Empirical Trade Theories

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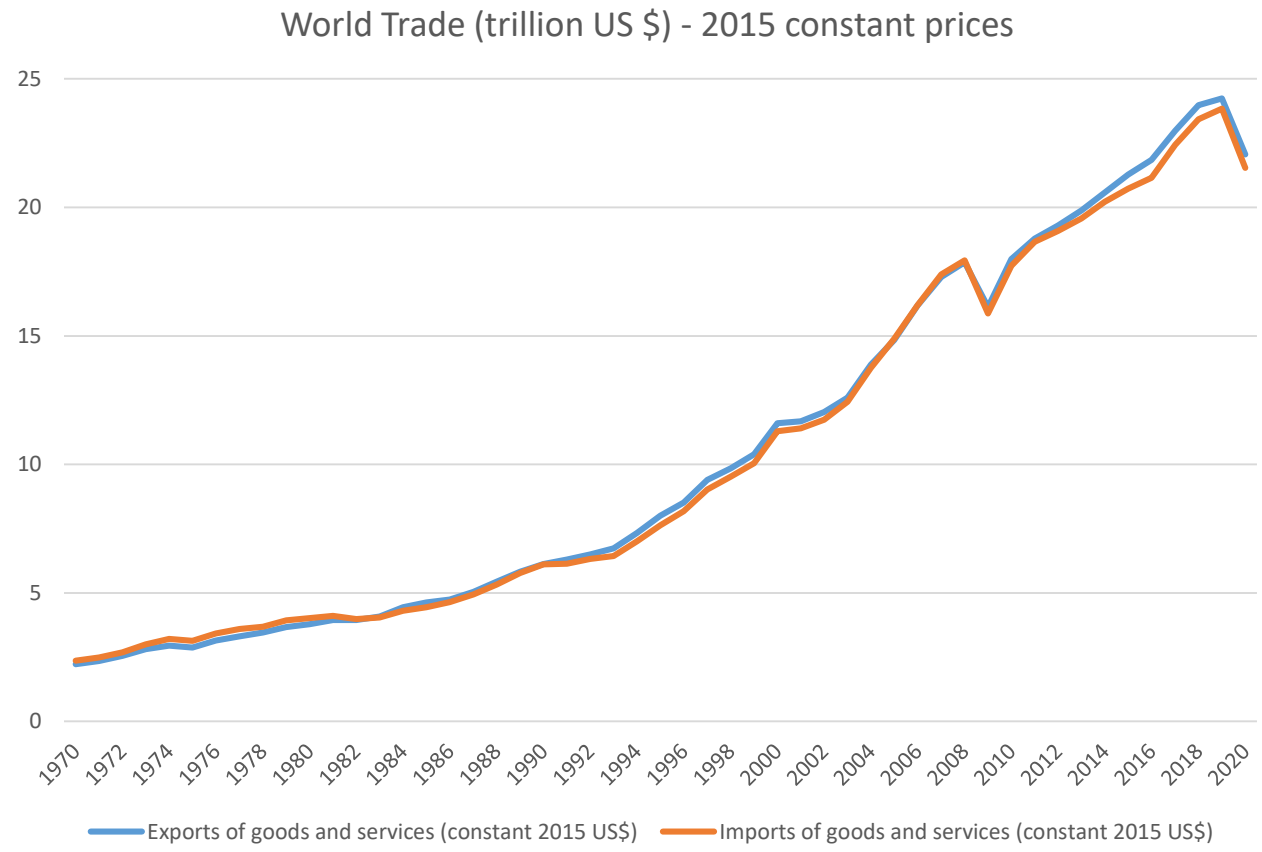
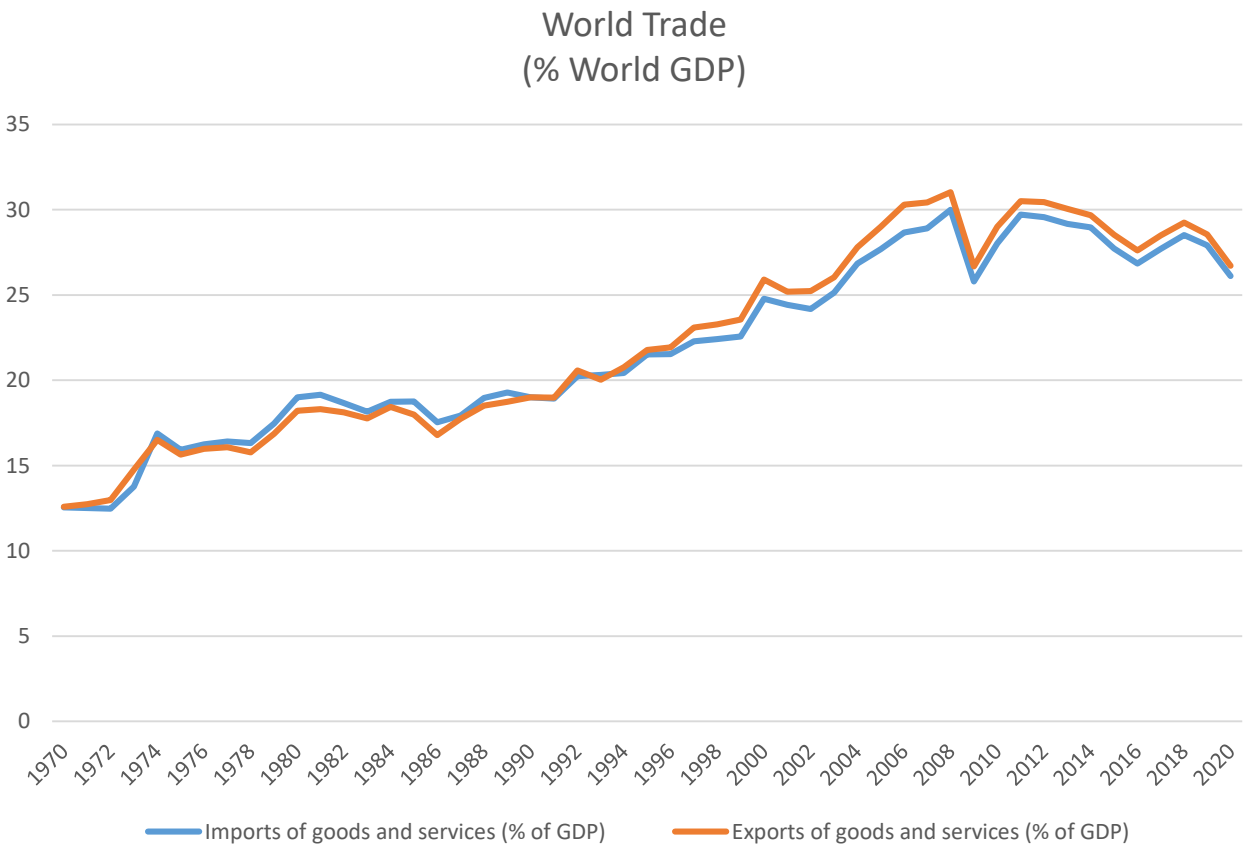
After WWII, unprecedented growth of trade volumes, both in absolute terms and as % of GDP



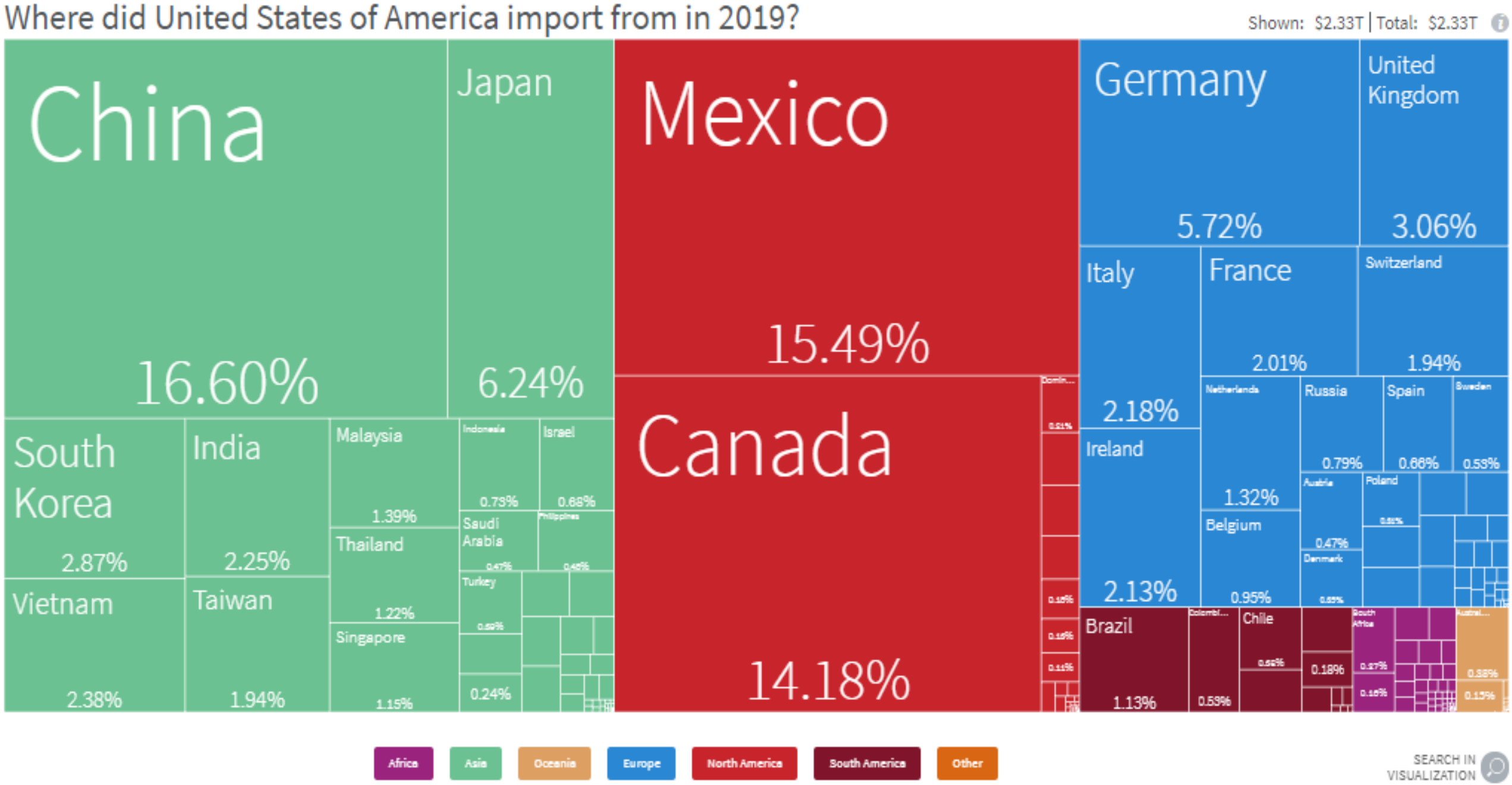


Reporter	TOTAL. ALL COMMODITIES			
	Exports		Imports	
	2019		2019	
	Value (US$)	World Share ($),	Value (US$)	World Share ($), %
China	2,498,569,865,637.00	13.70	2,068,950,254,597.00	11.23
USA	1,644,276,220,783.00	9.01	2,567,492,197,103.00	13.94
Germany	1,493,266,563,850.00	8.19	1,239,897,203,131.00	6.73
Japan	705,633,026,838.00	3.87	720,858,630,025.00	3.91
Netherlands	576,784,455,411.00	3.16	514,857,687,783.00	2.79
France	556,364,114,008.00	3.05	643,208,112,669.00	3.49
Korea	542,171,769,089.00	2.97	503,262,910,727.00	2.73
Hong Kong	535,711,018,905.00	2.93	578,590,151,014.00	3.14
Italy	532,683,664,808.00	2.92	473,562,249,714.00	2.57
United Kingdom	468,322,416,147.00	2.56	692,494,170,352.00	3.76
Mexico	460,703,804,234.00	2.52	455,289,486,227.00	2.47
Canada	446,079,889,867.00	2.44	453,359,841,430.00	2.46
Belgium	445,214,432,962.00	2.44	426,489,084,673.00	2.31
Russia	426,720,332,660.00	2.34	247,161,342,900.00	1.34
Singapore	390,331,757,374.00	2.14	358,974,637,219.00	1.94
United Arab Emirates	389,372,505,148.00	2.13	288,397,544,149.00	1.56
Spain	337,215,113,876.00	1.84	375,485,170,269.00	2.03
Other Asia, nes	329,483,858,291.00	1.80	285,931,193,664.00	1.55
India	323,250,726,424.00	1.77	478,883,729,111.00	2.60
Switzerland	313,629,550,202.00	1.72	276,291,811,281.00	1.50

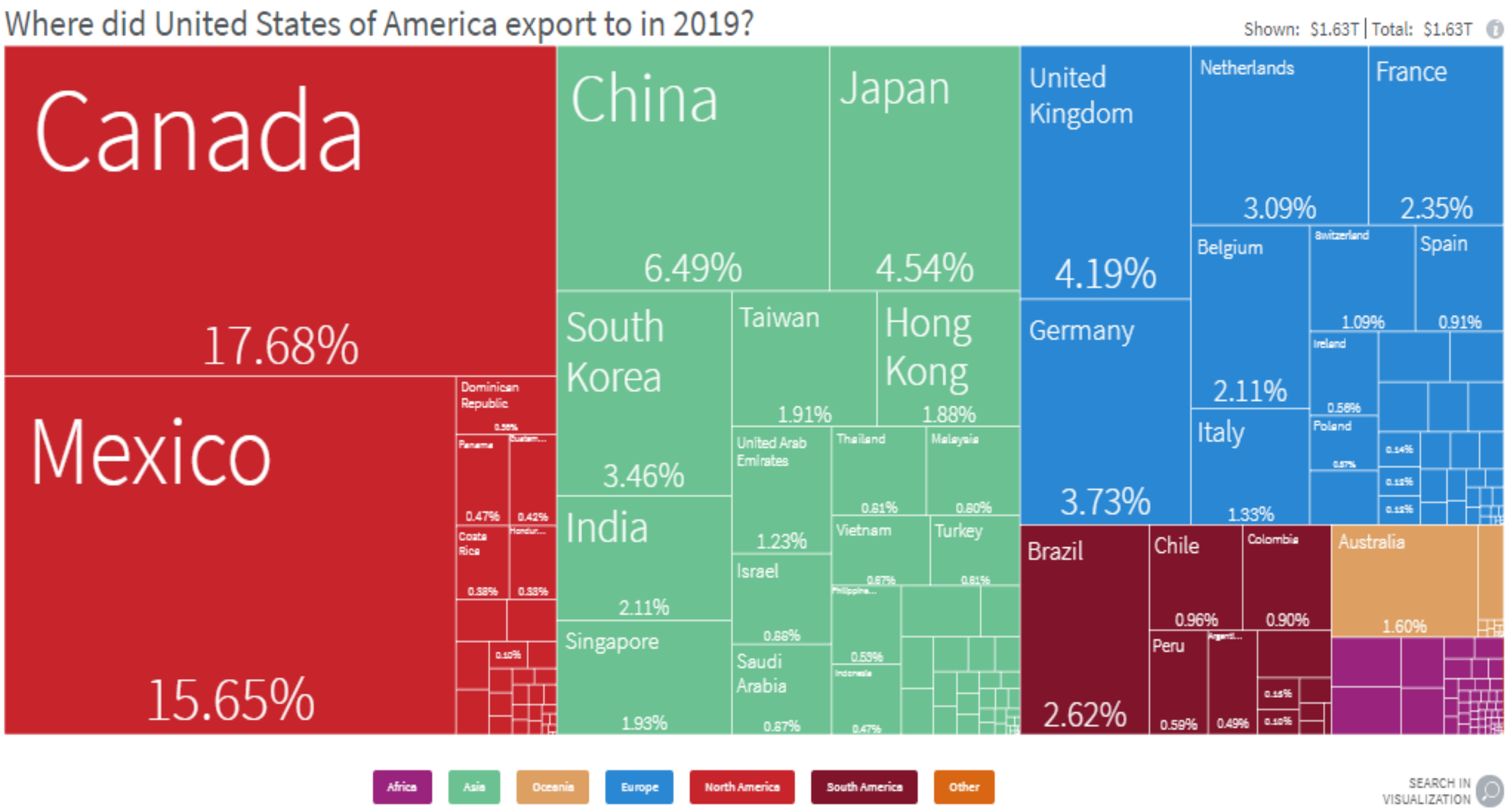
Trendeconomy (2020)
https://trendeconomy.com/data/commodity_h2

Reporter	TOTAL. ALL COMMODITIES			
	Exports		Imports	
	2020		2020	
	Value (US$)	World Share ($),	Value (US$)	World Share ($), %
China	2,590,600,666,465.00	15.41	2,055,590,611,924.00	12.15
USA	1,430,253,623,489.00	8.51	2,405,381,557,667.00	14.22
Germany	1,383,968,565,520.00	8.23	1,171,915,280,837.00	6.93
Japan	641,282,568,357.00	3.81	635,402,321,812.00	3.75
Hong Kong	551,515,755,924.00	3.28	573,061,309,610.00	3.38
Netherlands	551,352,792,281.00	3.28	484,088,530,592.00	2.86
Korea	512,709,856,024.00	3.05	467,498,278,739.00	2.76
Italy	495,976,960,159.00	2.95	422,648,102,450.00	2.49
France	488,562,445,788.00	2.90	582,775,305,815.00	3.44
Mexico	416,982,170,486.00	2.48	382,979,895,758.00	2.26
United Kingdom	395,692,086,586.00	2.35	634,174,870,301.00	3.75
Canada	389,564,428,806.00	2.31	405,847,451,332.00	2.39
Singapore	374,824,820,027.00	2.23	329,595,978,725.00	1.94
Other Asia, nes	347,194,556,373.00	2.06	287,429,187,097.00	1.69
Russia	337,103,969,588.00	2.00	231,664,185,408.00	1.36
United Arab Emirates	335,212,447,095.00	1.99	246,879,706,188.00	1.45
Switzerland	318,580,420,583.00	1.89	290,402,110,277.00	1.71
Spain	312,080,513,421.00	1.85	329,738,801,365.00	1.94
Belgium	296,130,587,976.00	1.76	294,178,865,005.00	1.73
Vietnam	281,441,457,236.00	1.67	261,309,451,920.00	1.54
India	275,488,744,927.00	1.63	367,980,363,479.00	2.17

Trendeconomy (2021)
https://trendeconomy.com/data/commodity_h2



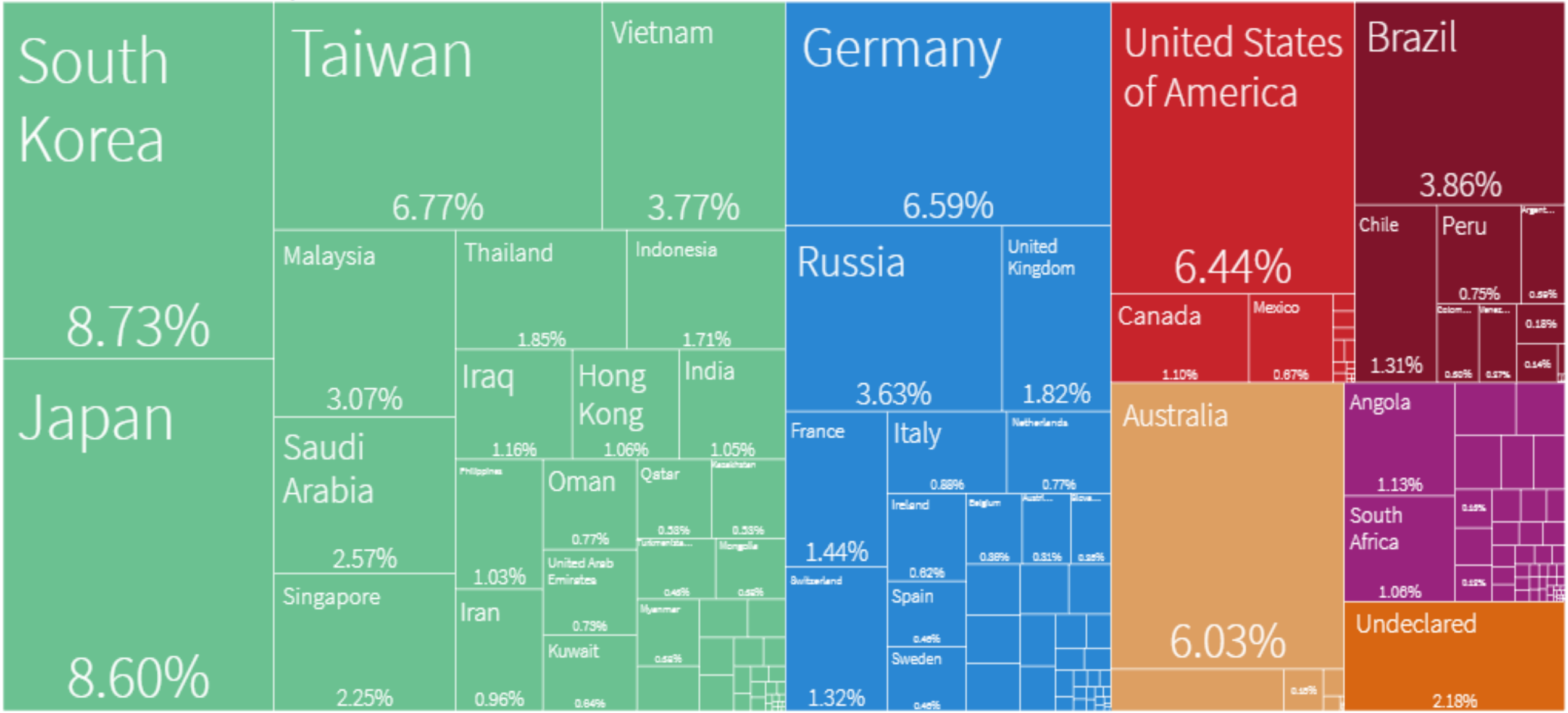
Source: http://atlas.cid.harvard.edu



Source: http://atlas.cid.harvard.edu

Where did China import from in 2019?

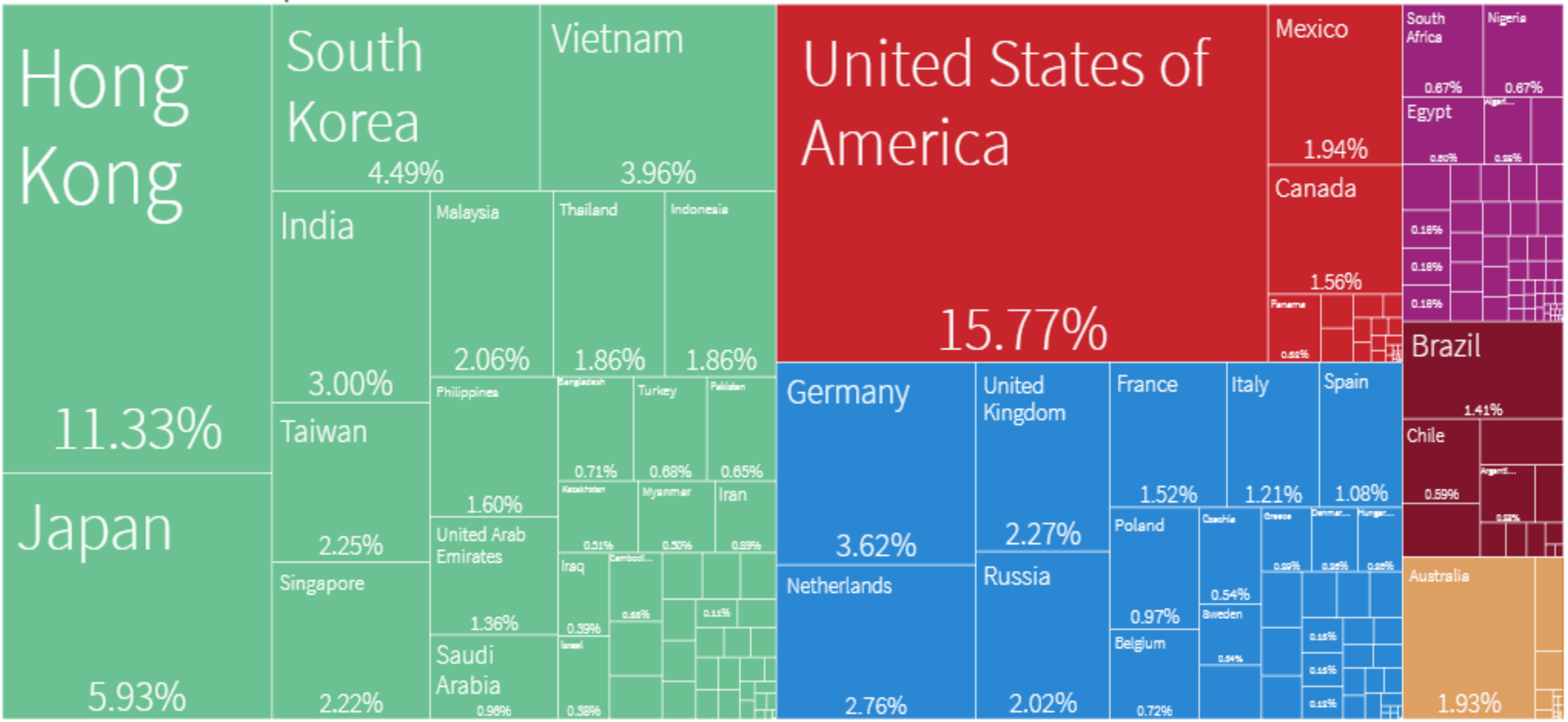
Shown: $1.64T | Total: $1.64T



SEARCH IN VISUALIZATION

Where did China export to in 2019?

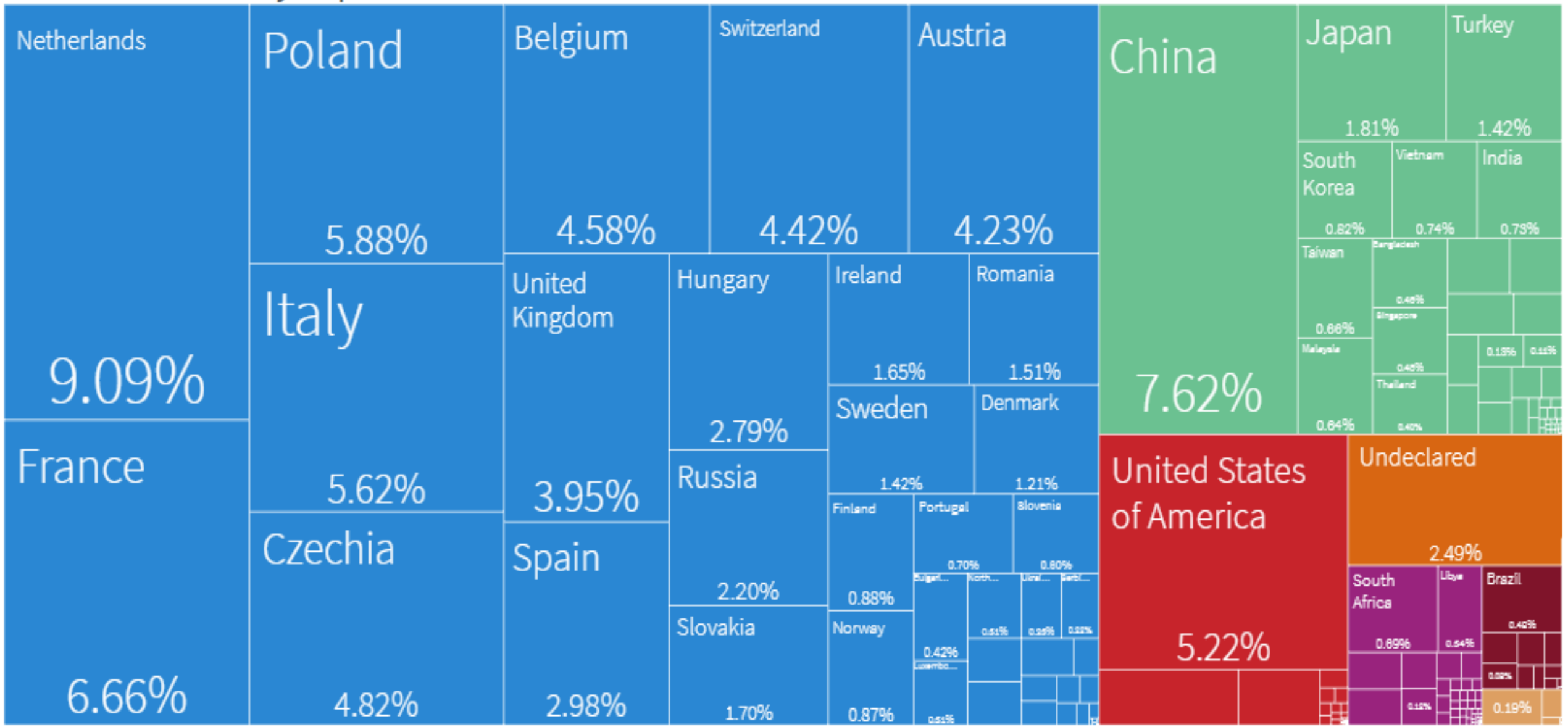
Shown: $2.46T | Total: $2.46T



SEARCH IN VISUALIZATION

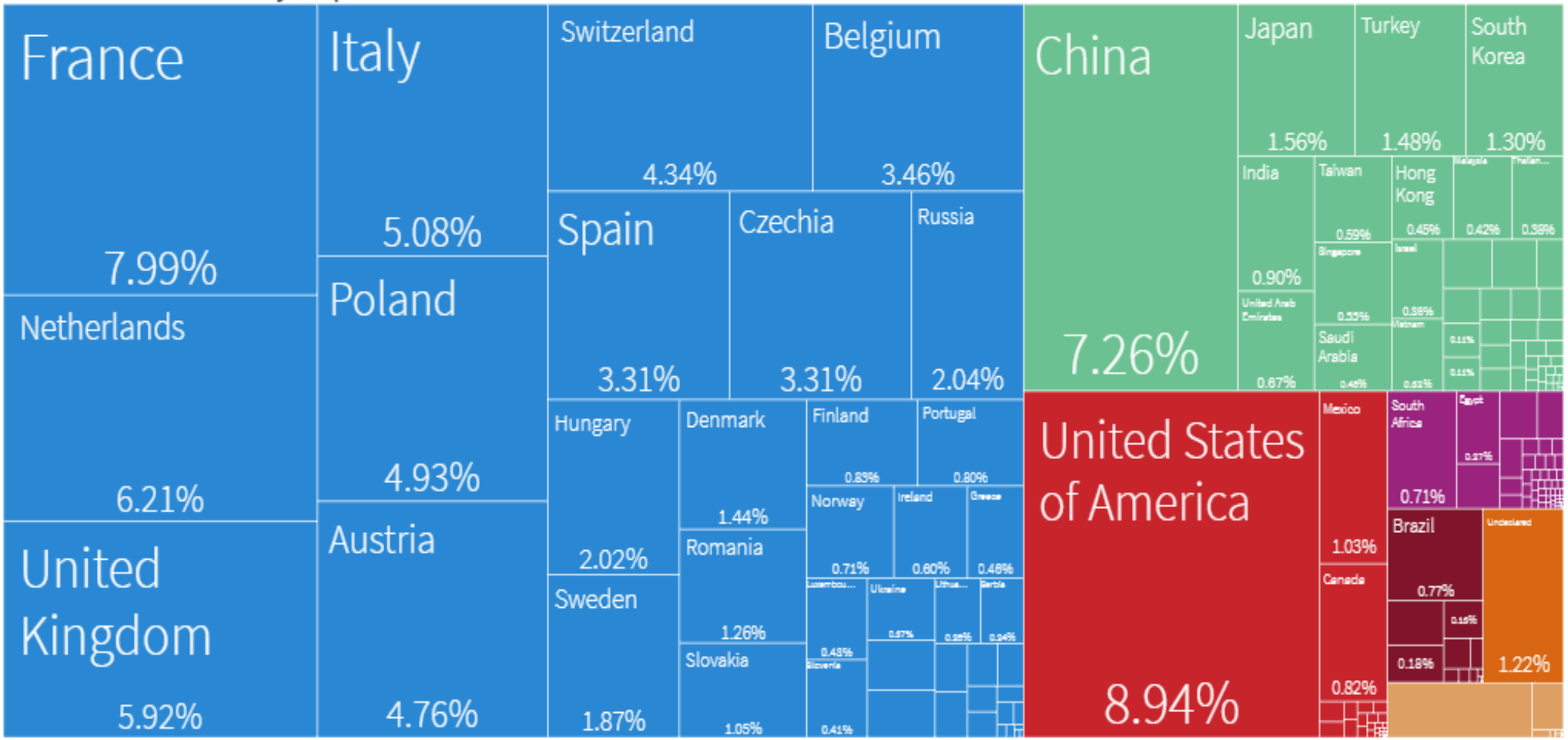
Where did Germany import from in 2019?

Shown: $1.17T | Total: $1.17T



Where did Germany export to in 2019?

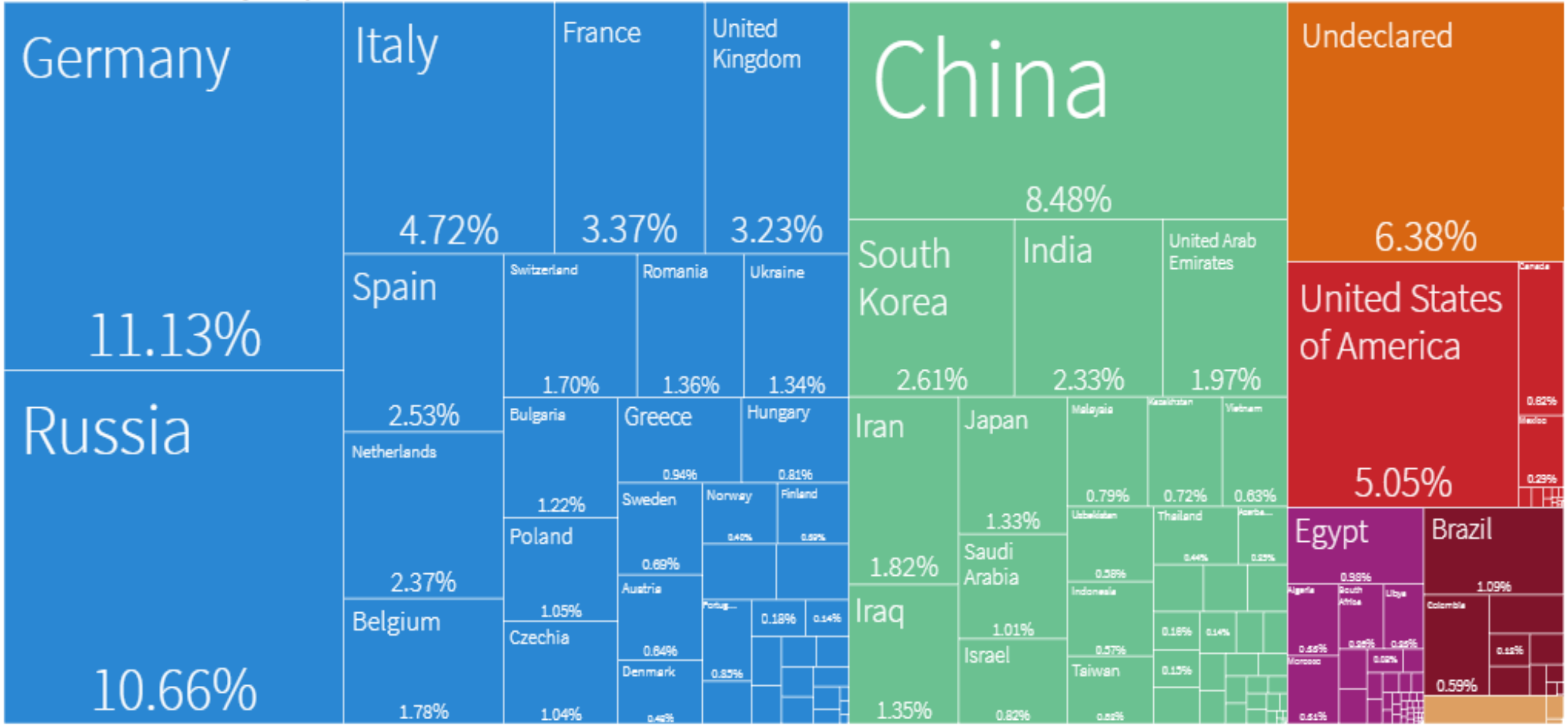
Shown: $1.49T | Total: $1.49T



SEARCH IN VISUALIZATION

Where did Turkey import from in 2019?

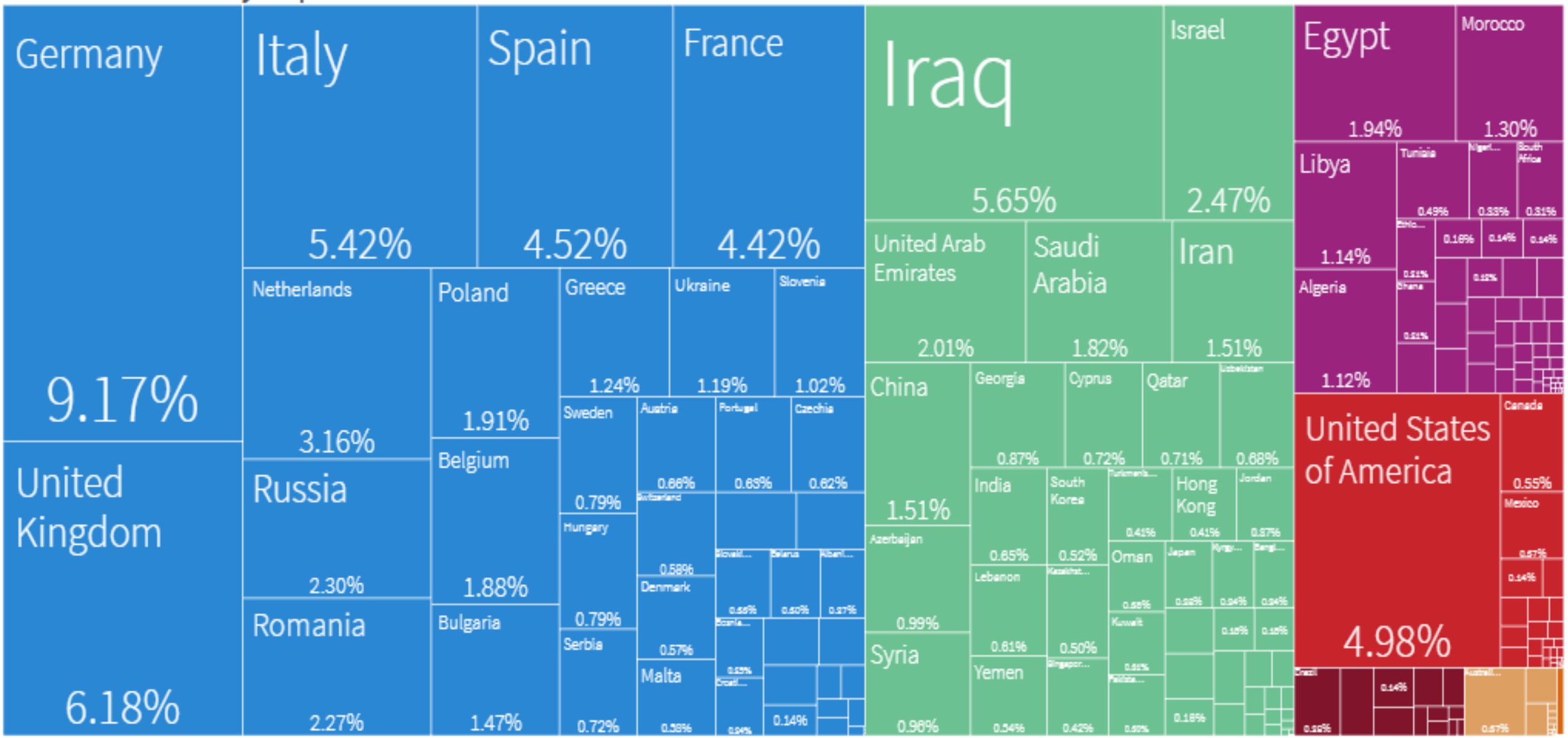
Shown: $198B | Total: $198B



SEARCH IN VISUALIZATION

Where did Turkey export to in 2019?

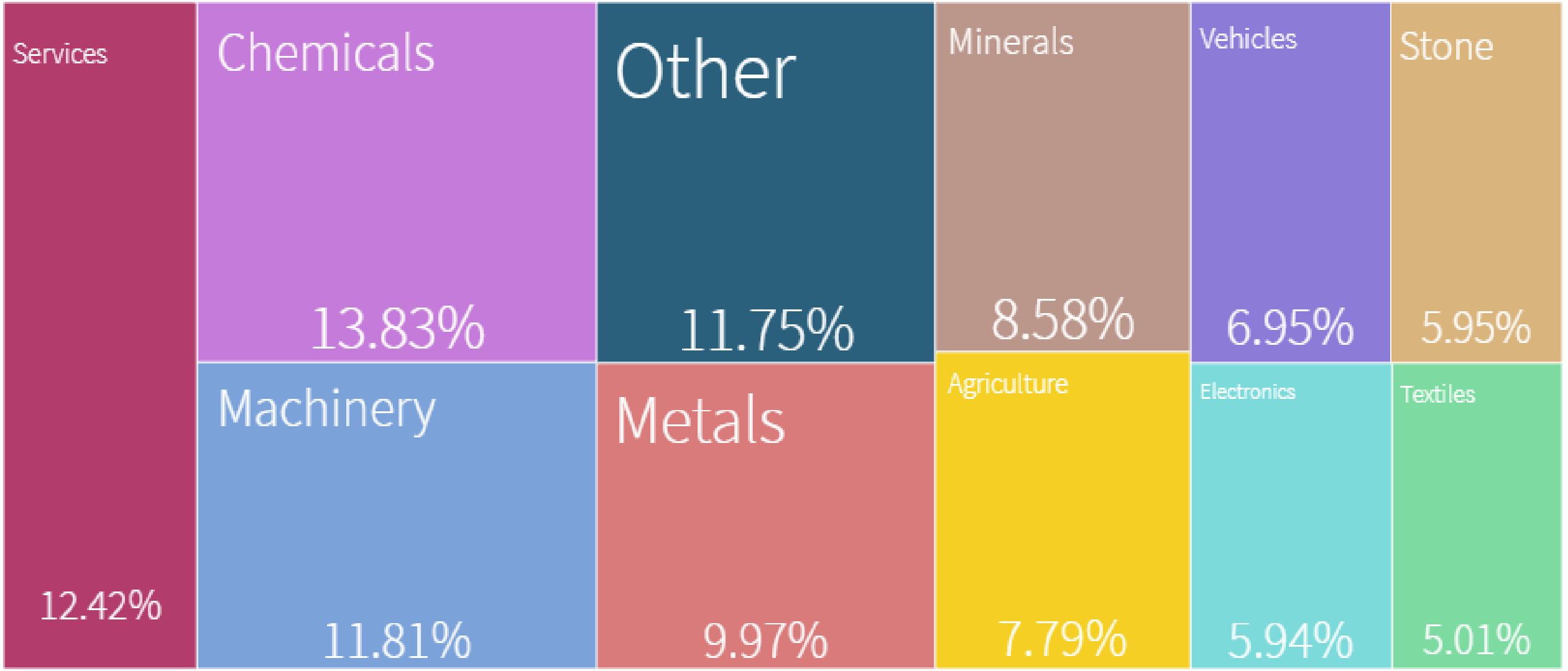
Shown: $181B | Total: $181B



SEARCH IN VISUALIZATION

What did Turkey import in 2019?

Shown: $226B | Total: $226B



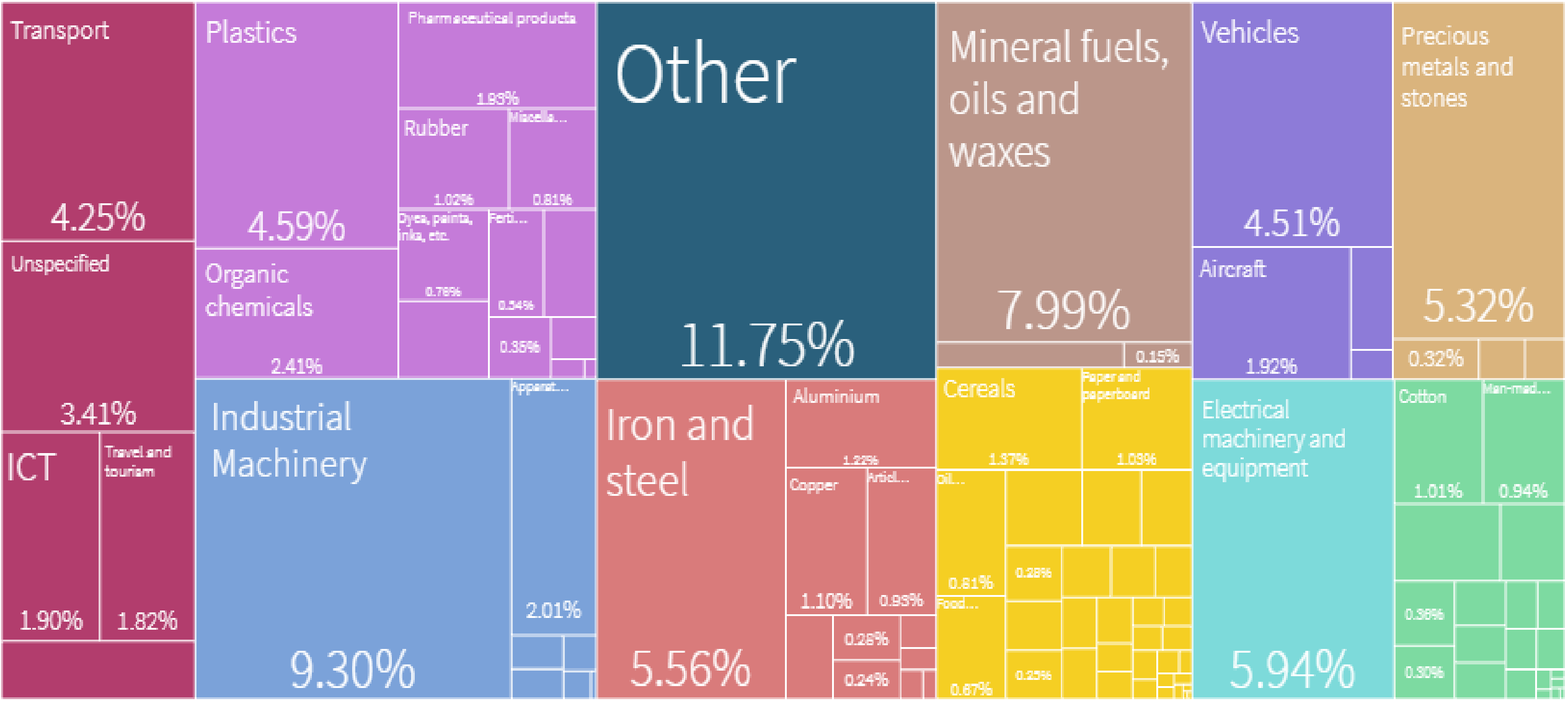
PRODUCT SECTORS

SEARCH IN VISUALIZATION

What did Turkey import in 2019?

2 digit sector level

Shown: $226B | Total: $226B



PRODUCT SECTORS

SEARCH IN VISUALIZATION

Green

Turkey Resumes Trade That Made It Europe's Top Trash Destination

By Burhan Yuksekkas +Sign Up
28 Temmuz 2021 07:00 GMT+3

- Authorities ease ban on imports of plastic garbage from Europe
- Environmentalists warn of risks to agriculture, water quality

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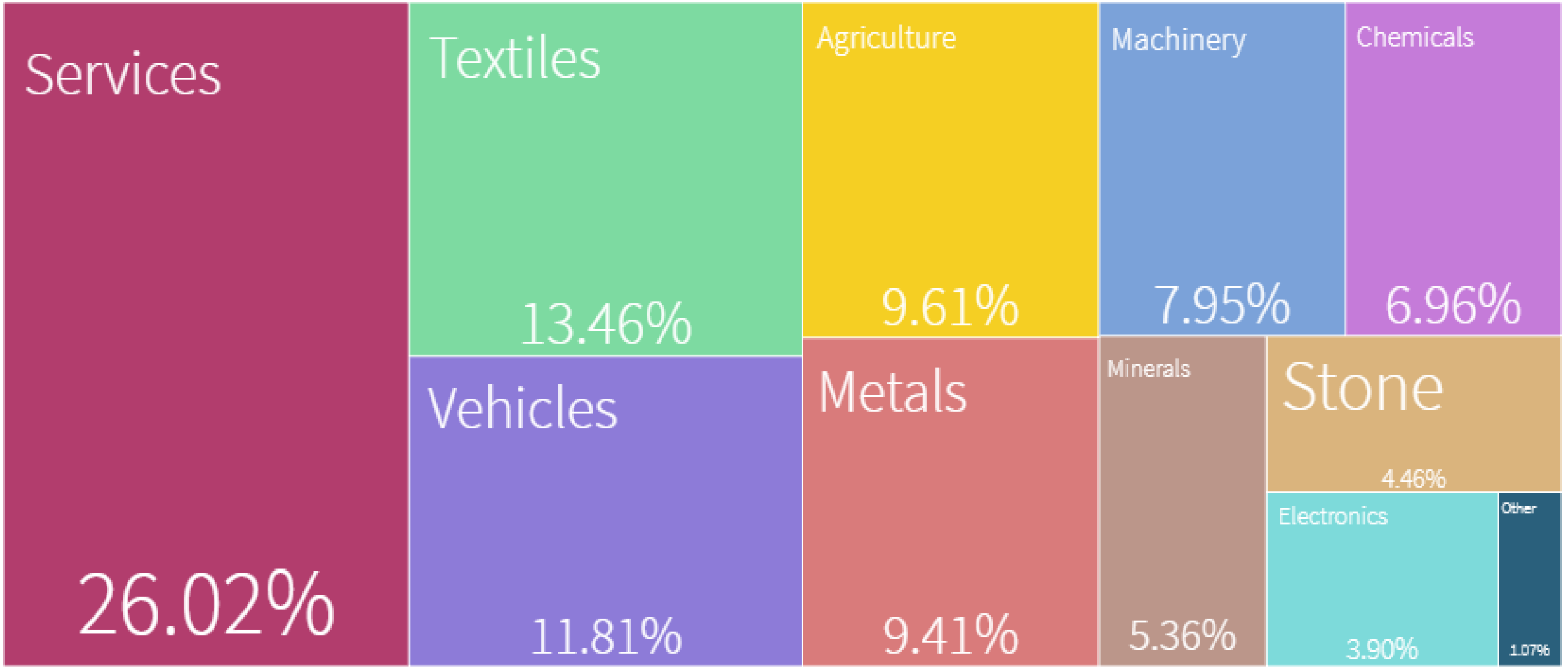
https://www.bloomberg.com/news/articles/2021-07-28/turkey-resumes-trade-that-made-it-europe-s-top-trash-destination

What did Turkey export in 2019?

Shown: $244B | Total: $244B

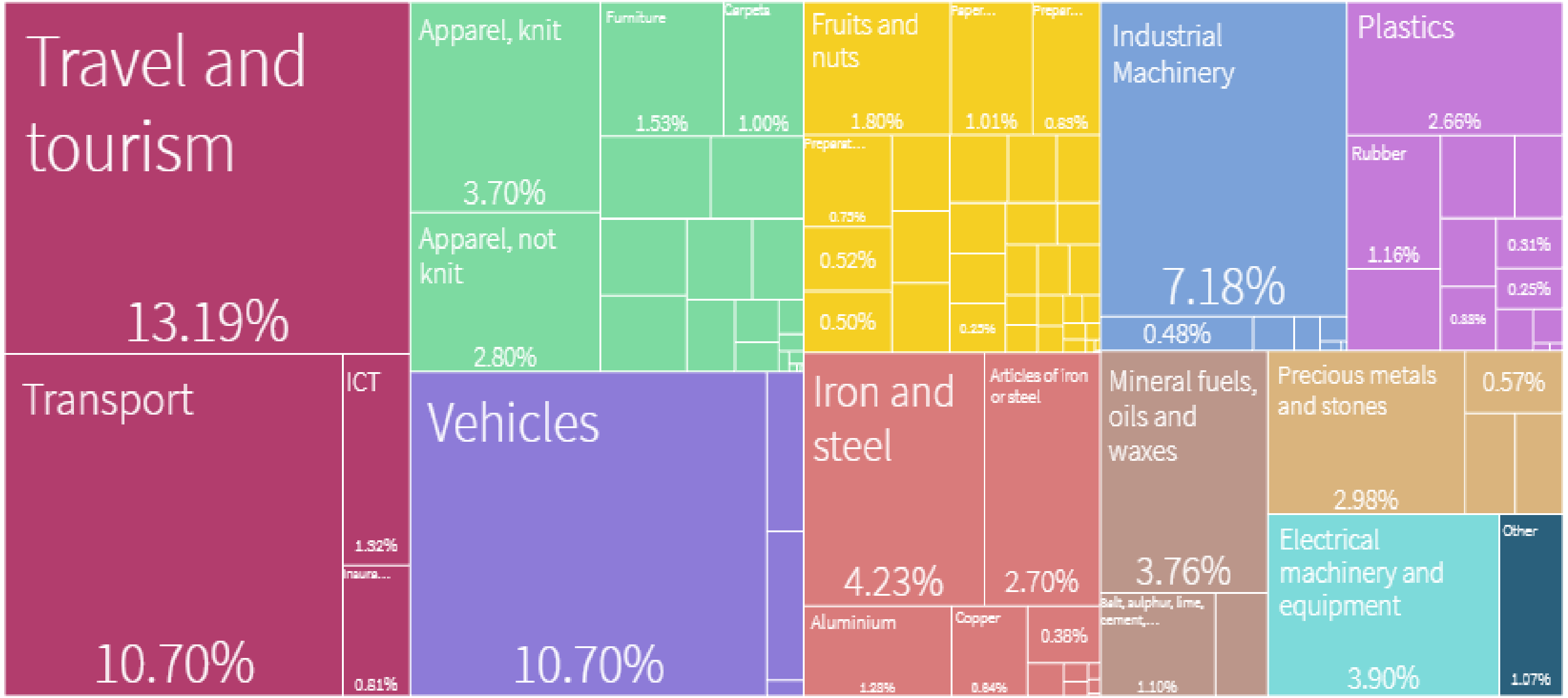


PRODUCT SECTORS

SEARCH IN VISUALIZATION

What did Turkey export in 2019?

Shown: $244B | Total: $244B



PRODUCT SECTORS

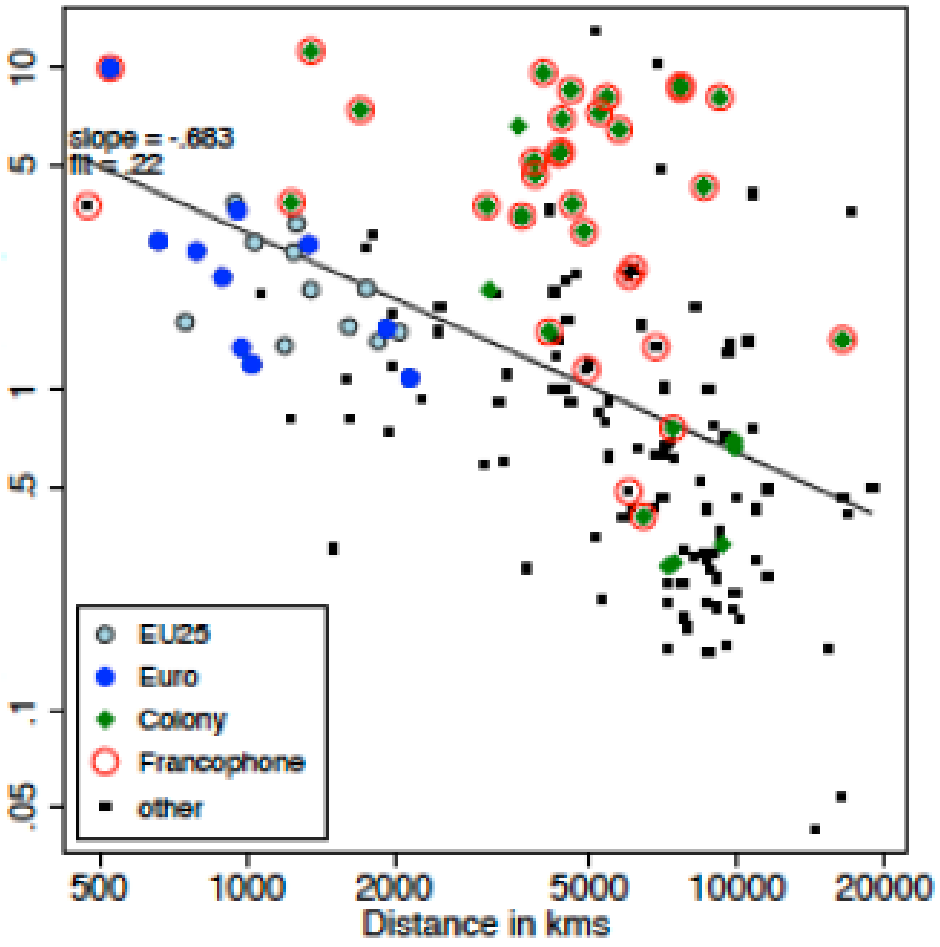
SEARCH IN VISUALIZATION

Map of World Trade

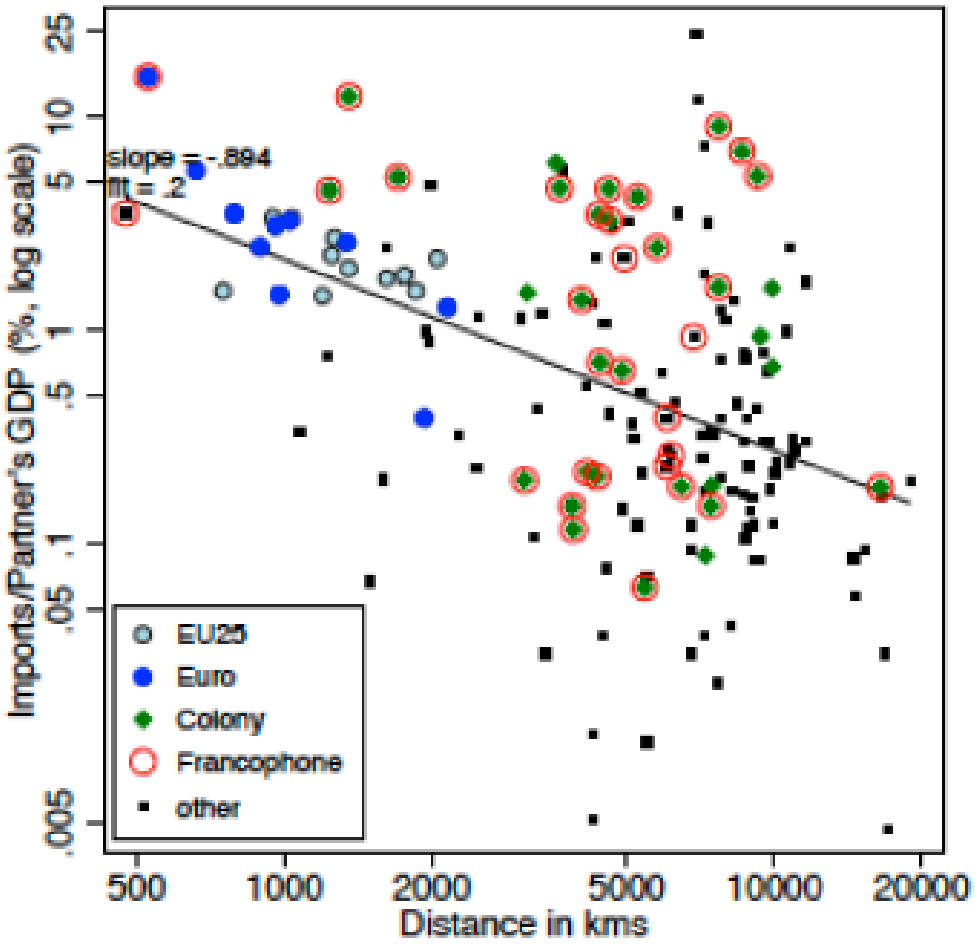
Source: Feenstra and Taylor (2011). Essentials of International Economics, Worth Publishers.

Trade is decreasing in distance

(c) France's exports (2006)



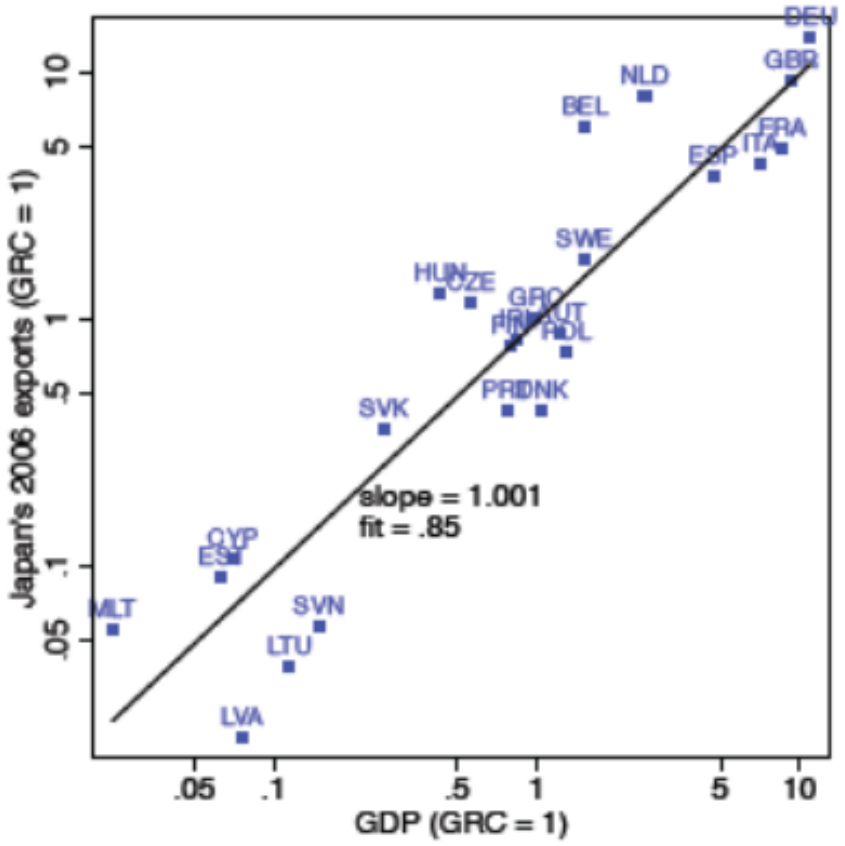
(d) France's imports (2006)



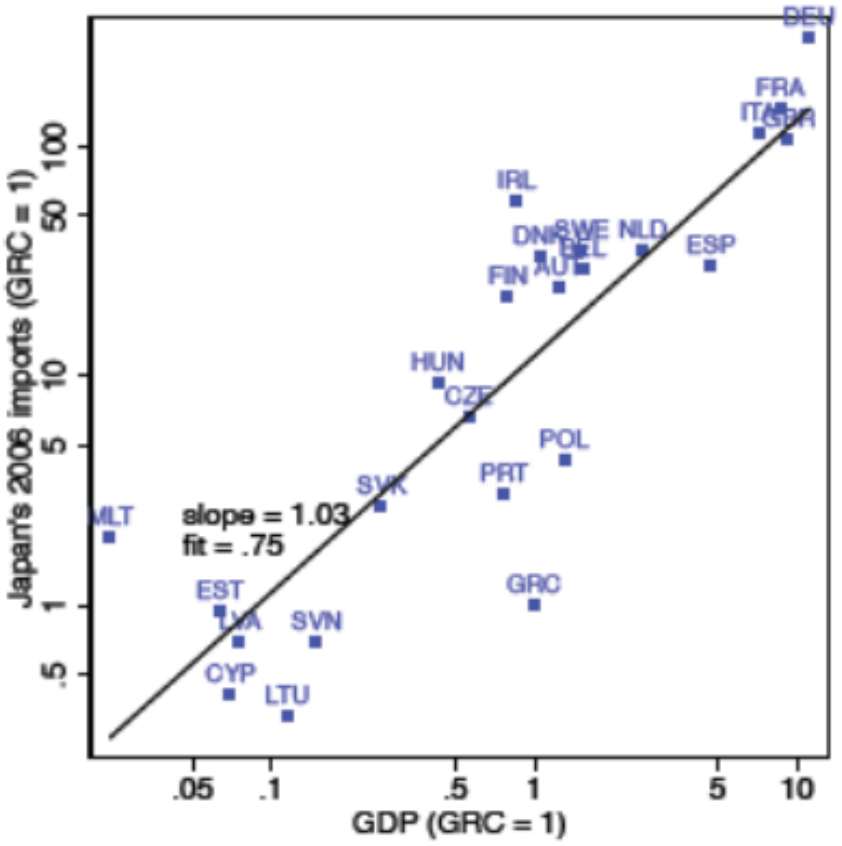
Trade is increasing in size

Measured by national output

(a) Japan's exports to EU, 2006



(b) Japan's imports from EU, 2006



Great example from Japan:

Goodness of fit varies between 75% and 85%.

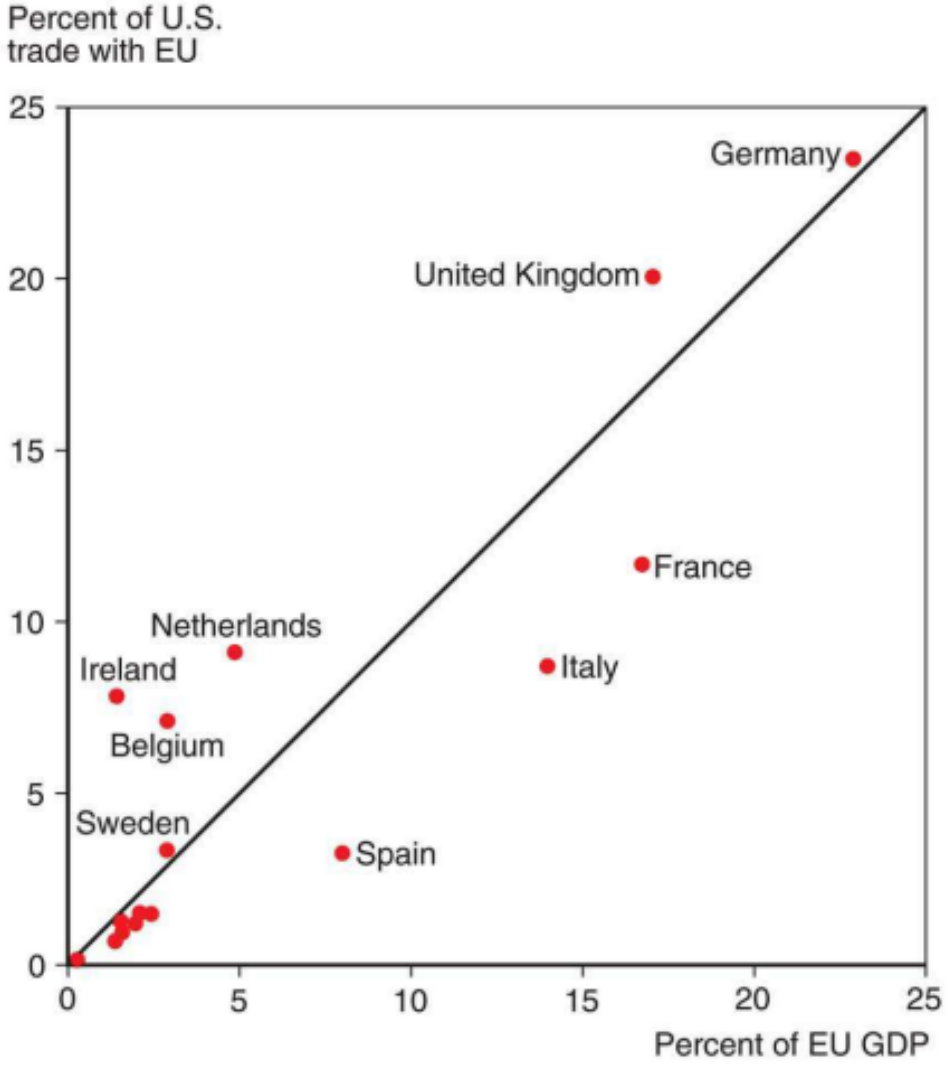
Remember: This example is a cross sectional data (at a point in time, that is year 2006 is fixed.

Source: Anderson (2019)

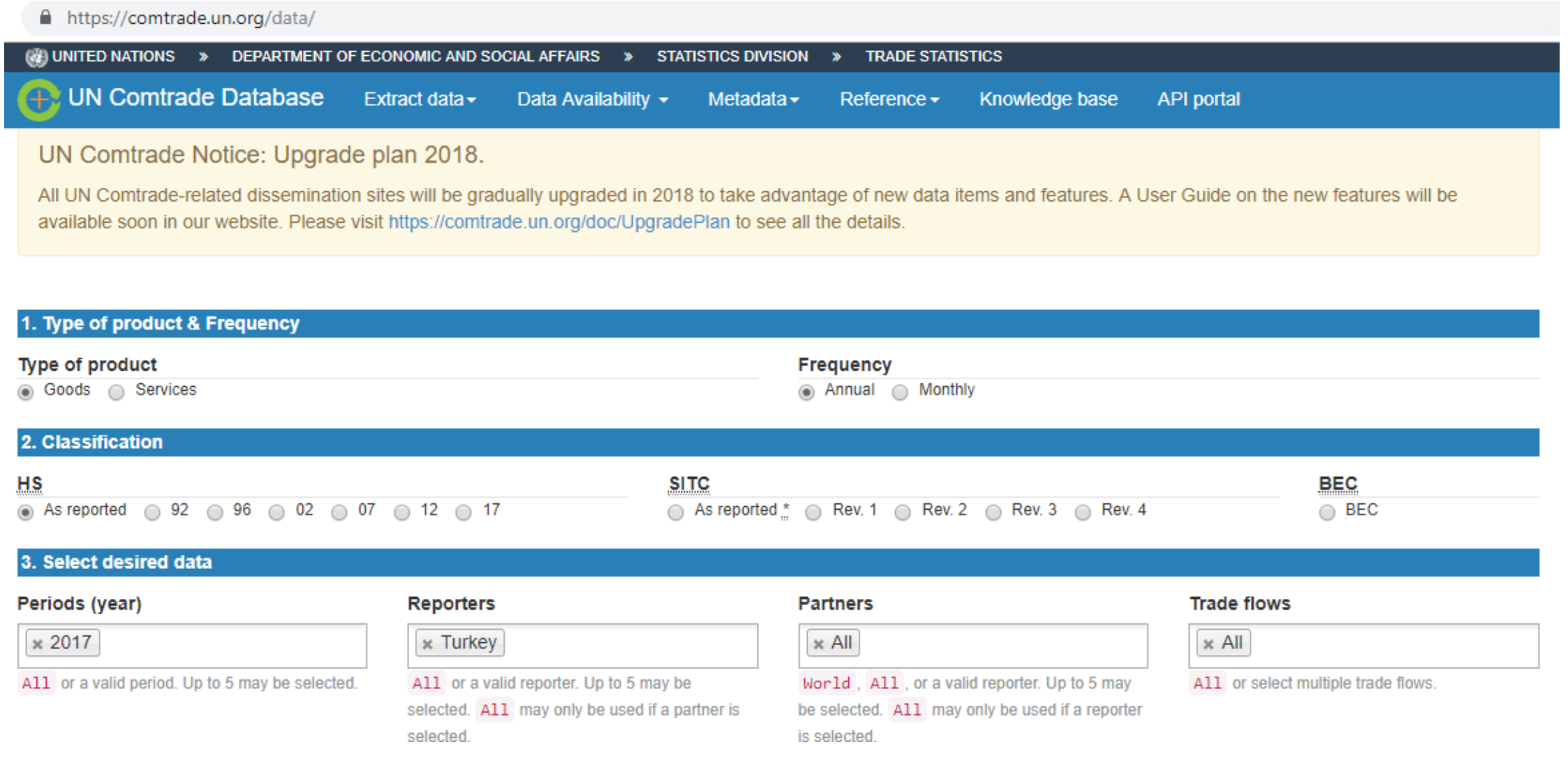
Another example from the US economy

The Size of European Economies, and the Value of Their Trade with the United States

Source: U.S. Department of Commerce, European Commission.

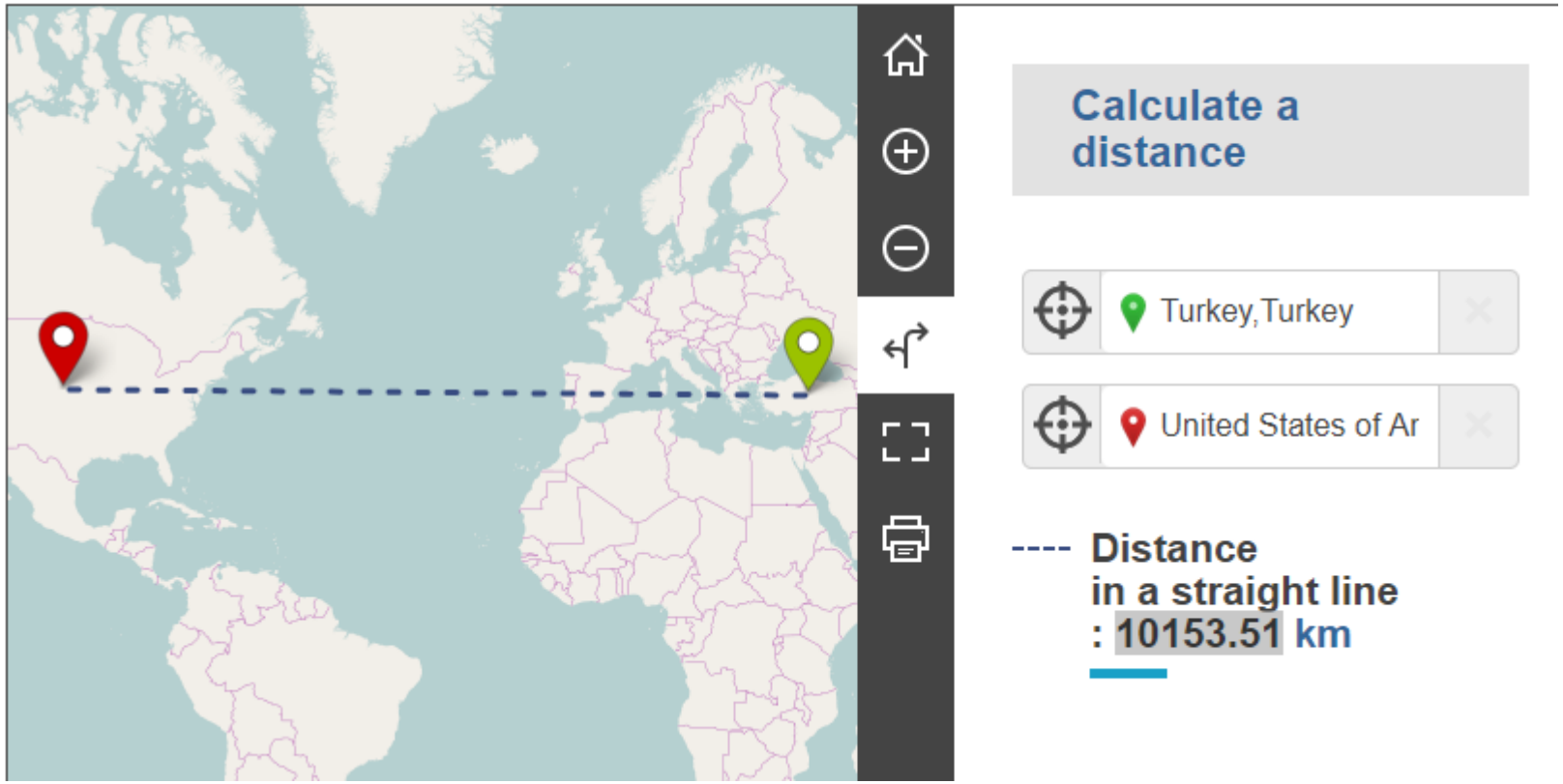


Trade Data for commodities: https://comtrade.un.org/data



Data for distance:

- https://ec.europa.eu/programmes/erasmus-plus/resources/distance-calculator_en



Gravity Model

Jan Tinbergen (1962) states that the size of bilateral trade flows between any two countries can be approximated by a law called the "gravity equation" by analogy with the Newtonian theory of gravitation.

$$M_{ij} = \frac{Y_i Y_j}{D_{ij}}$$

M_{ij}: Volume of trade from country i to country j

$Y_i Y_j$: GDP levels of country i and country j

D_{ij}: Distance between country i and country j

Gravity model suggests that bilateral trade flows are increasing in the size (GDP) of the countries involved, and decreasing in the distance between them.

Size and Trade Summary Observations for Frictionless Gravity

- bilateral trade rises with the size of either trading partner
- countries further apart trade less

Trade Compared to GDP

- Countries with the highest ratios of trade to GDP tend to be small in economic size. Countries with the lowest ratios of trade to GDP tend to be very large in economic size.
- Trade and Trade/GDP is not the same

Top 10 list	Exports of goods and services (constant 2015 US$)	2020	Exports of goods and services (% of GDP)	2020
1	United States	2.105427	Luxembourg	214.5268
2	Germany	1.587526	Hong Kong SAR, China	176.7431
3	United Kingdom	0.771112	Singapore	176.2409
4	France	0.708598	Djibouti	153.4432
5	Netherlands	0.69352	Malta	140.5805
6	Korea, Rep.	0.681978	Ireland	131.1126
7	Singapore	0.606705	Vietnam	106.1232
8	Hong Kong SAR, China	0.590884	Slovak Republic	85.7075
9	Ireland	0.549827	Belgium	80.57868
10	Italy	0.524542	Hungary	79.66272

Source: https://databank.worldbank.org/reports.aspx?source=world-development-indicators

Trade Costs

Empirical studies proxy trade costs with bilateral distance however there are several additional variables as no-frictions is not possible:

- Transportation costs
- Policy barriers (tariff and non-tariff barriers)
- Wholesale and distribution costs
- information costs (common language, other relevant cultural features such as colonial history)
- non-monetary barriers— regulation, licensing,...
- taste differences
- insecure contracts

What can be added to Gravity Model?

- language differences/similarity (dummy variables)
- former colonial ties (dummy variables)
- Population
- Trade agreements (dummy variables)
- Monetary unions (dummy variables)

- Gravity model is used for trade but also applies to migration and foreign direct investments. (physical movements can be more costly and bigger economic size can be more attractive)

Marshall-Lerner Condition

- XR↑ → TB ↑ if $\epsilon_x + \epsilon_m > 1$ (mathematical proof)

A depreciation in the currency improves TB if import and export elasticities of demand sum to more than unity.

- P_x ↓ => X ↑
- P_m ↑ => M ↓

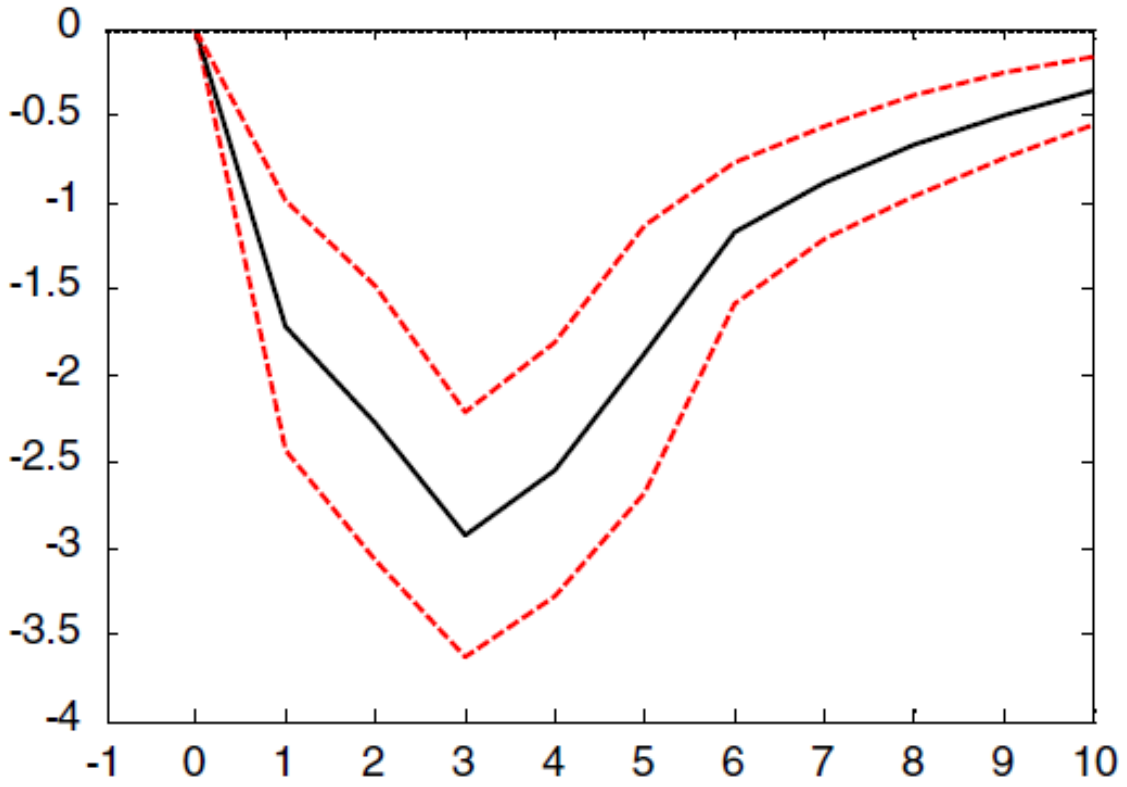
- In nominal terms: $P_m . M + P_x . X$

$\epsilon_x + \epsilon_m = 1$ => changes in XR leaves BOP unchanged

$\epsilon_x + \epsilon_m < 1$ => unstable foreign exchange market

$\epsilon_x + \epsilon_m > 1$ => stable foreign exchange market

J Curve



CA after a Depreciation Shock (Impulse Response)
Source: Kappler et al. (2013)

Empirically it is observed that trade in goods are inelastic in the short run since:

- Consumer patterns do not change easily
- Trade contracts prevents flexibility

Hence, Marshall-Lerner condition is not met and a depreciation in the currency initially leads to a deterioration in the trade balance. But in the long run it improves.

References

- Feenstra, R. C., & Taylor, A. M. (2011). Essentials of international economics. Macmillan.
- Anderson, J.E. (2019). Trade, Size, and Frictions: the Gravity Model. Lecture Notes. Retrieved from: https://cpb-us-w2.wpmucdn.com/sites.bc.edu/dist/3/78/files/2020/02/GravityNotes.pdf
- Distance calculator: https://ec.europa.eu/programmes/erasmus-plus/resources/distance-calculator_en