203         1.373
## 195:       Singapore           770628        558604         1.380
## 196:         Croatia           527583        381247         1.384
## 197:          Belize            92097         66466         1.386
## 198:         Uruguay           344345        246256         1.398
## 199:        Colombia           494150        352427         1.402
## 200:  Dominican Rep.           323954        230951         1.403
## 201:           Chile           568781        401602         1.416
## 202:       Indonesia           569711        401892         1.418
## 203:            Peru           469619        326339         1.439
## 204:   Rep. of Korea           771507        535194         1.442
## 205:        Paraguay           260181        179080         1.453
## 206:          France          1216004        835322         1.456
## 207:         Denmark           745249        510391         1.460
## 208:         Belarus           416389        280950         1.482
## 209:          Zambia           217049        144837         1.499
## 210:         Czechia           799978        533397         1.500
## 211: Bolivia (Plurin           289393        192027         1.507
## 212:        Slovakia           625076        413672         1.511
## 213:            Fiji           167592        110429         1.518
## 214:         Armenia           242789        159951         1.518
## 215:          Norway           730569        480536         1.520
## 216:      Kazakhstan           495711        325467         1.523
## 217:     Switzerland           939659        616597         1.524
## 218:         Bahrain           383847        250483         1.532
## 219:         Georgia           380719        247267         1.540
## 220:     New Zealand           611555        393386         1.555
## 221:       Nicaragua           248050        156716         1.583
## 222:          Uganda           232320        142858         1.626
## 223:    South Africa           830564        508424         1.634
## 224:        Zimbabwe           190980        116132         1.645
## 225: TFYR of Macedon           403985        244262         1.654
## 226:      Luxembourg           439840        261304         1.683
## 227:       Mauritius           359677        213116         1.688
## 228:          Mexico           770869        455649         1.692
## 229:        Botswana           138249         81685         1.692
## 230: United Rep. of            339973        199212         1.707
## 231:        Maldives           256218        141069         1.816
## 232: Bosnia Herzegov           472975        258277         1.831
## 233:          Canada          1049934        570552         1.840
## 234:         Namibia           212609        114517         1.857
## 235:      Montenegro           322440        172377         1.871
## 236:      Costa Rica           472822        243090         1.945
## 237:      Madagascar           261313        133074         1.964
## 238:         Iceland           423411        214405         1.975
## 239:     El Salvador           354754        179435          1.977
## 240: French Polynesi           210804        101647          2.074
## 241:          Rwanda           174337         83561          2.086
## 242:           Samoa            99340         44268          2.244
## 243:       Greenland           115396         50887          2.268
## 244:         Bermuda           141920         51409          2.761
## 245:           Palau            74982         19241          3.897
##             Reporter Reported Imports World Exports Share_Present
```

```
rm(rep_im, rep_im2, exports, imports_full12)
```

Origin x year combinations, per commodity code The following tables look at the number of origin x year combinations per reporter (`Reporter Pairs`) vs the number of combinations per partner (`Partner Pairs`) for reported exports and then reported imports.

```
#For each product how many origin X month combinations
load(paste(DataPath,"Analysis Data/imports_full12.Rda", sep = "/"))

imports_full12 <- rename(imports_full12, "Import Value" = "Trade Value (US$)")
imports_full12 <- imports_full12[,
                 .(Period, Reporter, Partner, `Commodity Code`, Commodity, `Import Value`)]

load(paste(DataPath,"Analysis Data/exports_full12.Rda", sep = "/"))

exports <- rename(exports, "Export Value" = "Trade Value (US$)")
exports <- exports[, .(Period, Reporter, Partner, `Commodity Code`, Commodity, `Export Value`)]

prod_ex <- exports[!is.na(`Export Value`), unique(`Reporter`),
                  by = c("Commodity", "Period")]

prod_ex <- prod_ex[, .N, by = "Commodity"]
prod_ex <- rename(prod_ex, "Reporter Pairs" = "N")

prod_expartner <- imports_full12[!is.na(`Import Value`), unique(`Partner`), by = c("Commodity", "Period")]
prod_expartner <- prod_expartner[, .N, by = "Commodity"]
prod_expartner <- rename(prod_expartner, "Partner Pairs" = "N")

prod_ex <- merge(prod_ex, prod_expartner, by = c("Commodity"), all = T)

prod_ex$Share <- prod_ex$`Reporter Pairs` / prod_ex$`Partner Pairs`

prod_ex$Commodity <- strtrim(prod_ex$Commodity, 30)
pander(prod_ex[order(Share)][1:25])
```

Commodity	Reporter Pairs	Partner Pairs	Share
Organic chemicals // Carboxyam	18	71	0.2535
Ores, slag and ash // Uranium	33	103	0.3204
Miscellaneous chemical product	26	81	0.321
Organic chemicals // Halogenat	24	70	0.3429
Salt; sulphur; earths and ston	21	61	0.3443
Works of art, collectors' piec	290	831	0.349
Works of art, collectors' piec	290	831	0.349
Works of art, collectors' piec	371	988	0.3755
Works of art, collectors' piec	371	988	0.3755
Pulp of wood or of other fibro	49	130	0.3769
Works of art, collectors' piec	305	792	0.3851
Works of art, collectors' piec	305	792	0.3851
Electrical machinery and equip	303	769	0.394

Commodity	Reporter Pairs	Partner Pairs	Share
Ores, slag and ash // Uranium	58	146	0.3973
Natural or cultured pearls, pr	269	673	0.3997
Natural or cultured pearls, pr	269	673	0.3997
Fish and crustaceans, molluscs	33	82	0.4024
Wood and articles of wood; woo	124	307	0.4039
Miscellaneous chemical product	48	117	0.4103
Ores, slag and ash // Uranium	32	78	0.4103
Wood and articles of wood; woo	76	185	0.4108
Wood and articles of wood; woo	164	398	0.4121
Ships, boats and floating stru	43	103	0.4175
Organic chemicals // Carboxyim	26	62	0.4194
Ores, slag and ash // Molybden	128	305	0.4197

```r
pander(prod_ex[order(-Share)][1:25])
```

Commodity	Reporter Pairs	Partner Pairs	Share
Aircraft, spacecraft, and part	236	214	1.103
Nuclear reactors, boilers, mac	215	206	1.044
Vehicles other than railway or	284	277	1.025
Other base metals; cermets; ar	52	51	1.02
Vehicles other than railway or	263	263	1
Railway or tramway locomotives	192	193	0.9948
Meat and edible meat offal //	285	288	0.9896
Nuclear reactors, boilers, mac	243	247	0.9838
Meat and edible meat offal //	278	283	0.9823
Preparations of meat, of fish	104	106	0.9811
Oil seeds and oleaginous fruit	154	158	0.9747
Organic chemicals // Carboxyim	295	305	0.9672
Live animals // Live swine. //	210	218	0.9633
Aircraft, spacecraft, and part	287	298	0.9631
Dairy produce; birds' eggs; na	335	348	0.9626
Nuclear reactors, boilers, mac	281	293	0.959
Cotton // Cotton yarn (other t	68	71	0.9577
Nuclear reactors, boilers, mac	322	337	0.9555
Railway or tramway locomotives	257	269	0.9554
Nuclear reactors, boilers, mac	231	242	0.9545
Ships, boats and floating stru	221	232	0.9526
Inorganic chemicals; organic o	281	295	0.9525
Meat and edible meat offal //	279	293	0.9522
Nuclear reactors, boilers, mac	350	368	0.9511
Nuclear reactors, boilers, mac	232	244	0.9508

```r
rm(prod_ex, prod_expartner)

prod_im <- imports_full12[!is.na(`Import Value`), unique(`Reporter`), by = c("Commodity", "Period")]
prod_im <- prod_im[, .N, by = "Commodity"]
prod_im <- rename(prod_im, "Reporter Pairs" = "N")

prod_impartner <- exports[!is.na(`Export Value`), unique(`Partner`), by = c("Commodity", "Period")]
prod_impartner <- prod_impartner[, .N, by = "Commodity"]
prod_impartner <- rename(prod_impartner, "Partner Pairs" = "N")

prod_im <- merge(prod_im, prod_impartner, by = c("Commodity"), all = T)
```

```r
prod_im$Share <- prod_im$`Reporter Pairs` / prod_im$`Partner Pairs`

prod_im$Commodity <- strtrim(prod_im$Commodity, 50)
pander(prod_im[order(Share)][1:25])
```

Commodity	Reporter Pairs	Partner Pairs	Share
Live animals // Other live animals. // - Birds : /	51	130	0.3923
Other base metals; cermets; articles thereof // Be	14	32	0.4375
Pharmaceutical products // Pharmaceutical goods sp	291	660	0.4409
Vehicles other than railway or tramway rolling-sto	277	623	0.4446
Vehicles other than railway or tramway rolling-sto	277	623	0.4446
Commodities not specified according to kind	544	1212	0.4488
Arms and ammunition; parts and accessories thereof	495	1094	0.4525
Arms and ammunition; parts and accessories thereof	463	1004	0.4612
Arms and ammunition; parts and accessories thereof	415	899	0.4616
Meat and edible meat offal // Meat and edible meat	437	937	0.4664
Meat and edible meat offal // Meat and edible offa	499	1069	0.4668
Nuclear reactors, boilers, machinery and mechanica	571	1221	0.4676
Rubber and articles thereof // Retreaded or used p	508	1086	0.4678
All Commodities	572	1221	0.4685
Electrical machinery and equipment and parts there	572	1220	0.4689
Optical, photographic, cinematographic, measuring,	572	1217	0.47
Beverages, spirits and vinegar // Wine of fresh gr	554	1178	0.4703
Plastics and articles thereof	572	1216	0.4704
Articles of iron or steel	572	1215	0.4708
Vehicles other than railway or tramway rolling-sto	572	1215	0.4708
Electrical machinery and equipment and parts there	571	1211	0.4715
Articles of apparel and clothing accessories, knit	572	1211	0.4723
Miscellaneous chemical products	572	1211	0.4723
Dairy produce; birds' eggs; natural honey; edible	405	857	0.4726
Meat and edible meat offal // Meat and edible meat	108	228	0.4737

```
pander(prod_im[order(-Share)][1:25])
```

Commodity	Reporter Pairs	Partner Pairs	Share
Ores, slag and ash // Uranium or thorium ores and	61	30	2.033
Pulp of wood or of other fibrous cellulosic materi	150	80	1.875
Organic chemicals // Carboxyamide-function compoun	48	27	1.778
Organic chemicals // Halogenated derivatives of hy	110	67	1.642
Ores, slag and ash // Uranium or thorium ores and	117	72	1.625
Organic chemicals // Carboxyamide-function compoun	131	86	1.523
Ores, slag and ash // Uranium or thorium ores and	83	55	1.509
Salt; sulphur; earths and stone; plastering materi	61	41	1.488
Organic chemicals // Heterocyclic compounds with n	90	61	1.475
Organic chemicals // Halogenated derivatives of hy	219	159	1.377
Fish and crustaceans, molluscs and other aquatic i	74	55	1.345
Pulp of wood or of other fibrous cellulosic materi	103	78	1.321
Miscellaneous chemical products // Prepared binder	152	116	1.31
Organic chemicals // Vegetable alkaloids, natural	38	29	1.31
Organic chemicals // Saturated acyclic monocarboxy	140	111	1.261
Miscellaneous chemical products // Prepared binder	108	87	1.241
Salt; sulphur; earths and stone; plastering materi	226	189	1.196
Other base metals; cermets; articles thereof // Be	127	107	1.187
Organic chemicals // Oxygen-function amino-compoun	98	83	1.181
Organic chemicals // Vegetable alkaloids, natural	94	80	1.175
Nuclear reactors, boilers, machinery and mechanica	245	209	1.172
Miscellaneous chemical products // Prepared binder	82	70	1.171
Organic chemicals // Carboxyimide-function compoun	40	35	1.143
Fish and crustaceans, molluscs and other aquatic i	117	103	1.136
Cotton // Cotton yarn (other than sewing thread),	130	117	1.111

```
rm(prod_im, exports, imports_full12)
```

What does tariff data include?

The following is an example of the non-tariff measure data and tariff data downloaded from WITS. The NTM data can only be downloaded for one country/year pair at a time. The tariff data can be downloaded all at once, but each county/year pair is organized in it's own csv file. Both datasets are organized at the 6-digit product code level, so they should merge with the trade data.

The tariff data has both most-favored nation and preferential rates. Descriptions of the columns can be found here: wits.worldbank.org/data/public/Help_BulkDownload_TRAINS.pdf

The NTM data descriptions can be found in the "NTM data dictionary" word document in Dropbox/BJ Customs Evasion/Raw Data. Detailed descriptions of the NTM code classifications can be found here: unctad.org/en/PublicationsLibrary/ditctab20122_en.pdf

```
#Example of NTM data
NTM <- read.csv(paste(DataPath,"Raw Data/NTM_data_example.csv", sep = "/"))
NTM <- as.data.table(NTM)
NTM[1:10]
```

```
##     NTMNomenclature  ReporterName Year NTMCode Measure_ID NomenCode
##   1:             M3 United States 2013    D110      83748        H4
##   2:             M3 United States 2013    D110      83749        H4
##   3:             M3 United States 2013    D110      83749        H4
##   4:             M3 United States 2013    D110      83749        H4
##   5:             M3 United States 2013    D110      83749        H4
##   6:             M3 United States 2013    D110      83749        H4
##   7:             M3 United States 2013    D110      83750        H4
##   8:             M3 United States 2013    D110      83750        H4
##   9:             M3 United States 2013    D110      83752        H4
## 10:             M3 United States 2013    D110      83752        H4
##     ProductCode PartialCoverage Partner
##   1:      391390               0     AUT
##   2:      441231               0     CHN
##   3:      441232               0     CHN
##   4:      441239               0     CHN
##   5:      441294               0     CHN
##   6:      441299               0     CHN
##   7:      690100               0     CHN
##   8:      690220               0     CHN
##   9:      721710               0     CHN
## 10:      722990               0     CHN
```

```
#Example of tariff data
tariff <- read.csv(paste(DataPath,"Raw Data/tariff_data_example.csv", sep = "/"))
tariff <- as.data.table(tariff)
tariff[1:10]
```

```
##     NomenCode Reporter_ISO_N Year ProductCode Partner ExcludedFrom
##   1:       H4            840 2013       10130     410           NA
##   2:       H4            840 2013       10130     484           NA
##   3:       H4            840 2013       10130     124           NA
##   4:       H4            840 2013       10130     036           NA
##   5:       H4            840 2013       10130     152           NA
##   6:       H4            840 2013       10130     L91           NA
##   7:       H4            840 2013       10130     N33           NA
##   8:       H4            840 2013       10130     004           NA
##   9:       H4            840 2013       10130     P26           NA
## 10:       H4            840 2013       10130     376           NA
##     Sum_Of_Rates Min_Rate Max_Rate SimpleAverage TotalNoOfLines
##  1:            4        4        4             4              1
##  2:            0        0        0             0              1
##  3:            0        0        0             0              1
##  4:            0        0        0             0              1
##  5:            0        0        0             0              1
##  6:            0        0        0             0              1
##  7:            0        0        0             0              1
##  8:            0        0        0             0              1
##  9:            0        0        0             0              1
## 10:            0        0        0             0              1
##     Nbr_Pref_Lines Nbr_MFN_Lines Nbr_NA_Lines EstCode
##  1:              1             0            0      U2
##  2:              1             0            0      U2
##  3:              1             0            0      U2
##  4:              1             0            0      U2
##  5:              1             0            0      U2
##  6:              1             0            0      U2
##  7:              1             0            0      U2
##  8:              1             0            0      U2
##  9:              1             0            0      U2
## 10:              1             0            0      U2
```