

ANALYSIS

August 2019

Prepared by

Steven G. Cochrane
Steve.Cochrane@moodys.com
Chief APAC Economist

Evan Karson
Evan.Karson@moodys.com
Associate Economist

Faraz Syed
Faraz.Syed@moodys.com
Economist

Contact Us

Email
help@economy.com

U.S./Canada
+1.866.275.3266

EMEA
+44.20.7772.5454 (London)
+420.224.222.929 (Prague)

Asia/Pacific
+852.3551.3077

All Others
+1.610.235.5299

Web
www.economy.com
www.moodysanalytics.com

The Ebb and Flow of Free Trade

Introduction

No matter the outcome of the trade war between the U.S. and China, global patterns of trade and investment have likely been fundamentally and permanently changed. Recently implemented tariffs between the U.S. and China will not disappear soon. The shift in foreign investment away from China toward other locations in Asia and around the world, which began before the U.S.-China trade dispute because of the rising cost of production in China, has intensified. And concerns about ownership of intellectual property and security of data will slow the pace of global trade in technology equipment and services, and perhaps even create separate standards for such industries in different parts of the world.

The Ebb and Flow of Free Trade

BY STEVEN G. COCHRANE, EVAN KARSON AND FARAZ SYED

No matter the outcome of the trade war between the U.S. and China, global patterns of trade and investment have likely been fundamentally and permanently changed. Recently implemented tariffs between the U.S. and China will not disappear soon. The shift in foreign investment away from China toward other locations in Asia and around the world, which began before the U.S.-China trade dispute because of the rising cost of production in China, has intensified. And concerns about ownership of intellectual property and security of data will slow the pace of global trade in technology equipment and services, and perhaps even create separate standards for such industries in different parts of the world.

This paper shows how the pattern of trade and the rules that have governed trade have changed dramatically over the past two years from a system that was set up shortly after World War II and that more or less thrived until the current trade war. The first section of this paper tracks the development of the global system of trade since the 1920s. The functions of the World Trade Organization and the risks facing its continued efficacy are presented in the second section. The third section describes changes in tariffs during the post-World War II period. The fourth section describes how the pattern of global trade growth has changed over the past 50 years. Finally, the paper focuses on the shift in trade policy in the U.S. and China over the past two years, specifically the abrupt rise in tariffs.

The path to free trade

There are few issues economists agree upon more than the economic benefits of free trade. However, there are few political issues as controversial as government policy toward trade. Indeed, the damage high tariffs inflicted on the world economy during the 1930s shows what can happen when governments around the world abandon free trade.¹

Protectionism in the U.S. began with the passage of the Fordney-McCumber Act in 1922, which raised the average tariff on imports to the U.S. to around 40% and led to retaliation from European governments. While the U.S. economy continued to prosper during the 1920s, improving agricultural production in Europe prompted calls to protect U.S. farmers from agricultural imports. It was not until the stock market crash of 1929, however, that increased protectionism gained enough support to lead to the passage of the Smoot-Hawley Tariff Act of 1930, which raised average tariffs an additional approximately 20%. During the four years the tariffs were in place, total trade between the U.S. and Europe plummeted.

The road toward trade liberalization began in 1934 when the U.S. reduced tariffs, but liberalization did not begin in earnest until the early post-World War II era when rising global trade was viewed as a way to accelerate postwar economic growth and to spread the benefits of economic recovery and growth. This road, however, was not always a smooth one.

In December 1945, 15 countries began talks to reduce tariffs. The group of countries grew to 23 and on October 30, 1948 agreed to a package of trade rules and

tariff concessions on \$10 billion of trade, amounting to one-fifth of global trade at the time. The General Agreement on Tariffs and Trade was born (see Table 1).

Prior to GATT, a formal charter was approved by representatives of 50 countries for an International Trade Organization that would have been a permanent companion to the World Bank and the International Monetary Fund. A number of countries, however, balked at ratifying the ITO charter and in 1950 the process came to an end when the U.S. government decided not to seek congressional approval. GATT thus remained the governing instrument for international trade for the next 45 years.

The GATT period included eight separate negotiating rounds that gradually reduced tariffs and other barriers to global trade. The first five focused solely on tariffs. The Kennedy Round (1964-1967) added anti-dumping measures, the Tokyo Round (1973-1979) included nontariff measures and broader framework agreements, and the Uruguay Round (1986-1994) included trade in services, intellectual property, and dispute settlement procedures that led to the establishment of the World Trade Organization on January 1, 1995. Today, WTO membership

¹ R. Glenn Hubbard and Anthony Patrick O'Brian, *Economics*, 4th edition (2013), p. 297.

Table 1: Timeline of GAAT and WTO Trade Negotiations

Date	Topic	Number of countries
Dec 1945	Fifteen countries began talks to reduce and bind customs tariffs.	15
Mar 1948	“Havana Charter” proposed for creation of International Trade Organization.	50
30 Oct 1948	Package of trade rules and 45,000 tariff concessions agreed to, affecting \$10 bil of trade. GATT is born.	23
1950	ITO ratification process ends in failure. GATT remains the governing instrument for international trade.	
1947	Geneva trade conference covers tariffs.	23
1949	Annecy trade conference covers tariffs.	13
1951	Torquay trade conference covers tariffs.	38
1956	Geneva trade conference covers tariffs.	26
1960-1961	Dillon Trade Round covers tariffs.	26
1964-1967	Kennedy Trade Round covers tariffs and anti-dumping measures.	62
1973-1979	Tokyo Trade Round covers tariffs, nontariff measures and “trade framework”.	102
1986-1994	Uruguay Trade Round covers tariffs, nontariff measures, rules, services, intellectual property, dispute settlement, textiles and agriculture.	123
1995	WTO established.	112
2001-present	Doha Trade Round covers lower trade barriers, revised trade rules, and improved trade with developing countries.	164

Sources: WTO, Moody's Analytics

includes 164 countries that account for 98% of international trade.

The current Doha Round (ongoing since 2001) has tried to further reform international trade through lower trade barriers and revised trade rules meant to improve the trading prospects of developing countries.

Crashing to a halt?

Over the many rounds of negotiations, the WTO has taken on two important functions: first, as a forum for permanent negotiations leading to the formation of rules of multilateral trade, and second, as a dispute settlement function when conflicts arise between member states. Both of these functions, however, are at risk.

Under the dispute settlement function, ad hoc panels issue rulings on member country compliance with their WTO rights and obligations, subject to review by a standing Appellate Body composed of seven judges. Decisions by the Appellate Body are final and binding, and generally respected by disputing parties.

The dispute mechanism is in crisis today because in the WTO's negotiation and rule-making function, WTO members have failed to negotiate updates to the rulebook, including rules on dispute

settlement itself.² In the interim, the Appellate Body must address issues raised by the initial review panel, including when facts reported by the panel are questioned. Yet the Appellate Body is prohibited from “adding or diminishing rights and privileges of WTO members.” A Peterson Institute policy brief summarizes: “The Appellate Body should not create laws for WTO members and should not become a substitute for multilateral negotiations.”

Proposals to update the rule book have come primarily, although not exclusively, from the U.S. Without agreements on rule updates, the Appellate Body increasingly renders decisions on ambiguous or incomplete WTO rules, and by WTO rules the Appellate Body's decisions are final. The U.S. charges that the Appellate Body is creating rules for the broader WTO membership, infringing on the sovereignty of WTO members.

To force a return to negotiations on trade rule updates, the U.S. has blocked appointments of Appellate Body members. Without the replacement of members completing

their terms, the Appellate Body soon will not have enough members to review cases. There have been only three members—the required minimum—since September. With terms ending for two of the remaining members on December 11, the Appellate Body will cease to function.

If this happens, there will be no appeal process, and because initial rulings by panels are not binding, a risk is run of returning the world trading system to a free-for-all in which unilateral action and retaliation once again become the norm. Thus, the long road that has created a rules-based trading system and diminished tariffs is at risk of running over a cliff and coming to an end.

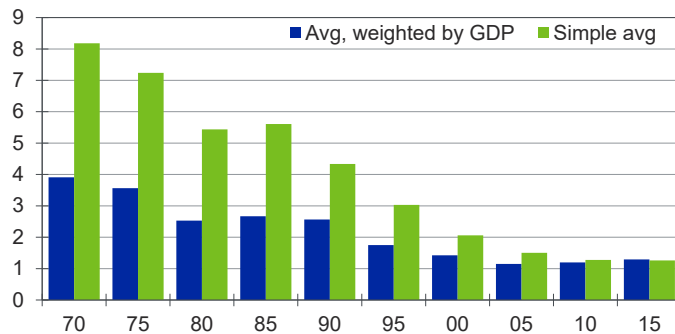
Diminished tariffs

Through the course of the many rounds of trade negotiations, effective tariff rates around the globe gradually fell. While accurate global data on tariffs do not extend back to the early days of GATT, the data do show a gradual decline in tariffs through 2010. The sharpest decline occurred from 1990 to 2000, the decade in which the WTO was established. Shortly thereafter, in December 2001, China was admitted as a member. It can be argued that the current trade dispute began at this time as foreign markets opened up to goods from China while China maintained some restrictions

² For a complete review of these issues, see “The Dispute Settlement Crisis in the World Trade Organization: Causes and Cures” by Tetyana Payosova, Gary Clyde Hufbauer, and Jeffrey J. Schott, Peterson Institute for International Economics Policy Brief 18-5, March 2018. <https://www.piie.com/system/files/documents/pb18-5.pdf>

Chart 1: Global Tariffs Fall Over Time

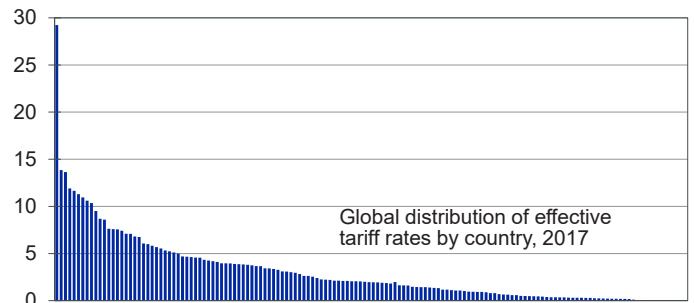
Total tariff revenue, % of total imports



Sources: National statistical offices, OECD, IMF, World Bank, Moody's Analytics

Chart 2: Effective Tariff Rates Mostly Low

Total tariff revenue, % of total value of imports



Sources: National statistical offices, OECD, IMF, World Bank, Moody's Analytics

on foreign firms opening and operating in China.

Using a subset of 31 countries that have data back to 1970, which account for about 70% of GDP of all the countries in the Moody's Analytics tariff dataset, the global average effective tariff rate fell from 8.2% in 1970 to 1.3% in 2015 (see Chart 1).³ Using a weighted average based on GDP, the decline is less dramatic but still significant, from 3.9% to 1.3%, since many smaller countries had higher tariffs in 1970. The range of effective tariff rates has narrowed considerably since then.

The path over the past 50 years to lower tariffs was not a smooth one nor was it guaranteed. A sharp decline in tariffs occurred from 1975 to 1980 coinciding with the Tokyo Round of negotiations that brought 102 countries into GATT, compared with the 62 countries that agreed to the previous Kennedy Round that ended in 1967. However, from 1980 to 1985 average effective tariffs rose. After 1985 tariffs resumed their long-term decline, when the Uruguay Round of negotiations brought the number of GATT member countries up to 123. The current Doha Round, launched in 2001, resulted in further tariff declines through 2005 as many developing nations joined this latest round.

Following the financial crisis, there was again a slight retrenchment, at least as measured by the unweighted effective tariff rate, which rose slightly in 2010. But essentially,

the global effective tariff rate held fairly steady at just over 1% until the opening salvos of the U.S.-China trade dispute.

Although tariffs have fallen considerably over the past 50 years, they are still far from uniform (see Chart 2). In 2017 the highest effective tariff rate across the 163 countries for which Moody's Analytics has data ranged from 29% for Botswana and from 10% to 14% for Ethiopia, Namibia, Bangladesh, Benin, The Bahamas, Solomon Islands, Uganda and Burkina Faso. At the low end, much of Europe, as well as Hong Kong, the UAE, and several African countries have rates at less than 0.5%. The U.S. had a rate in 2017 of 1.3%; China's was 2% (see Table 2). The simple average across all countries in 2017 was 3.1%. The weighted average was 1.6%.

By income group, low-income countries have the highest effective tariff rates, exceeding 6% (see Table 3). As incomes rise, tariff rates generally fall. The members of the generally high-income OECD have an average rate of 0.7%.

By geographic region, the pattern is similar with average effective tariffs ranging from 6.1% in South Asia to a very small 0.3% in the EU. Because much of EU trade is intra-regional and not subject to tariffs, it should be no surprise that the EU's rate is the lowest. But it does exemplify the fact that the EU is a large free-trade association. If the free traders are in Europe, followed closely by North America (through 2017), then the greatest trade barriers via tariffs are in South Asia and in

Sub-Saharan Africa. East Asia is in the middle of the pack. Its 3.5% rate is weighted heavily by China.

Bilateral tariffs also explain some of the origin of current U.S. trade complaints. Data from the World Bank's WITS trade statistics⁴ show that, prior to the trade war, China imposed higher tariffs on imports from the U.S. than the U.S. imposed on imports from China. In 2017, the effective tariff rate in China on U.S. goods was 6.3% while the U.S. rate on goods from China was 2.6%. Some of this difference arises from China's designation as a developing country, which allows it, under WTO rules, to protect certain industries. The Trump administration has recently proposed that China be designated as a developed country.

To a lesser extent, the pattern with the European Union is the same. The EU's effective tariff on U.S. imports stood at 2% in 2017, versus 1.4% levied by the U.S. on goods from the EU. This is partly because of the EU's protection of its agriculture industry.

Trade patterns over time

Patterns of industrial production and merchandise trade have varied over the past two business cycles (see Chart 3). The period of 2002 to 2008 marked a strong period of growth, with global industrial production growing on average by 3.4% year to year and global merchandise trade by 6.8%. The

3 Effective tariffs are defined as the total annual revenue from trade tariffs divided by total value of imports.

4 The World Bank's World Integrated Trade Solution combines data from the United Nations Statistical Division, UNCTAD, WTO, and the World Bank on trade and tariffs. See: <https://wits.worldbank.org/Default.aspx?lang=en>.

Table 2: Global Effective Tariff Rates, 2017*Total tariff revenue, % of value of total imports*

Rank	Country	Effective tariff rate	Rank	Country	Effective tariff rate	Rank	Country	Effective tariff rate
1	Botswana	29.2	48	St Kitts and Nevis	3.7	97	Timor-Leste	0.9
2	Ethiopia	13.9	49	New Zealand	3.4	98	Peru	0.9
3	Namibia	13.6	50	South Africa	3.4	99	Albania	0.9
4	Bangladesh	11.9	51	Trinidad and Tobago	3.4	100	Canada	0.8
5	Benin	11.7	52	Paraguay	3.3	101	Bhutan	0.8
6	Bahamas, The	11.3	53	World (simple avg)	3.1	102	Iraq	0.7
7	Solomon Islands	11.0	54	Russian Federation	3.1	103	Mexico	0.7
8	Uganda	10.6	55	Mongolia	3.0	104	Chile	0.6
9	Burkina Faso	10.4	56	Burundi	3.0	105	United Kingdom	0.6
10	Sri Lanka	9.5	57	Dominican Republic	2.8	106	Spain	0.6
11	Nepal	8.7	58	Armenia	2.6	107	Italy	0.5
12	Ecuador	8.6	59	Lao PDR	2.6	108	Iceland	0.5
13	Kenya	7.6	60	Angola	2.6	109	Netherlands	0.5
14	Fiji	7.6	61	Sierra Leone	2.4	110	Mauritius	0.5
15	Cameroon	7.6	62	Zambia	2.3	111	Belgium	0.5
16	Belize	7.4	63	Colombia	2.2	112	Germany	0.4
17	Palau	7.1	64	Kiribati	2.2	113	Malaysia	0.4
18	Philippines	7.1	65	Kazakhstan	2.1	114	Poland	0.4
19	Vanuatu	6.8	66	Micronesia, Fed Sts	2.1	115	France	0.4
20	India	6.8	67	Seychelles	2.1	116	Greece	0.4
	China (Jul 2019)	6.5	68	Lebanon	2.1	117	Sweden	0.3
21	Senegal	6.1	69	Mozambique	2.1	118	Norway	0.3
22	Togo	6.0	70	Kuwait	2.1	119	Denmark	0.3
23	Rwanda	5.8	71	Azerbaijan	2.0	120	Georgia	0.3
24	Afghanistan	5.7	72	China (2017)	2.0	121	Switzerland	0.3
25	Samoa	5.5	73	Morocco	2.0	122	Latvia	0.3
26	St Lucia	5.3	74	Uzbekistan	1.9	123	Croatia	0.3
27	Liberia	5.2	75	Myanmar	1.9	124	Austria	0.3
28	Ghana	5.1	76	El Salvador	1.9	125	Portugal	0.2
29	Marshall Islands	5.0	77	Costa Rica	1.9	126	Czech Republic	0.2
30	Mali	4.7	78	Jordan	1.8	127	Estonia	0.2
31	Maldives	4.7	79	Tunisia	1.6	128	Hong Kong SAR, China	0.2
32	Argentina	4.6	80	Guatemala	1.6	129	Finland	0.2
33	Kyrgyz Republic	4.6	81	Belarus	1.6	130	Hungary	0.2
34	Venezuela, RB	4.6	82	Turkey	1.5	131	Slovenia	0.2
	United States (Jul 2019)	4.5	83	Korea, Rep	1.4	132	Slovak Republic	0.2
35	Jamaica	4.3	84	Ukraine	1.4	133	Ireland	0.1
36	Brazil	4.3	85	Indonesia	1.4	134	Luxembourg	0.0
37	Malawi	4.2	86	Honduras	1.4	135	Bosnia and Herzegovina	0.0
38	St Vincent and the Grenadines	4.1	87	Oman	1.4	136	Bulgaria	0.0
39	West Bank and Gaza	4.0	88	United States (2017)	1.3	137	Uruguay	0.0
40	Egypt, Arab Rep	4.0	89	Nicaragua	1.2	138	Barbados	0.0
41	Antigua and Barbuda	3.9	90	Macedonia, FYR	1.2	139	Romania	0.0
42	Grenada	3.9	91	Japan	1.1	140	Panama	0.0
43	Bolivia	3.9	92	Bahrain	1.1	141	Cyprus	0.0
44	Dominica	3.8	93	Thailand	1.1	142	United Arab Emirates	0.0
45	Niger	3.8	94	Moldova	1.0	143	Cote d'Ivoire	0.0
46	Australia	3.8	95	Israel	1.0	144	Cabo Verde	0.0
47	Cambodia	3.7	96	Equatorial Guinea	0.9	145	Congo, Dem Rep	0.0

Sources: National statistical offices, OECD, IMF, World Bank, Moody's Analytics

Chart 3: A Shift in Trend in November 2018

Global trade and industrial production, % change yr ago



Sources: CPB World Trade Monitor, Moody's Analytics

subsequent period was much slower by both measures—1.9% for IP and 2.4% for trade.

This should be no surprise, as 2002 to 2008 was a period of strong growth in both developed and developing countries. Further, the pace of global trade vastly outpaced IP during this period as supply chains were established linking countries with low labor costs with wealthier developed economies.

The current business cycle since 2009 is characterized by slower growth. Developing economies grew rapidly after 2009 but developed economies, particularly in North America and Europe, struggled to emerge from the financial crisis of 2008.

imposed a 10% tariff on \$200 billion worth of imports from China. It is difficult to draw a direct line between the tariffs and the shift in global IP and trade growth, but global production has slowed to an average of 1.4% per month through May of this year and global trade has nearly leveled off, averaging just 0.2% year-to-year growth through May. While this period is short, it is the first time since 2002 in which trade growth was slower than global IP growth and the economy was not in recession.

A new world of trade

The trade negotiations between the U.S. and China have reversed the long postwar trend of falling tariffs and the opening of global markets. This process began in May 2017 when the U.S. submitted so-called safeguard investigations to the WTO for large residential washers and crystalline silicon photovoltaic cells used in solar power generation systems. Under WTO rules, member states may take temporary action to restrict imports of a product to protect a specific domestic industry from an increase in

imports of any product that is causing or threatening to cause, serious injury to the industry.⁵ Safeguard measures were always available under the GATT, but they were infrequently used. Their use was high in 2002 and rose again from 2009 to 2014; both were periods of slow global economic growth (see Chart 4).

Since the WTO began regulating safeguard measures in 1995, there have been 347 measures initiated by 52 countries. India and Indonesia, two of the most protected economies in the world, are the most frequent users of safeguard tariffs (see Chart 5). The U.S. ranks ninth for safeguard initiatives among WTO members. The two initiatives filed in 2017—for washing machines and solar cell components—marked a change in policy, however; they were the first filed by the U.S. since 2001.

The WTO Safeguards Agreement prohibits so-called gray area protection measures such as “voluntary” export restrictions, and sets time limits on all safeguard actions—usually four years during which the tariff rates steadily diminish.

Safeguard tariffs do not target specific countries. The tariffs on large washers, however, primarily hit South Korea, and the photovoltaic cell tariffs largely hit China and Malaysia, where many Chinese producers had tried to circumvent earlier tariffs. Both of these tariffs went into effect in February 2018 (see Chart 6).

Tariffs on steel and aluminum followed shortly thereafter. With each safeguard tariff, the effective tariff rate rose modestly, rising above 2% of total import value after the U.S. imposed its first bilateral tariffs on imports from China in late 2018. The U.S. effective tariff rate jumped above 3% when a 10% tariff was placed on an additional \$200 billion of imports from China, and reached nearly 4.5% when that tariff rate was raised to 25% in May of this year.

Retaliation by China of tariffs on imported goods from the U.S. has brought up its effective tariff rate as well. China's effective tariff rate has been higher than the U.S. over the

Table 3: Effective Tariff Rates by Country Aggregates

Total tariff revenue, % of value of total imports

	Number of countries	Effective tariff rate
By income group		
Low	16	6.3
Middle	77	3.5
High	50	1.2
OECD members	35	0.7
By geographic group		
South Asia	7	6.1
Sub-Saharan Africa	28	5.6
East Asia & Pacific	23	3.5
Latin America & Caribbean	29	3.2
Middle East & North Africa	12	1.7
U.S. and Canada	2	1.0
European Union	26	0.3

Sources: National statistical offices, OECD, IMF, World Bank, Moody's Analytics

⁵ WTO safeguard measures: https://www.wto.org/english/tratop_e/safeg_e/safeg_e.htm#statistics

Chart 4: Safeguard Tariffs Pick Up Again

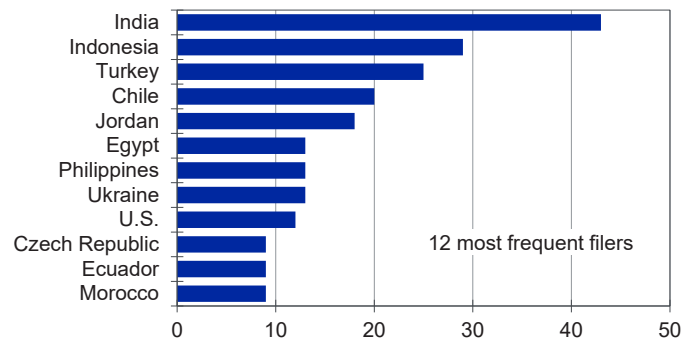
Number of safeguard investigations initiated by WTO members



Sources: WTO, Moody's Analytics

Chart 5: Safeguard Tariffs Widely Used

Number of safeguard initiatives filed with WTO, 1995 to 2018



Sources: WTO, Moody's Analytics

past 20 years (see Charts 7 and 8). It has risen from the close to 2% rate that prevailed between 2005 and 2017 to about 6.5% today.

There is no clear end to the trade dispute between the U.S. and China. Indeed, the U.S. has threatened to raise tariffs to 25% on the remaining more than \$300 billion of imports from China that are not yet subject to this rate if an agreement is not reached soon between the two countries. President Trump announced on August 1 that a first round of such tariffs at a 10% rate will take effect on September 1. This will bring the U.S. effective tariff rate from 4.5% to 5.4%. China would certainly retaliate with further tariffs and nontariff measures, although only a small range of imported goods from the U.S. could be made subject to higher tariffs. If the U.S. plays its final hand, raising the tariff from 10% to 25% on the more than \$300 billion of imports from China, this "full trade war" scenario would see the U.S. and China enter into an

entirely new world of trade with effective tariff rates of 7% and 12%, respectively.

It is indeed a new world when effective tariffs in the world's two largest economies are higher than the average tariff rates in South Asia and Sub-Saharan Africa. If the full trade war comes to pass, U.S. trade policy will hark back to the protectionist period during the early years of the Great Depression. The proposed tariffs, which remain largely targeted at China, would not take U.S. trade policy back to the days of the Fordney-McCumber or Smoot-Hawley tariffs. But if tariffs became a regular part of the U.S. foreign policy arsenal against friend and foe alike, it would not take long to enter a dark period much like the one that followed the change in U.S. trade policy in 1930.

Methodology

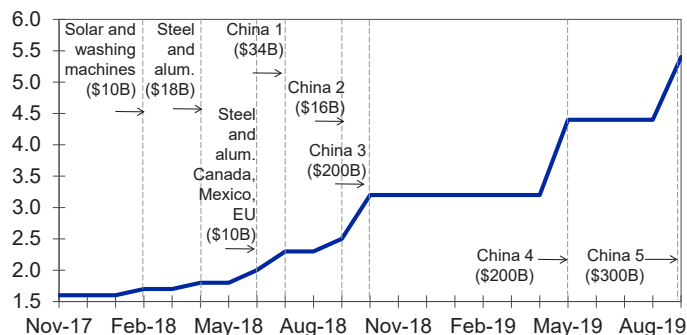
The metric used by Moody's Analytics for the effective tariff rate combines data

on tariff revenues and imports to better understand patterns in trade policies across countries and shed light on how protectionist trade policies ebb and flow over time. This measure is calculated by computing tariff revenues as a percentage of total imports. Effective tariff rates have a theoretical lower bound of zero and have no upper bound—scores in the dataset range as high as 150%.

The value of an effective tariff statistic depends on its ability to measure the tax rate a nation charges on goods and services crossing its borders from abroad. The Moody's Analytics measure provides a straightforward calculation of such revenue collections and strictly considers the funds that change hands from importers to government coffers. In contrast to other statistics, this method abstracts from the byzantine records of product-level tariff rates that countries report to the WTO, which do not always reflect the actual tariffs applied.

Chart 6: The Trade War Intensifies

U.S. effective tariff rate, %



Sources: Census Bureau, USTR, USITC, Moody's Analytics

Chart 7: The U.S. Breaks From History...

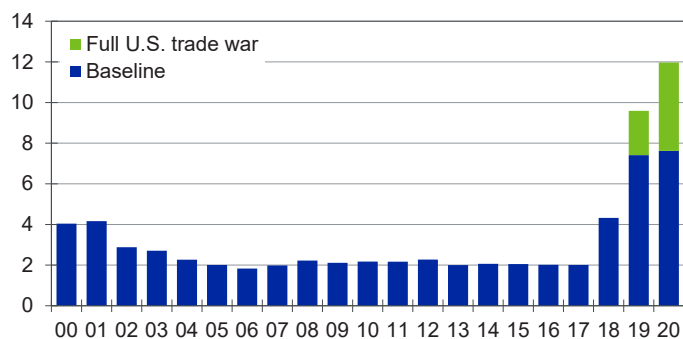
U.S. effective tariff rate, %



Sources: Census Bureau, USTR, USITC, World Bank, Moody's Analytics

Chart 8: ...And China Follows Suit

China effective tariff rate, %



Sources: World Bank, China National Bureau of Statistics, Moody's Analytics

customs revenue from that product, and the Moody's Analytics statistic would not include any information on those duties nor would it reflect the extreme tariff rate. However, this feature of the methodology is expected to have trivial effects on the dataset.

The GFSY offers the widest sample of countries. Moody's Analytics utilized data from the OECD when available since it made it possible to construct longer time series for developed nations. Last, data were collected from the statistical bureaus of individual countries to fill gaps in the panel. The dataset comprises information on 163 countries with observations beginning as early as 1960 for some countries and ending in 2017.

After building its comprehensive panel, Moody's Analytics constructed a subset of 31 countries with consistent observations from 1970 to the present to better examine intertemporal changes in the global effective tariff rate. Working with a fixed panel provides a global average that is unaffected by changes stemming from entry into or exit from the overall sample. On average, this panel of countries accounts for 70% of world GDP.

The Moody's Analytics method does not capture tariff rates levied on goods that a country does not import. For example, if a country raises a product's tariff rate to a level that reduces imports to zero, the country would no longer receive any

Historical series in this panel dataset originate from three different sources:

1. The IMF's Government Finance Statistics Yearbook
2. The OECD
3. National statistical bureaus

About the Authors

Steven G. Cochrane is chief APAC economist with Moody's Analytics. He leads the Asia economic analysis and forecasting activities of the Moody's Analytics research team, as well as the continual expansion of the company's international, national and subnational forecast models. In addition, Steve directs consulting projects for clients to help them understand the effects of regional economic developments on their business under baseline forecasts and alternative scenarios. Steve's expertise lies in providing clear insights into an area's or region's strengths, weaknesses and comparative advantages relative to macro or global economic trends. A highly regarded speaker, Dr. Cochrane has provided economic insights at hundreds of engagements over the past 20 years and has been featured on Wall Street Radio, the PBS News Hour, C-SPAN and CNBC. Through his research and presentations, Steve dissects how various components of the macro and regional economies shape patterns of growth. Steve holds a PhD from the University of Pennsylvania and is a Penn Institute for Urban Research Scholar. He also holds a master's degree from the University of Colorado at Denver and a bachelor's degree from the University of California at Davis. Dr. Cochrane is based out of the Moody's Analytics Singapore office.

Evan Karson is an associate economist at Moody's Analytics. He covers the economies of Hungary, Kenya, Delaware, Kentucky and several U.S. metro areas. Before his work with Moody's Analytics, Evan served as a senior research associate at the Federal Reserve Bank of St. Louis, where he studied the effects of unconventional monetary policy. Evan graduated cum laude from Washington University in St. Louis, where he received a bachelor's degree in economics. His honors thesis focused on financial inclusion and analyzed the determinants of bank account ownership rates across the U.S.

Faraz Syed is an economist in the Sydney office of Moody's Analytics. Faraz leads the modeling for the CoreLogic-Moody's Analytics Australian Home Value Index forecasts, and is responsible for leading the research on Australia's housing market. Faraz also leads the research, modeling and forecasting for Japan and India. Faraz's research focuses on key macroeconomic issues, along with using econometric models to shed light on various thematic issues. He is a key contributor in showcasing the Moody's Analytics Global Macroeconomic Model. He is also a regular contributor to Economy.com and is quoted by international news media such as CNBC, Bloomberg, the Wall Street Journal and Financial Times. He previously worked as an analyst at the Australian Bureau of Agricultural Resources, Economics and Sciences, where he was responsible for exchange rate forecasting and economic analysis on Australia's key trading partners. Faraz received his bachelor's degree in economics (honours) from Macquarie University, and is working on his master's degree with a major in econometrics.

About Moody's Analytics

Moody's Analytics provides financial intelligence and analytical tools supporting our clients' growth, efficiency and risk management objectives. The combination of our unparalleled expertise in risk, expansive information resources, and innovative application of technology helps today's business leaders confidently navigate an evolving marketplace. We are recognized for our industry-leading solutions, comprising research, data, software and professional services, assembled to deliver a seamless customer experience. Thousands of organizations worldwide have made us their trusted partner because of our uncompromising commitment to quality, client service, and integrity.

Concise and timely economic research by Moody's Analytics supports firms and policymakers in strategic planning, product and sales forecasting, credit risk and sensitivity management, and investment research. Our economic research publications provide in-depth analysis of the global economy, including the U.S. and all of its state and metropolitan areas, all European countries and their subnational areas, Asia, and the Americas. We track and forecast economic growth and cover specialized topics such as labor markets, housing, consumer spending and credit, output and income, mortgage activity, demographics, central bank behavior, and prices. We also provide real-time monitoring of macroeconomic indicators and analysis on timely topics such as monetary policy and sovereign risk. Our clients include multinational corporations, governments at all levels, central banks, financial regulators, retailers, mutual funds, financial institutions, utilities, residential and commercial real estate firms, insurance companies, and professional investors.

Moody's Analytics added the economic forecasting firm Economy.com to its portfolio in 2005. This unit is based in West Chester PA, a suburb of Philadelphia, with offices in London, Prague and Sydney. More information is available at www.economy.com.

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). Further information is available at www.moodyanalytics.com.

DISCLAIMER: Moody's Analytics, a unit of Moody's Corporation, provides economic analysis, credit risk data and insight, as well as risk management solutions. Research authored by Moody's Analytics does not reflect the opinions of Moody's Investors Service, the credit rating agency. To avoid confusion, please use the full company name "Moody's Analytics", when citing views from Moody's Analytics.

About Moody's Corporation

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). MCO reported revenue of \$4.4 billion in 2018, employs approximately 13,100 people worldwide and maintains a presence in 42 countries. Further information about Moody's Analytics is available at www.moodyanalytics.com.

© 2019 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND ITS RATINGS AFFILIATES ("MIS") ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MOODY'S PUBLICATIONS MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL, FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS OR MOODY'S PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing the Moody's publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY SUCH RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any rating, agreed to pay to Moody's Investors Service, Inc. for appraisal and rating services rendered by it fees ranging from \$1,500 to approximately \$2,500,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody's.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors. It would be reckless and inappropriate for retail investors to use MOODY'S credit ratings or publications when making an investment decision. If in doubt you should contact your financial or other professional adviser.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any rating, agreed to pay to MJKK or MSFJ (as applicable) for appraisal and rating services rendered by it fees ranging from JPY200,000 to approximately JPY350,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.