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The Strange and Futile World of Trade Wars

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Since the 2016 Presidential election, international trade policy has been daily fodder for front-page news coverage and has contributed to heightened volatility in financial markets. Though both major candidates in that election promised some revision of trade policy, the winner took the more extreme position, actually promising a trade war. Since the election, he has clearly shown that he considers there to be continuing political and/or economic benefits from prosecuting that war.[1]

It is likely that President Trump, many of his closest advisers, and his strongest supporters sincerely believe that trade is like a real war—or a zero-sum game—in which any gains to winners are losses to losers. Such mistaken notions have afflicted many sovereigns and elected officials throughout history. Indeed, they had their greatest influence during Western Europe's mercantilist era from the 16th to the 18th centuries, when most nations thought their wealth depended on encouraging exports, restraining imports, and therefore engaging in colonial expansion of their territories.[2] Modern mercantilists' views about international trade—particularly the U.S. external balance (variously termed "trade balance," or more broadly, the "current account balance")—are equally simple-minded and misinformed: an external balance that is in deficit is *per se* bad; what's more, it is a malady deliberately inflicted by foreigners who further their own ends by manipulating exchange rates, imposing tariff and non-tariff barriers, stealing intellectual property, and engaging in an untold number of other unfair trade practices.

Part of the popular appeal of this mercantilist view of international trade and external accounts—whose followers are legion—is rooted in its analogy with how individual businesses operate. Most healthy businesses generate positive free cash flows—that is, revenues exceed costs and other outlays. If a business is not able to generate positive free cash flows on a sustained basis, or to raise outside capital to finance its current operating cash flow deficit, then it will eventually be forced to declare bankruptcy. Many in business naturally employ this general free-cash-flow template when they think about the economy and its external balance. For them, a negative external balance for the nation is equivalent to a negative cash flow for a firm. In both cases, more cash is going out than coming in. But this line of thinking is fallacious. Indeed, it represents a classic fallacy of composition,[3] or the belief that what is true of a part (a business) is true for the whole (the economy).

In reality, the negative external balance in the United States is not a problem and is not caused by foreigners engaging in nefarious activities. As we will show, the U.S.A.'s negative external balance, which the country has registered every year since 1975, is made in the U.S.A. and is a result of a combination of its fiscal profligacy and a savings deficiency.

Of course, when it comes to any nation's balance of trade, it is not only those in business who hold the view that a negative external balance is bad. Large segments of the general public also harbor this neo-mercantilist mentality.[4] This, in part, results from the press coverage of international trade and the external balance. Given the press's penchant for spectacular "sky-is-falling" stories, chronic external deficits—surely a sign of impending doom—are an inviting target.[5] So, the general public is fed a steady stream of stories that frame

*The authors thank Stephen J.K. Walters and Christopher Arena for comments on an earlier draft of this paper.

1 See, e.g.: Reuters, "Trump tweets: 'Trade wars are good and easy to win,'" March 2, 2018, at: https://www.reuters.com/article/us-usa-trade-trump/trump-tweets-trade-wars-are-good-and-easy-to-win-idUSKCN1GE1E9.

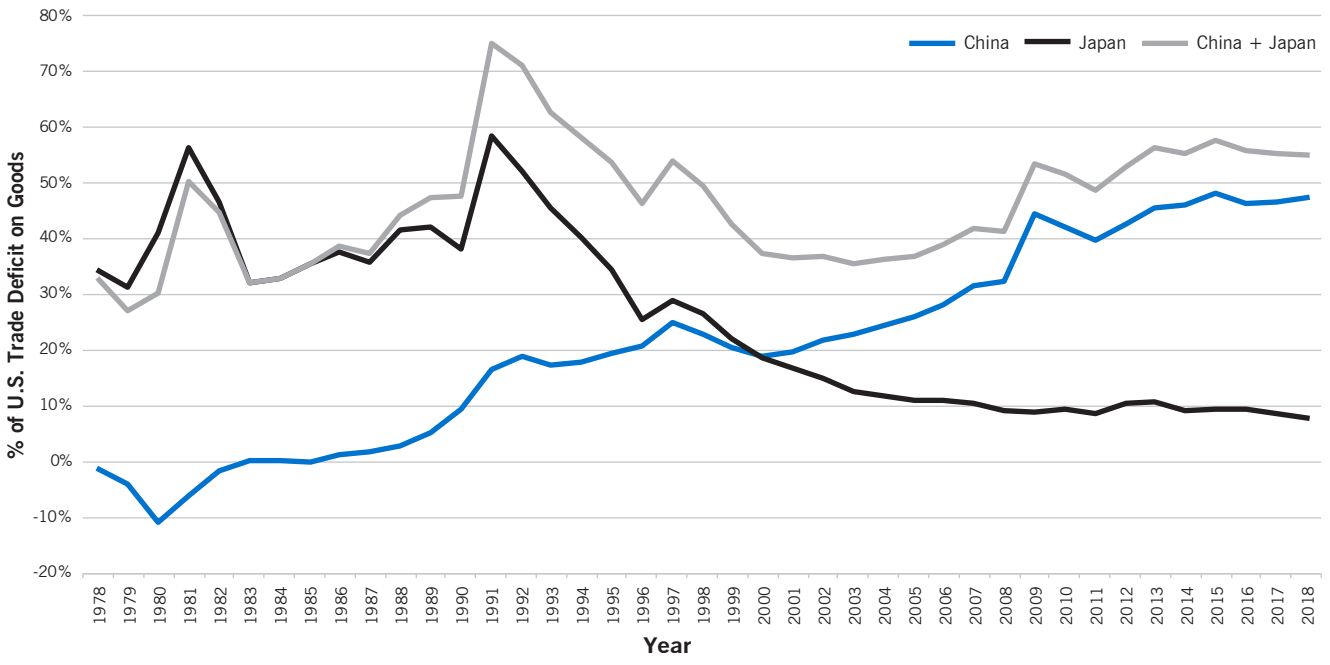
2 Lionel Robbins, *A History of Economic Thought: The LSE Lectures*, edited by Steven G. Medema and Warren J. Samuels, Princeton, NJ: Princeton University Press, 1998, pp. 46-54.

3 Thomas Sowell, *Economic Facts and Fallacies*, New York: Basic Books, 2008.

4 Alexandra Guisinger, *American Opinion on Trade: Preferences Without Politics*, New York: Oxford University Press, 2017, p. 199.

5 Guisinger 2017, p. 179.

Figure 1
Contribution to U.S. Trade Deficit



Source: U.S. Department of Commerce - Bureau of Economic Analysis.

the U.S.A.'s negative external balance as an undesirable and, indeed, dangerous phenomenon. In this article, we demonstrate that external balances—that is to say, the U.S. current account balance—are the result of *domestic*—not foreign—economic activity. Our demonstration rests on a classic trade identity and supporting empirical evidence.

Japan and China: Washington's Favorite Whipping Boys on Trade

For the neo-mercantilists, the biggest "trade troublemakers" for the U.S. in recent decades have been Japan and China, the two largest contributors to the U.S. trade deficit. As indicated in Figure 1, trade with Japan accounted for the lion's share of the U.S. trade deficit during the 1980s and 1990s, with peaks of 56.4% of the total in 1981 and 58.4% in 1991. The neo-mercantilists' general argument was captured at the time by a *Business Week* cover story: "America's Hidden Problem: The Huge Trade Deficit is Sapping Growth and Exporting Jobs" (August 29, 1983).

Since the 1990s, China has overtaken Japan as a source of the U.S. trade "imbalance." As shown in Table 1, its share of America's trade deficit is now many times greater than that of any other country. China accounts for 48.0% of the total deficit, followed by Mexico (9.2%), Germany (7.8%), and Japan (7.7%).

Faced with those significant contributions—first by Japan and then China—the neo-mercantilists, in an attempt to correct "the problem," struck back. The most remarkable reaction was by the Reagan administration. There was virtually no mention of international trade in the economic policy transition blueprint that was prepared prior to President Reagan's first term.[6] But shortly after Reagan's inauguration in 1981, questions arose about how the administration would deal with Japan's "unfair" trade practices and its outsized contribution to the U.S. trade deficit. In response, the Reagan administration, led by Trade Representative William Brock, drafted a "Statement on U.S. Trade Policy." Last minute intervention by the free-trade coalition within the administration—the Treasury, the Office of Management and Budget, and the Council of Economic Advisers (CEA)—ensured that the eventual policy statement was broadly free-market and consistent with the President's campaign promises.[7]

When it ultimately came to the implementation of trade policies, however, Japan was seen as an enemy that had to be dealt with—and it was.[8] Remember that in 1981 the U.S.

6 Ronald Reagan, *America's New Beginning: A Program for Economic Recovery*, Washington, D.C.: Government Printing Office, 1981.

7 William A. Niskanen, *Reaganomics: An Insider's Account of the Policies and the People*, New York: Oxford University Press, 1988, p. 138.

8 Douglas A. Irwin, *Clashing over Commerce: A History of US Trade Policy*, Chi-

Table 1

Table 1: Major Contributors to U.S. Trade Deficit in 2018

Country	% of U.S Trade Deficit
China	48.0%
Mexico	9.2%
Germany	7.8%
Japan	7.7%
Ireland	5.3%
Vietnam	4.5%
Italy	3.7%
Malaysia	3.0%
India	2.4%
Thailand	2.2%
Canada	2.2%
Switzerland	2.2%
Korea, South	2.0%
France	1.8%
Taiwan	1.7%
Russia	1.6%
Indonesia	1.4%
Iraq	1.2%
Saudi Arabia	1.2%
Austria	1.1%
Israel	0.9%
Venezuela	0.8%
Sweden	0.7%

Source: U.S. Department of Commerce - Census Bureau.

was running a very large trade deficit, and Japan accounted for almost 60% of the total. The U.S. dealt with imports of Japanese automobiles immediately. In the face of great pressure, the Japanese agreed to a voluntary restraint agreement (VRA) to limit the export of their cars to the U.S. The Japanese VRAs on auto exports imposed costs on U.S. consumers of more than $1.1 billion per year, which amounted to about $240,000 for each job saved in the domestic auto industry. In Japan, however, the VRAs turned out to be a boon for Japanese companies: under the VRAs, Japanese automakers filled their U.S. export quota with higher-end cars that carried higher price tags and delivered larger profit margins.[9]

Washington also ramped up pressure on Japan to appreciate the yen relative to the dollar. An ever-appreciating yen would, according to its advocates, reduce Japan's contribution to America's trade deficit. The Japanese caved under this pressure, and the yen appreciated, moving from 360 to the greenback in 1971 to 80 in 1995. But this massive yen appreciation did not put a dent in Japan's exports to the U.S., with Japan contributing more than any other country to the U.S. trade deficit until 2000 (see Figure 1). Moreover, in April 1995, Secretary of the Treasury Robert Rubin belatedly realized that the yen's great appreciation was causing the Japanese economy to sink into a deflationary quagmire. As a consequence, the U.S. stopped bashing the Japanese government about the value of the yen, and Secretary Rubin began to invoke his now-famous strong-dollar mantra.[10]

While Washington's rhetoric towards Japan's trade practices was one-sided and decidedly negative—Japan was presumed guilty of under-handed trade tactics—hardly a word was uttered in public about U.S. trade practices. However, there was plenty that was being uttered within the confines of the administration. One of us (Hanke) was staffing the Japanese trade portfolio at the Council of Economic Advisers. At every occasion possible, the CEA urged the U.S. to drop trade barriers that were actually *restricting U.S. exports* to Japan. Specifically, the CEA argued that the restrictions on the export of Alaskan oil to Japan and the bans on the export of logs cut on federal lands should be lifted.[11] On these two issues, the CEA's position was the one embraced by unilateral free traders.

The definitive account of the Reagan administration's trade policies[12] was penned by William A. Niskanen, who was fired as Chief Economist at the Ford Motor Company because he publicly opposed the U.S. government's efforts to restrict the importation of Japanese cars.[13] As a prominent member of President Reagan's Council of Economic Advisers,[14] Niskanen's summary is stunning: "Trade policy in the Reagan administration is best described as a strategic retreat. The consistent goal of the president was free trade, both in the United States and abroad. In response to domestic political pressure, however, the administration imposed more new restraints on trade than any administration since Hoover. A strategic retreat is regarded as the most difficult military maneuver and may be better than the most likely alternative, but it is not a satisfactory outcome."[15]

cago: University of Chicago Press, 2017, pp 565-624.

9 Niskanen 1988, p. 140.

10 Ronald I. McKinnon, *Exchange Rates under the East Asian Dollar Standard: Living with Conflicted Virtue*, Cambridge, MA: MIT Press, 2005, p. 152.

11 Steve H. Hanke, "U.S.-Japanese Trade: Myths and Realities," *Cato Journal*, winter 1983/84, vol. 3, no. 3, pp. 757-775.

12 Niskanen 1988.

13 Robert L. Simison, "Ford Fires an Economist," *Wall Street Journal*, July 30, 1980.

14 One of us was a long-time colleague and collaborator of Niskanen (Steve H. Hanke, "William A. Niskanen: In Memoriam," *Cato Policy Report*, January/February 2012, vol. 34, no. 1., pp. 4-5.) and was responsible for the part of the Japanese trade portfolio at the council (Steve H. Hanke, "U.S.-Japanese Trade: Myths and Realities," Cato Journal, winter 1983/84, vol. 3, no. 3, pp. 757-775.).

15 Niskanen 1988, p. 137.

After the Reagan administration's confrontations with Japan in the 1980s, discussion of international trade issues became less heated (with the exception of the rhetoric of third-party Presidential candidates Ross Perot in 1992 and 1996 and Patrick Buchanan in 2000) and policy generally favored the elimination of trade barriers.[16]

Of course, that all changed with the arrival of President Trump and his entourage of neo-mercantilists. By the time the Trump administration took office, China had overtaken Japan as the major contributor to the U.S. trade deficit. Today, China's 48% share of the total U.S. trade deficit dwarfs Japan's 7.7%. So, given President Trump's mercantilist mentality, he has taken aim at China. The President has imposed tariffs and quotas on virtually everything under the sun.[17] He has even gone so far as to "order" U.S. companies to stop doing business in China under the questionable cover of the International Emergency Economic Powers Act of 1977.[18] As a consequence, the U.S. is deeply engaged in a trade war with China. Remarkably, however, this war has generated nothing in the way of reductions in the total trade deficit; in fact, the overall U.S. trade deficit has increased significantly since the arrival of the Trump administration.[19] As Figure 1 shows, China's share of that increased deficit has also slightly increased. Let us now turn to an analysis of why this trade war cannot be won.

The Savings-Investment Gap Determines the External Balance

To truly understand trade issues and fluctuations in the external balance, one must focus on the domestic economy rather than things foreign such as exchange rates, trade agreements, or the tariffs and regulations of other countries. That is because, strange as it may seem, the external balance is homegrown; it is produced by the relationship between domestic savings and domestic investment. Foreigners come into the picture only through the "backdoor" in the sense that countries that run external balance deficits must finance them by borrowing from countries that run external balance surpluses.

It is the gap between a country's savings and domestic investment that ultimately determines its external balance. This fact can easily be seen by studying the savings-investment identity (for the derivation of this identity, see the accompanying Appendix):

$$CA = S_{private} - I_{private} + S_{public} - I_{public},$$

where CA is the current account balance, $S_{private}$ is private savings, $I_{private}$ is private domestic investment spending, S_{public} is government savings, and I_{public} is government domestic investment spending. In this form, $S_{private} - I_{private}$ is the savings-investment gap for the private sector and $S_{private} - I_{public}$ is the savings-investment gap for the government sector.

So, what does this equation tell us? First, the overall national savings-investment gap determines the current account balance. Both the public and private sector contribute to the current account balance through their respective savings-investment gaps. The counterpart of the current account balance is the sum of the private savings-investment gap and the government (federal, plus state and local) savings-investment gap. The U.S. current account deficit, therefore, directly reflects what is happening in the U.S. domestic economy. In fact, this holds true for any country—even those with significant trade surpluses. Figure 2 makes this clear. The U.S. displays a savings deficiency and, as night follows day, it also displays a negative current account balance that mirrors its negative savings-investment gap. Both Japan and China display savings surpluses and, sure enough, they both run current account surpluses that mirror their savings surpluses.

A Closer Look at Data from the U.S.A. and Japan

Table 2 shows that U.S. data support the important savings-investment identity derived above. The cumulative current account deficit the U.S. has racked up since 1973 is $11.488 trillion, and the amount by which total savings has fallen short of investment is $11.417 trillion.[20] But that is not the end of the story. Disaggregated U.S. data are available that allow us to calculate both the private and government contributions to the U.S. current account deficit. As shown in Table 2, the U.S. private sector generates a savings surplus—that is to say, private savings exceed private domestic investment—so it actually reduces (makes a negative contribution to) the current account deficit. The government stands in sharp contrast to the private sector, with the government accounting for a cumulative savings deficiency—that is to say, government

16 Irwin 2017, pp. 565-688.

17 Peterson Institute for International Economics, "Trump's Trade War Timeline: An Up-to-Date Guide," August 23, 2019, at: https://www.piie.com/blogs/trade-investment-policy-watch/trump-trade-war-china-date-guide.

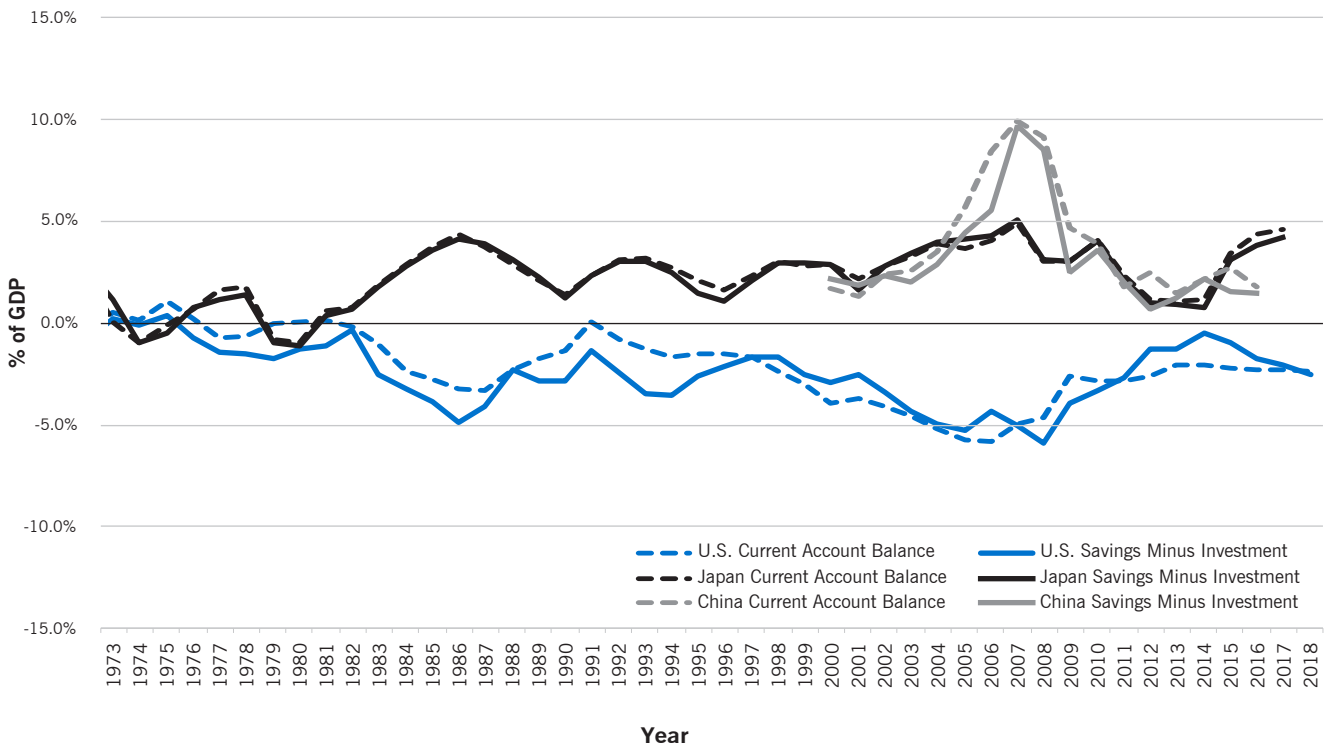
18 Keith Bradsher and Alan Rappeport, "Trump Ordered U.S. Companies to Leave China. Is That Possible?" *The New York Times*, August 24, 2019.

19 During the Obama administration's second term, the annual trade deficit averaged $726.2 billion. So far, under the Trump administration, the annual trade deficit has ballooned to an average of $840.7 billion. See: United States Census Bureau, "Trade in Goods with World, Seasonally Adjusted," at: https://www.census.gov/foreign-trade/balance/c0004.html.

20 Oskar Morgenstern, *On the Accuracy of Economic Observations*, 2nd ed., Princeton, NJ: Princeton University Press, 1963, pp. 137-180. Note that the savings and investment gaps do not match the current account balances exactly for short intervals, but they tend to equate. This is due in large part to the statistical discrepancy between the expenditure accounting and the income accounting methods.

Figure 2

Current Account Balance and the Savings-Investment Gap



Source: Cabinet Office of Japan - Economic and Social Research Institute, National Bureau of Statistics of China, U.S. Department of Commerce - Bureau of Economic Analysis.

Table 2

U.S. Savings and Investment (in billion USD)

Period	Current Account Balance	Total Savings Minus Investment	Private Savings Minus Investment	Government Savings Minus Investment
1973-1979	1.8	-118.4	514.1	-632.5
1980-1989	-777.9	-1,174.7	1,227.4	-2,402.2
1990-1999	-1,216.6	-1,816.9	1,305.4	-3,122.3
2000-2009	-5,710.4	-5,477.9	1,298.1	-6,776.0
2010-2018	-3,784.5	-2,829.4	8,457.3	-11,286.8
1973-2018	**-11,487.6**	**-11,417.4**	**12,802.3**	**-24,219.7**

Source: U.S. Department of Commerce - Bureau of Economic Analysis.

domestic investment exceeds government savings, resulting in fiscal deficits—that is almost twice the size of the private sector surplus.

Clearly, then, the U.S. current account deficit is driven by the government's (federal, plus state and local) fiscal deficits. Without the large cumulative private sector surplus, the cumulative U.S. current account deficit since 1973 would be almost twice as large as the one that's been recorded.

The straightforward implication of this analysis is that President Trump can bully countries he identifies as unfair traders and can impose all the restrictions on trading partners that his heart desires, but it won't change the current account balance. The U.S. current account deficit is solely a function of the savings deficiency in the U.S., in which the government's fiscal deficit is the proverbial elephant in the room. And how is the current account deficit financed?

Table 3

Japan Savings and Investment (in billion yen)

Period	Current Account Balance	Total Savings Minus Investment	Private Savings Minus Investment	Government Savings Minus Investment
1973-1979	4,739.1	3,322.7	65,292.7	-61,970.0
1980-1989	74,090.2	72,952.5	130,508.7	-57,556.2
1990-1999	122,711.4	112,784.6	224,602.0	-111,817.4
2000-2009	175,150.8	178,663.3	400,464.9	-221,801.6
2010-2017	114,652.1	103,359.1	325,691.0	-222,331.9
1973-2017	**491,343.6**	**471,082.2**	**1,146,559.3**	**-675,477.1**

Source: Cabinet Office of Japan - Economic and Social Research Institute.

Well, it turns out that foreigners who generate savings surpluses and current account surpluses finance the U.S. current account deficits. It is clear, therefore, that current account balances represent nothing more than a measure of the international trade in savings.[21]

What's more, the Trump administration's fiscal policies, which promise ever-widening fiscal deficits,[22] will throw a monkey-wrench into President Trump's trade policy works. Indeed, if his fiscal deficits are not offset by an increase in private savings relative to private investment, increases in the federal budget deficit will translate into larger current account deficits. So, the U.S. current account deficit will not only continue to be made in the good old U.S.A., but it will be greatly enlarged by President Trump himself—the professed archenemy of external imbalances.

The good news, however, is that the U.S. has been able to finance its current account deficit with relative ease. Indeed, foreigners are more than willing to park their savings in U.S.-dollar-denominated assets. This is a tribute to the dollar's role as the world's reserve currency, America's creditworthiness, and the effectiveness of U.S. corporate governance.

To look at the other side of the coin, consider Japan. As shown in Table 3, since 1973 Japan has racked up a significant current account surplus: 491,344 billion yen. This is closely matched by a cumulative national savings surplus of 471,082 billion yen. In Japan, the contribution to the national savings surplus is dominated by a private sector cumulative savings surplus of 1,146,559 billion yen. As in the U.S., the Japanese government has accumulated a large fiscal deficit, which subtracts from the private sector savings surplus. But, on balance, the private sector's savings surplus outweighs the government's fiscal deficits. So, Japan has been left with a significant national savings surplus, which translates into a large cumulative current account surplus and a large export of surplus savings used to finance other countries' current account deficits.

The Way Forward

Given the identities discussed and the evidence presented that comports with and confirms their utility and robustness, it becomes clear that the world of international trade policy is strange—one in which the public holds miles of strongly held preferences that are generated by inches of facts.[23] Largely as a result of a major fallacy of composition, many people embrace traditional mercantilist ideas. They believe that any reduction in imports or increase in exports will necessarily benefit their country by improving its external balance. For them, a negative external balance is caused by foreigners and is "bad." Economic theory coupled with hard evidence, however, shows that the external balance is not caused by foreigners but solely by domestic behaviors.

When it comes to international trade policy, most of what is debated is either wrong or irrelevant. This is in large part the product of what David Henderson has dubbed "do-it-yourself economics."[24] These are the economics of the everyman, if you will. They are the ideas about the workings of the economy that owe little or nothing to trained economists and the economics profession. Instead, they are based on the intuitive and often fallacious ideas of lay people. And not surprisingly, Henderson concluded that the gap between the notions of do-it-yourself economics and orthodox economics is widest in the sphere of international trade.[25]

Of course, the conclusions reached by do-it-yourself economics are important because they form public opinion.

21 John Pitchford, *The Current Account and Foreign Debt*, London and New York: Routledge, 1995, pp. 8-10.

22 Congressional Budget Office, *An Update to the Budget and Economic Outlook: 2019 to 2029*, Washington, D.C.: Congress of the United States, 2019.

23 Aaron B. Wildavsky, "Choosing Preferences by Constructing Institutions: A Cultural Theory of Preference Formation," *American Political Science Review*, March 1987, vol. 81, no. 1, p. 8.

24 David Henderson, *Innocence and Design: The Influence of Economic Ideas on Policy*, Oxford and New York: Basil Blackwell, 1986, p. 3.

25 Henderson 1986, pp. 53-72.

And as Ludwig von Mises concluded, "Governments cannot free themselves from the pressure of public opinion."[26]

This problem was experienced by William Niskanen early in the fall of 1984, when he was serving as a member of President Reagan's Council of Economic Advisers. Niskanen made a presentation to Reagan's cabinet about the trade deficit. He stressed that the trade deficit was made in the U.S. and that it was the difference between savings and investment in the U.S. He informed those assembled that the only way to reduce it was to reduce the government's fiscal deficit, reduce private investment, or increase private savings. As Niskanen put it, "Although my presentation was little more than stating the implications of some accounting identities, this relation was not broadly understood." He went on to write: "Only the courtesies of a cabinet meeting prevented the pragmatists and trade hardliners from commenting that I might understand economics, but I did not understand the real world." Niskanen "was no more successful in making this point in personal discussions with members of Congress."[27]

Although Niskanen understood the theory and presented the trade identities, he was not armed with the data to support the identities. His lack of data proved to be his Achilles' heel. Indeed, an airtight theoretical argument is often not enough. Even when armed with facts, one cannot be assured of winning a trade policy debate. As Henry Rosovsky put it: "Never underestimate the difficulty of changing false beliefs by facts."[28]

But even if armed with the relevant theory, identities, and facts, what is one to do? There is, surprisingly, a wide chasm between distinguished economists who oppose engaging directly with the public on matters of policy and those who believe that engagement is a moral duty. Perhaps the most extreme opponent of public engagement was the University of Chicago's Frank Knight, who thought that economists who adopted persuasive rhetoric in the political realm were failing to uphold their academic responsibilities. Knight went as far as to pointedly avoid making speeches or even attending public events that had a bearing on contemporary debates.[29] George Stigler, another Chicago economist, adopted broadly the same position as Knight. Indeed, Stigler famously argued against "the economist as preacher."[30]

But, while Stigler opposed engagement with the public, he was a preacher within the academy. As he wrote: "A scholar is an evangelist seeking to convert his learned brethren to the new enlightenment he is preaching."[31] Stigler's view was held by yet another Chicago economist Friedrich Hayek, who opposed economists engaging in what he termed "mass propaganda."[32]

At the other end of the spectrum was John Maynard Keynes, who thought engagement with the public to influence popular opinion was part and parcel of being an economist. Keynes wrote 300 op-eds that were widely distributed by his literary agents throughout the world. As Don Patinkin saw it, "for some periods of his life… it would be more appropriate to say that in addition to being a publicist [Keynes] was also an economist.[33]

Holding views similar to Keynes's was Milton Friedman, a leader of the Chicago school. He was accompanied by economists from what is broadly termed the Stockholm School of Economics, whose members expended great efforts to educate the Swedish populace about economics. The great Knut Wicksell penned 450 op-eds, while Gustav Cassel wrote 1,506 op-eds and Bertil Ohlin topped the list with 2,300 items. Even Gunnar Myrdal wrote 50 pieces for newspapers.[34]

Given the stunning level of economic illiteracy that surrounds the strange world of international trade policy, it is time to use the arguments and evidence presented and follow the course taken by Keynes, Friedman, and members of the Stockholm School. If economists and others fail to do so, we will continue to fight unwise wars against the wrong enemies.

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26 Ludwig Von Mises, *Human Action: A Treatise on Economics*, 3rd ed., Washington, D.C: Henry Regnery Company, 1966, p. 793.

27 Niskanen 1988, p. 150.

28 Henry Rosovsky, *The University: An Owner's Manual*, New York: W. W. Norton & Company, 1990, p. 259.

29 Angus Burgin, *The Great Persuasion: Reinventing Free Markets since the Depression*, Cambridge, MA: Harvard University Press, 2015, pp. 48-49.

30 George J. Stigler, *The Economist as Preacher, and Other Essays*, Chicago: University of Chicago Press, 1982, p. 6.

31 George J. Stigler, *Memoirs of an Unregulated Economist*, New York: Basic Books, 1985, p. 211.

32 Alan Ebenstein, *Friedrich Hayek: A Biography*, New York: Palgrave, 2001, p. 286.

33 Wayne Parsons, *The Power of the Financial Press: Journalism and Economic Opinion in Britain and America*, New Brunswick, NJ: Rutgers University Press, 1990, p. 52. In 1923, Keynes was part of a group that bought a newspaper, The Nation and Athenaeum.

34 Benny Carlson and Lars Jonung, "Ohlin on the Great Depression: The Popular Message in the Daily Press," *Bertil Ohlin: A Centennial Celebration* (1899-1999), edited by Ronald Findlay, Lars Jonung, and Mats Lundahl, Cambridge, MA: MIT Press, 2002.

Appendix: Derivation of the Savings-Investment Identity

To derive the savings-investment identity, we must start by studying some identities in the national income accounts. In economics, identities (or "equality relations," usually true by definition) are generally derived by breaking down an aggregate into a sum of parts or by equating two different breakdowns of a single aggregate.[35] For our derivation of the savings-investment identity, we must first derive the basic identity for savings. Then, we must derive another identity for national income before connecting it all together.

Savings are the accumulation of total assets or, in other words, the augmentation of net worth.[36] Since we know that savings is a "netted-out" measure, we can construct an identity by breaking savings down in terms of gross additions to total assets and gross subtractions from total assets.

To define an appropriate aggregate measure for gross additions to total assets, we need to consider carefully what leads to these additions. Income, which is identical to production,[37] serves as a good basis. But, as it is commonly defined in national accounting terms, income refers specifically to only factor income, which is the return derived from the factors of production—land, labor, capital, and entrepreneurship.

When thinking in terms of savings, the thing that really matters is disposable income—income that is available for use—because this is what is ultimately added to total assets. Disposable income can differ from factor income since factor income can be redistributed after it is generated from the factors of production; disposable income already accounts for all subtractions from (and additions to) total assets associated with redistributions. With gross additions to total assets defined as disposable income, the only subtractions that can remain must be associated with the destruction of assets.

By definition, consumption is the purposeful destruction of resources.[38] Thus, an aggregate measure of consumption is sufficient for netting out gross subtractions from total assets from disposable income. The basic savings identity can now be written as

$$\text{Savings} = \text{Disposable Income} - \text{Consumption}. \quad (1)$$

The basic savings identity depends on a measure of disposable income, for which we can develop another identity.

For most analyses of national income or production, the convention today is to use Gross Domestic Product (GDP), which is defined as the total market value of final goods and services produced by factors of production *located within a country's borders*. Since income is generated by spending, we can relate GDP to spending with an accounting identity:

$$GDP = C_{private} + I_{private} + G + NX, \quad (2)$$

where $C_{private}$ is private consumption spending, $I_{private}$ is private domestic investment spending[39] is government spending, and is exports of goods and services minus imports of goods and services. G is government spending, and NX is exports of goods and services minus imports of goods and services. GDP accounts for all factor income produced within a country's borders.

But because it does not consider whether that factor income belongs to residents of a country or its non-residents, GDP does not represent the country's disposable income, which is what is actually available for use (disposal) by the country. This aspect of GDP presents a problem: when analyzing a country's savings and investment, one is looking at how that country's income is used.

Gross National Product (GNP) allows us to remedy part of the problem associated with the GDP metric. GNP—the original convention for measuring national income, before the 1990s[40]—takes us a step closer by considering what is actually earned by residents of the country. GNP is defined as the total market value of final goods and services produced by factors of production *supplied by residents*. Unlike GDP, GNP considers who owns the factors of production instead of where they are located. Due to this distinction, GNP excludes any factor income earned domestically by foreigners, but includes factor income earned overseas by residents. Accordingly, we have the following GNP identity:

35 We will only be working with identities in this paper, so identities are indicated by the equals sign (=).

36 Kenneth E. Boulding, *Macroeconomics*, 4th ed., New York: Harper & Row, 1966, pp. 121-124. This definition of savings should not be confused with the concept of hoarding—the accumulation of money assets, which is what is left after all money expenditures are subtracted from money receipts. In contrast to hoarding, savings encompasses all assets and does not net out non-destructive forms of spending, like investment.

37 When a quantity of output is produced, an identical quantity of income is attributed to the producer(s)—i.e., payments to suppliers of raw materials, labor, land, capital, etc. will sum to the value of the output.

38 Kenneth E. Boulding, "The Consumption Concept in Economic Theory," *American Economic Review,* May 1945, vol. 35, no. 2, pp. 1-14.

39 For an economy, total savings is always equal (identical) to total investment. However, in these national income identities, only domestic investment is considered. Due to this exclusion of foreign investment, total domestic investment does not equal total savings.

40 U.S. Bureau of Economic Analysis, "Gross Domestic Product as a Measure of U.S. Production," *Survey of Current Business*, August 1991, vol. 71, no. 8, p. 8.

$$\begin{aligned} GNP &= GDP + NY \\ &= C_{private} + I_{private} + G + NX + NY, \end{aligned} \quad (3)$$

where NY is factor income earned overseas by residents minus factor income earned domestically by foreigners.

Although GNP considers all factor income earned by a country's residents, it does not include current transfers, which are unilateral transfers between residents and foreigners. Current transfers are not considered factor income and do not affect measures of production levels, but they still add to or take away from disposable income. So, at the very least, they are relevant for measuring a country's savings and investment.

Thus, we must add current transfers to GNP in order to obtain the measure of national income we need, which is represented by the following Gross National Disposable Income (GNDI) identity:

$$\begin{aligned} GNDI &= GNP + NCT \\ &= C_{private} + I_{private} + G + NX + NY + NCT \end{aligned} \quad (4)$$

where NCT is current transfers from foreigners minus current transfers to foreigners. Since the current account balance for a country is NX + NY + NCT, the national income identity for GNDI can be written as

$$GNDI = C_{private} + I_{private} + G + CA, \quad (5)$$

where CA is the current account balance. With the insight revealed by this identity, the current account balance is placed squarely where it should be, namely in the context of a nation's savings and investment balance.

With the identity for disposable income as a national aggregate, disposable income aggregates for the private and public sectors can be developed to shed some light on their respective savings and investment. For the private sector, disposable income is what is left over from national disposable income (GNDI) after subtracting out taxes paid to the government, net of transfers paid back by the government (T). Then, to obtain private savings ($S_{private}$), private consumption spending ($C_{private}$) must be subtracted from private disposable income (GNDI – T):

$$S_{private} = GNDI - T - C_{private} \quad (6)$$

Substituting in the identity for GNDI (5) gives

$$\begin{aligned} S_{private} &= C_{private} + I_{private} + G + CA - T - C_{private} \\ &= I_{private} + G + CA - T \end{aligned} \quad (7)$$

Rearranging (7) so that CA is alone on one side, we have the savings-investment identity

$$S_{private} - I_{private} + T - G = CA. \quad (8)$$

Note that T – G is the government fiscal balance, which we can define in terms of government savings and investment. For the government, disposable income is just its tax revenue, net of transfers paid back to the private sector (T). Then, to obtain government savings (S_{public}), government consumption spending (C_{public}) must be subtracted from government disposable income (T):

$$S_{public} = T - C_{public} \quad (9)$$

Rearranging (9) so that T is alone on one side, we have

$$T = C_{public} + S_{public} \quad (10)$$

Writing out G in terms of its expenditure components, government consumption spending (C_{public}) and government domestic investment spending (I_{public}), we have

$$G = C_{public} + I_{public} \quad (11)$$

Then, we can substitute in the new identities for T (10) and G (11) into government fiscal balance, T – G, to obtain the savings-investment identity for the government sector:

$$T - G = C_{public} + S_{public} - C_{public} - I_{public} \quad (12)$$

Substituting the government savings-investment identity (12) into the original savings-investment identity (8), we finally have the consolidated national savings-investment identity, which relates a country's overall savings and domestic investment to its current account balance:

$$\begin{aligned} CA &= S_{private} - I_{private} + S_{public} - I_{public} \\ &= S_{national} - I_{national} \end{aligned} \quad (13)$$

where $S_{national} = S_{private} + S_{public}$ is total national savings and $I_{national} = I_{private} + I_{public}$ is total national domestic investment. The quantity S – I is often referred to as the savings-investment gap.

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