The Economic Effects of a Potential Armed Conflict Over Taiwan

Christopher J. Neely

Abstract

This article examines the likely economic effects of a Chinese invasion or blockade of Taiwan for the U.S. and the world by considering historical precedents. Such a conflict would likely produce a flight-to-safety in the asset market, huge disruptions in international trade, and banking problems, and it would greatly exacerbate existing fiscal pressures. The authorities of the People's Republic of China would probably try to sell U.S. and other western securities prior to a conflict to avoid sanctions on those assets. Such sales would be temporarily disruptive but would likely have only marginal effects on yields in the longer term. Long-term effects would include disrupted trade, higher price levels, higher levels of nominal debt, and higher taxes.

JEL codes: H56, F40, O24, G14, G15, G12

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1. INTRODUCTION

The 2022 Russian invasion of Ukraine provides a recent example of the use of violence to change the status quo. It has distressed the world economy through its effect on commodity prices. This episode has rekindled speculation that the People's Republic of China (PRC) might invade or blockade Taiwan, bringing on an armed conflict with much greater global economic repercussions. The U.S. Department of Defense (2023) warns that the PRC uses the People's Liberation Army (PLA) as "an instrument of statecraft" that has "adopted more coercive actions" and is strengthening its ability to "fight and win wars against a strong enemy."

The PRC and the island of Taiwan have been separately governed since the Chinese Nationalist forces retreated to Taiwan, while the Chinese Communist forces gained control of the mainland at the end of the Chinese civil war in 1949. PRC leaders have repeatedly asserted that Taiwan is an integral part of China (PRC, 2022). The government of Taiwan has also historically insisted that China and Taiwan

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are one nation, although popular sentiment on the island increasingly views the Taiwanese as a distinct nationality (BBC, 2024a).

Since the 1970s, the U.S. position has been described as a "one-China" policy: This position recognizes that the PRC is the government of China and that Taiwan is part of China. The U.S. has formal diplomatic relations with the PRC but only unofficial relations with Taiwan (Green and Glaser, 2017). Despite this, the U.S. has opposed the forceful reunification of the mainland and Taiwan and has adopted a policy of strategic ambiguity when dealing with the PRC's attempts to forcefully reunite the mainland and Taiwan (Liu, 2023; Lawrence, 2023). Strategic ambiguity means that the U.S. has not committed to how it would react to an attempt at forceful reunification. Likewise, it is uncertain how other countries in the region would react. Lawrence (2023) describes this policy as follows: *"[T]he United States does not support Taiwan independence, opposes unilateral changes to the cross-Strait status quo, is committed to meeting its TRA [Taiwan Relations Act of 1979] obligations to support Taiwan's self-defense, and has an abiding interest in peace and stability in the Taiwan Strait."*

Despite this policy of strategic ambiguity, many observers have long believed that the U.S. would likely assist Taiwan if the PRC blockaded or invaded Taiwan without provocation (Cancian, Cancian, and Heginbotham, 2023). President Biden made public statements that the U.S. would assist Taiwan in the event of an attack, although the White House later withdrew these statements (Sevastopulo, Inagaki, and Hille, 2022). In addition, many analysts believe that Australia and Japan would assist the U.S. in coming to Taiwan's defense but that South Korea would be unlikely to join the coalition (Cancian, Cancian, and Heginbotham, 2023).

Such an armed conflict between the PRC and the U.S., Australia, Japan, and Taiwan would produce both great human costs and very significant, negative economic effects. The intensity and scale of such a conflict would dwarf those of any sea-air conflict since World War II. In particular, the economic effects would probably be more serious than any conflict in which the U.S. has been engaged in recent decades.

The Russian invasion of Ukraine is the clearest recent precedent with which to study the economic implications of armed conflict over Taiwan. The potential losses are far greater, however, because the U.S., Australia, Japan, the PRC, and Taiwan are economically much more important than Russia and Ukraine in the world economy. According to International Monetary Fund (IMF) statistics, the combined GDP of the U.S., Australia, Japan, the PRC, and Taiwan is $54 trillion, or about 24 times the combined size of Russian and Ukrainian output ($2.25 trillion).

This article examines the likely economic effects of such a war for the U.S. and the world partly by looking for historical precedents that might shed light on the effects of such a war. Despite its importance, there has been almost no published research on this topic. Vest, Kratz, and Goujon (2022) provide a broad view of the likely economic consequences while Blanchette, DiPippo, and Johnstone (2023) also review the likely consequences, focusing on financial markets. Bermudez et al. (2023) explore the ability of the U.S. and its allies to use economic sanctions against the PRC and the possible responses.

I begin by describing my assumptions about the nature of the conflict before moving on to effects on financial markets, international trade, the U.S. and global economies, and long-term implications.

2. ASSUMPTIONS ABOUT THE POTENTIAL CONFLICT

"I know not with what weapons World War III will be fought, but World War IV will be fought with sticks and stones."—Albert Einstein

We do not know the nature of a potential future conflict over Taiwan. That is, we do not know the geographical limits (if any), the opposing alliances, or the types of weapons to be used. To estimate the economic effects of an armed conflict over Taiwan, however, one must make some assumptions about the nature of that conflict.

This article will follow the assumptions of an analysis (i.e., a series of war games) by Cancian, Cancian, and Heginbotham (2023). These authors investigate 24 possible scenarios to model a 2026 PRC invasion of Taiwan. Each scenario makes different assumptions about the decisions of the U.S. and Japanese political systems in response to the PRC invasion and the effectiveness of various weapons systems. Their base case is that the U.S. and Japan would assist Taiwanese forces in defending against a PRC blockade or invasion. Analysts generally believe that U.S. support would be necessary for Taiwan to successfully defend itself against a PRC invasion or blockade (Heath, Lilly, and Han, 2023). Cancian, Cancian, and Heginbotham (2023) assume the following about other countries:

- Australia would actively assist the U.S. and Japan in military action in the South China Sea.
- South Korea would passively assist the U.S. and Japan but be deterred from actively joining the Western Coalition by concern about both the PRC and North Korea.
- India, Singapore, Thailand, and Vietnam would passively assist the U.S. and Japan, perhaps allowing overflights but not taking action themselves.
- Most NATO countries would limit themselves to economic sanctions on the PRC. The United Kingdom and France might send modest naval and air assets to aid the U.S. and Japan.

For simplicity, we will refer to the group of Australia, Japan, Taiwan, and the U.S. as the Western Coalition, although Japan is western in some respects but not others. As in the Cancian, Cancian, and Heginbotham (2023) study, this article will assume that the conflict remains conventional, with no nuclear weapons used. The study calculated that the most likely duration of the conflict would be one to three weeks, but a longer conflict is definitely possible.

These war games indicate that, in the most likely scenarios, Taiwanese, U.S., and Japanese forces would be able to keep Taiwan autonomous, although they would pay a high price, losing hundreds of aircraft and dozens of ships. As with the other assumptions and calculations of the Cancian, Cancian, and Heginbotham (2023) study, the present article accepts this outcome for calculation of long-term economic effects.

It is difficult to tell how such a conflict would play out, but any armed conflict over Taiwan would have enormous effects on the world economy through its impact on financial and trade relations and its destruction of human and physical capital in the form of shipping, ports, and airfields. The record-setting growth of East Asia has raised its contribution to global output substantially, from 14 percent of world GDP in 1980 to 23.6 percent of world GDP in 2023 (IMF, 2024).[1]

3. THE EFFECTS ON INTERNATIONAL FINANCIAL MARKET EFFECTS

Prewar

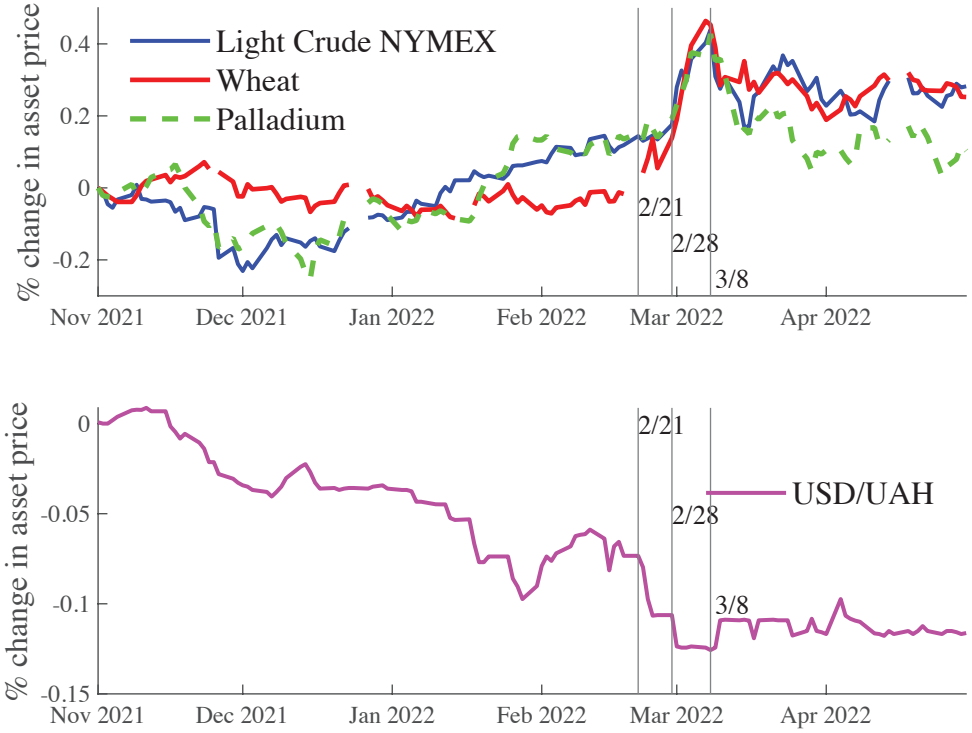
"It's tough to make predictions, especially about the future."—Yogi Berra

A conflict over Taiwan would presumably physically disrupt trade in goods and result in widespread trade and financial sanctions. Financial markets are forward looking and react as expectations change, so asset prices might change substantially even prior to physical or legal disruptions to trade or financial sanctions. Figure 1, which is excerpted from Neely (2022), shows an example of such anticipation in the two months prior to the Russian invasion of Ukraine in February 2022. During that prewar period, the prices of two important Russian exports, palladium and crude oil, rose substantially while the Ukrainian currency, the hryvnia, declined by about 5 percent against the dollar (Neely, 2022). These effects are consistent with market anticipation of disruptions in trade in these commodities.

1. The IMF defines "East Asia" as China, Hong Kong SAR, the Republic of Korea, and Taiwan Province of China.

Figure 1

Anticipation of the Russian Invasion of Ukraine in Asset Markets



NOTE: NYMEX, New York Mercantile Exchange; USD, U.S. dollar; UAH, Ukrainian hryvnia. The figure is excerpted from Neely (2022). The top panel of the figure shows normalized daily futures prices for commodities from November 1, 2021, to April 29, 2022. The bottom panel shows the normalized USD/UAH exchange rate from November 1, 2021, to April 29, 2022. Normalization depicts the percentage change in the asset price relative to its initial value in the figure.

SOURCE: Tick Data.

There are also indications that the Russian authorities prepared for economic sanctions by reducing debt and increasing foreign exchange and gold reserves (Pierson and Dean, 2022; Arnold and Salisbury, 2024). The PRC already has very large foreign exchange and gold reserves—easily the largest in the world—but could add to them to increase its buffer of liquid assets to use against economic sanctions. How the Chinese authorities might avoid sanctions on reserves and the consequences of those avoidance measures will be discussed later in this section.

The Western Coalition would surely impose economic sanctions at the outbreak of hostilities or even prior to actual hostilities when aggression seems imminent. Such sanctions would probably follow the outline of those imposed on Russia by the U.S., the European Union, Japan, the United Kingdom, Canada, Australia, and other countries after the Russian invasion of Ukraine: freezing about half of foreign exchange reserves; freezing most of the assets of the Russian banking system; banning commercial flights from Russia; embargoing military and technology exports, including most electronics; prohibiting the export of U.S. dollar-denominated bank notes and luxury goods; prohibiting the import of many Russian products, such as crude oil and petroleum products, coal, gold, diamonds, seafood, and alcoholic beverages; prohibiting the use of the Society for Worldwide Interbank Financial Telecommunication (SWIFT) system; prohibiting transactions with the central bank or other government agencies; and prohibiting western financial institutions from processing debt payments to foreign

investors from the Russian government. Partly as a result of these sanctions, hundreds of major western firms, including McDonald's, Coca-Cola, Starbucks, and Heineken, have closed production and sales in Russia. The goal of all these sanctions is to impede Russia's efforts to purchase and/or fund the purchases of military and logistical items to prosecute its invasion of Ukraine. See Neely (2022), Congressional Research Service (2023), and the BBC (2024b) for more details on these sanctions.

The PRC would doubtless countersanction the countries of the Western Coalition, perhaps seizing financial and physical foreign assets.

Western Asset Prices Respond to Hostilities

Expectations of death, destruction of human and physical capital, and the curtailment of trade would rise at the outbreak of hostilities, if not before. Uncertainty would soar. Fearful lenders would restrict lending, providing loans only to borrowers with very good collateral. Generally, investors would seek safe assets. Institutional investors, particularly hedge funds, whose experienced professionals watch markets and news closely are likely to move first.

The flight-to-safety would very likely drive down international stock prices, but the uncertainty will have conflicting effects on U.S. bond yields and the value of the dollar. Investment-grade U.S. bond yields would probably decline, as they do in flights-to-safety, but this response is less certain than usual because dangers to the U.S. and its fiscal situation would tend to raise yields. Traditionally safe European currencies, such as the euro and Swiss franc, would likely appreciate, while there would be conflicting effects on the U.S. dollar and the Japanese yen, which are usually considered safe currencies.

The large reduction of trade and the concomitant demand for commodities might reduce the prices of some commodities—such as oil and foodstuffs—that East Asia imports and consumes. A reduction in commodity prices is usually associated with depreciation of the Australian and Canadian currencies, as Australia and Canada are commodity exporting countries (Chen and Rogoff, 2003).

Past experiences with the beginnings of sudden, armed conflicts provide some insight as to the likely patterns in asset prices. The first three panels of Figure 2 show the S&P 500 index price from a week before the events: the Pearl Harbor attack, the start of the Korean War, and the 9/11 attacks. We normalize the S&P 500 index to equal 100 just prior to or at the time the event was known to facilitate calculation of percentage changes and comparison of price patterns across events. The vertical lines in each panel denote the last observation before each event.

The third panel also shows the 10-year Treasury yield in the weeks around 9/11, while the fourth panel shows the implied volatilities from S&P 500 options (the VIX) around 9/11.[2] We omit Treasury yields in the first two panels—Pearl Harbor and the start of the Korean War—because daily data are not readily available for those early periods, and the graphs would not be very informative because the Federal Reserve System controlled Treasury yields fairly closely during a span of years that included those events (Rose, 2021). That is, bond yields would probably not have reacted strongly to these events.

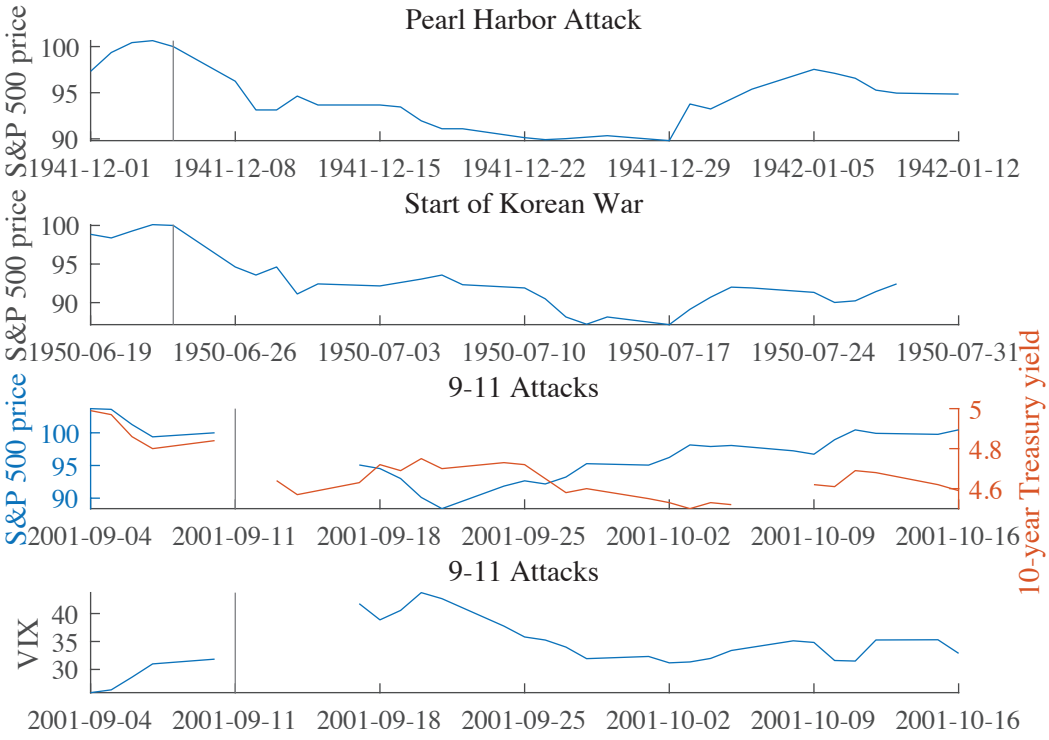
VIX-implied volatilities are not shown for Pearl Harbor and the start of the Korean War because these statistics were not available prior to 1993. In the third and fourth panels, the S&P 500 prices and VIX-implied volatilities are missing from September 11, 2001, until September 17, 2001, reflecting the closure of the stock market during this time.

Although the duration and costs of each of these three conflicts were unknown at their outsets, the S&P 500 prices show similar patterns for all three events. Stock values declined substantially, by 10 to 15 percent, over the course of two or three weeks, then recovered much of the lost ground. These are very large three-week declines compared with historical patterns. Only 1 percent of all three-week S&P 500 percentage changes from 1928 through April 2024 were less than negative 10 percent.

2. The VIX measures expected volatility of stock prices from option prices on the index. These volatility estimates are called implied volatility. Neely (2005) explains options prices and the use of options to estimate the volatility of the underlying asset price.

Figure 2

Financial Market Reactions to the Pearl Harbor Attack, the Start of the Korean War, and the 9/11 Attacks



NOTE: The panels of the figure display combinations of daily S&P 500 stock prices, Treasury yields, and implied volatility (VIX) in the weeks around the Pearl Harbor attack in December 1941, the start of the Korean War in June 1950, and the 9/11 terrorist attacks in September 2001. S&P 500 prices and VIX are missing in panels 3 and 4 from Tuesday, September 11, 2001, until the following Monday, September 17, because the New York Stock Exchange was closed during that time. Treasury bond yields became available again on Thursday, September 13, 2001.

SOURCE: S&P (Yahoo Finance) and FRED, Federal Reserve Bank of St. Louis.

Consistent with rising uncertainty reducing risky asset prices and prompting a flight-to-safety, expected volatility (i.e., the VIX) rose dramatically after 9/11, from a level of about 32 to about 42 (third panel, Figure 2). A level of 32 is higher than 94 percent of all VIX observations since 1990, while a level of 42 is higher than 98 percent of all VIX observations during the same period.[3] Likewise, the third panel shows that Treasury yields declined substantially after the 9/11 attacks, about 30 basis points within a few days, but reached their nadir after about three weeks.

The Exposure of Non-Chinese Banks to the Conflict

A war in the western Pacific would also affect non-Chinese banks, as many firms and individuals would become unable to pay back their loans. A number of factors would threaten the likelihood that loans or other claims would be repaid. These factors include an interruption of trade and disruption of economic activity, physical damage to people and property, and imposition of countersanctions by the PRC, which might include the PRC authorities or Chinese firms defaulting on debts to foreign banks. Together, these factors might threaten the solvency of banks with heavy exposure in the western Pacific,

3. The VIX was at a high level just prior to the 9/11 attacks, and it had been rising from more moderate, normal levels for the previous two weeks. Research suggests that weak economic news depressed equity markets globally during those weeks; for example, Norris (2001), Brooke (2001), and O'Brien (2001).

Table 1

Banking Claims on Residents of China

Rank	Reporting nation	Total claims (billion USD)	% of total	% short-term	% local currency
	Foreign banks total	1,234	100	47	28
1	United Kingdom	235	19	29	47
2	United States	134	11	64	32
3	Japan	80	6	13	61
4	France	51	4	42	25
5	Chinese Taipei	47	4	19	72
6	Switzerland	28	2	84	0
7	Canada	27	2	63	4
8	Korea	27	2	37	48
9	Germany	25	2	0	0
10	Australia	22	2	54	17

NOTE: The table shows banking claims in billions of U.S. dollars on residents of the PRC by reporting countries (left column). Short-term claims are those of a year or less. Local currency claims are payable in the PRC currency. The data refer to claims in 2023:Q4.

SOURCE: Bank for International Settlements.

although a combination of deposit insurance, emergency lending to banks, and perhaps injections of capital would alleviate the problem.

Table 1 uses data from the Bank for International Settlements to summarize the size of claims of foreign banks on residents of China. The table shows that total exposure is $1.234 trillion, of which 47 percent is of maturity less than one year, and 28 percent is denominated in the Chinese currency. U.K. banks have the largest exposure to China ($235 billion), followed by those of the U.S. ($134 billion) and Japan ($80 billion). Of these three countries, U.S. banks tend to lend in dollars (USD) for relatively short terms, with 64 percent of positions of maturity less than one year and only 32 percent in the Chinese currency.

The exposures to potential losses in Table 1 are large, especially for U.K. banks. Large losses to banks might produce uncertainty about which banks were sound and thereby cause other financial firms to avoid lending, except to firms with very good, liquid collateral. That is, there could be contagion as depositors and other institutions that fund banks could withdraw funds from banks with little to no exposure. This is a problem because modern economies still depend on banks.

Likely Response of Central Banks

Dysfunctions in credit markets would likely prompt central banks in affected countries to intervene with lending and accommodative monetary policy, as they have done the past.[4] Initially, central banks would likely lower short-term policy rates and provide forward guidance about accommodative future policy, and they might also purchase government bonds to ease the borrowing requirements. Depending on economic conditions, central banks might also introduce targeted lending programs, perhaps focused on banks with heavy exposure to the western Pacific region. Additional steps might include capital injections and/or the purchase of "bad" assets from banks. Such steps might be necessary to prevent the freezing up of the national financial system.

4. For example, Neely (1996, 2004) chronicles the Federal Reserve System's responses to the 1987 stock market crash, the Mexican peso crisis of 1994, the Asian currency crisis, Russian default, the terrorist attacks of September 11, 2001, and the 2007-08 great financial crisis. Haas, Neely, and Emmons (2020) describe the reactions of international central banks to the COVID-19 crisis.

The immediate goal of all these central bank tactics would be to facilitate functioning of financial markets, but the need for fiscal spending associated with the conflict might also contribute to accommodative monetary policy. One is tempted to say that, to the extent that this accommodation—lower rates, lending programs, and bond purchases—permanently raises the monetary base, it *monetizes* the debt. However, in the modern age in which central banks pay interest on bank reserves, the distinction between money and bonds is blurred.

The Chinese Financial System

Like authorities in many emerging markets, Chinese authorities have tightly regulated their financial system and have used both monetary policy and capital and exchange controls to manage the value of the Chinese yuan (CNY) to facilitate export-led growth (Neely, 1999, 2017).[5] These controls compel Chinese residents to conduct all onshore foreign exchange transactions through designated foreign exchange banks (Kimball and Xiao, 2006). While these controls prohibit most capital account transactions, such as trade in assets, loans, or other investments, they permit current account transactions (trade in goods and services). These financial controls have enabled China to maintain a fairly stable exchange rate over a period of decades while also retaining some independence for domestic monetary policy to meet employment and inflation goals.[6]

Because PRC financial markets are much more heavily regulated than those in the West, the reactions of asset prices in the PRC would likely be more muted and much less informative. The experience of the Russian ruble in 2022 provides an example of an asset price that was not informative because trading was very heavily regulated. After the Russian invasion of Ukraine, the ruble plunged substantially but then recovered and even appreciated for several months. The reasons for this temporary appreciation likely included two factors: (1) Sanctions on Russia reduced its ability to import, temporarily reducing demand for foreign currency and buoying the ruble. (2) Russian authorities instituted ever tighter regulations to protect the ruble's value (Neely, 2022). As the Russians began to successfully evade import sanctions, the ruble began depreciating again, declining more than 60 percent from its apogee in June 2022 to May 2024.

Chinese Foreign Exchange Reserves

As a consequence of high domestic savings rates, China has accumulated large current account surpluses and corresponding foreign assets in the form of foreign exchange reserves, which comprise foreign-denominated deposits and bonds, special drawing rights, IMF reserves, and gold (Wen, 2011). As of November 2024, the PRC authorities held the largest foreign exchange reserves in the world, valued at $3.523 trillion, about 93 percent of which was in foreign-denominated deposits and bonds (PRC, 2024). In addition to these direct holdings, the PRC might hold as much as another $786 billion in USD-denominated assets through custodial holdings of Belgium and Luxembourg (Setser, 2018).[7]

China is not alone in holding U.S. Treasury securities. As of November 2024, foreign countries held about 30.6 percent of U.S. publicly held, marketable debt ($8,635 billion of $28,791 billion), and that figure has declined somewhat over the past 15 years. Table 2 shows the 20 foreign countries that cur-

5. The name of the Chinese currency is "renminbi," which literally translates as "the people's currency"; the yuan is the unit of account. Therefore, prices are quoted in yuan, but the name of the currency is the renminbi. CNY is the official abbreviation for the currency while RMB is commonly used, and CNH is used for yuan in offshore accounts (Majaski, 2024; HSBC, 2016).

6. McKinnon and Oates (1966) describe the "incompatible trinity" or the trilemma: No government can maintain fixed exchange rates, free capital mobility, and an independent monetary policy; one of the three options must give (Obstfeld and Taylor, 1998). In other words, policymakers must restrict capital flows if they wish to avoid exchange rate fluctuations and retain scope for independent monetary policy.

7. Setser (2023a) discusses how the PRC can disguise its reserves.

Table 2

Foreign Holdings of U.S. Treasury Securities

Country	Treasury holdings	% of total foreign holdings	% of marketable, publicly held Treasuries
Japan	1,098.8	12.7	3.9
PRC	768.6	8.9	2.7
United Kingdom	765.6	8.9	2.7
Luxembourg	424.5	4.9	1.5
Cayman Islands	397.0	4.6	1.4
Canada	374.4	4.3	1.3
Belgium	361.3	4.2	1.3
Ireland	338.1	3.9	1.2
France	332.5	3.9	1.2
Switzerland	300.6	3.5	1.1
Taiwan	286.9	3.3	1.0
Singapore	257.7	3.0	0.9
Hong Kong	255.7	3.0	0.9
India	234.0	2.7	0.8
Brazil	229.0	2.7	0.8
Norway	159.0	1.8	0.6
Saudi Arabia	135.6	1.6	0.5
Korea, South	127.8	1.5	0.5
Mexico	100.8	1.2	0.4
Germany	97.7	1.1	0.3
All other	1,589.0	18.4	5.6
Total foreign holdings	8,634.6	100.0	30.6

NOTE: The columns of the table show the value of Treasuries held, the percentage of foreign holdings of Treasuries, and the percentage of marketable, publicly held Treasuries. Data are as of November 2024.

SOURCE: U.S. Department of the Treasury; https://ticdata.treasury.gov/resource-center/data-chart-center/tic/Documents/slt_table5.html.

rently hold the greatest quantities of U.S. Treasuries (U.S. DOT, 2024). The second row of Table 2 shows that only $769 billion of the $3.523 trillion of directly held Chinese foreign exchange reserves consist of Treasury bonds. This is a small portion of Chinese foreign exchange reserves. The rest is probably made up of U.S. agency debt, which is not officially guaranteed by the U.S. government, corporate bonds of various nationalities, government-sponsored enterprise (GSE) bonds, and perhaps international equities.[8] Setser (2023b) shows a time series of estimates of Chinese holdings of various types of U.S. assets.

The PRC holds about 8.9 percent of all *foreign* holdings of Treasuries and 2.7 percent of *all* marketable Treasuries held by the public. If one adds the whole of the Belgium and Luxembourg holdings ($786 billion) to the PRC's direct holdings of $769 billion in U.S. Treasury bonds, the PRC's shares of foreign

8. U.S. agency debt obligations are highly rated securities issued by federally chartered corporations called government-sponsored enterprises (GSEs) or U.S. government agencies. The GSEs include the Federal Home Loan Banks (FHLB), the Federal Farm Credit Bank (FFCB), the Federal National Mortgage Association (Fannie Mae) and the Federal Home Mortgage Corporation (Freddie Mac). U.S. government agencies include the Government National Mortgage Association (Ginnie Mae) and the Federal Housing Administration (FHA). The federal government does not formally guarantee GSE debt but does guarantee the debt of U.S. government agencies.

and all Treasury holdings are around 18 percent and 5.4 percent, respectively.[9] The percentages would be a bit more than half of those if one assumes no Chinese holdings through Belgium or Luxembourg.

The large Chinese holdings of U.S. securities raise four questions:

1. Could the PRC demand early redemption of Treasury bonds?
2. As a practical matter, could the U.S. selectively repudiate debt held by particular parties in case of hostilities?
3. Would the PRC sell its USD-denominated assets—especially Treasuries—if it anticipated a conflict?
4. How would such sales affect the U.S. economy?

First, holders of U.S. Treasury bonds cannot legally demand early redemption from the U.S. Treasury, but they can sell those bonds to another party. In other words, Treasury securities are not *puttable* bonds.[10]

Second, the U.S. Treasury probably has only limited technical ability to selectively repudiate debt held by particular parties. The U.S. Treasury tracks bond ownership electronically by bank account numbers, not with ownership of pieces of paper. So, it might be possible to refuse to pay coupons or principal (face value) of bonds held in some particular account, assuming that the Treasury had the appropriate legal mandate to do so from Congress and/or the President. The tactic would generally be imperfect, however, because it is not always clear who owns the bank accounts to which Treasury payments would be made, especially if the targeted party were to plan ahead by holding disguised accounts.

Of course, selective repudiation of debt would be extreme and would create serious distrust in the U.S. as a borrower. But this effect would probably be limited because most buyers of U.S. Treasuries do not plan on getting into a war with the U.S.

Third, it seems very possible, even likely, that the PRC would try to sell its USD-denominated assets prior to a conflict to avoid loss or freezing of those assets through sanctions. Indeed, such sales might be an early warning sign of hostilities, although sales might also occur for other reasons, such as trade tensions. While Setser (2023b) reported that China has not shifted its reserves away from dollar bonds, in the first quarter of 2024, China was reportedly again diversifying away from U.S. assets and increasing its holdings of gold, although such gold holdings are still small (Kondo and Ouyang, 2024).

Fourth, if the PRC did sell its U.S. Treasury, agency, and/or corporate bonds, one might very roughly estimate the effect on the U.S. bond market from the previously estimated effects of surprising U.S. large-scale asset purchase (LSAP) announcements. The total effect of a $1 trillion medium- and long-bond purchase announcement in 2008-09 was about 30 basis points on the 10-year yield (Gagnon et al., 2011; Neely, 2015). If we assume that half of this effect came from "signaling"—changes in expectations about Fed short-rate policy—then the portfolio balance effect of the purchases themselves were about 15 basis points on the 100-year yield.[11] Only the portfolio balance effect would occur from a private-sector sale of bonds; we can exclude the signaling effect. The (nominal) economy has grown about

9. According to November 2024 data from the U.S. Department of the Treasury, total foreign holdings of Treasuries are $8.63 trillion, while total Treasuries outstanding are $28.20 trillion. The Fed's large bond purchases in 2020 raised the Fed's holdings of Treasury debt and substituted banking reserves with the Fed for Treasury securities as liabilities of the U.S. government. So, one cannot simply discount Fed holdings of U.S. government debt because those holdings exist, because they are the flip side of a Fed liability: bank reserves.

10. *Puttable* bonds permit the holder of the bond the option of early redemption. *Callable* bonds provide the bond issuer the right to redeem the bonds early.

11. Asset purchase effects on yields are typically apportioned into liquidity, signaling, and portfolio balance effects. Liquidity effects occur when asset purchases restore functioning to dysfunctional markets. Signaling effects on yields occur if central bank asset purchases cause markets to anticipate lower short-term rates in the future—that is, easier future central bank policy. Portfolio balance effects occur because short- and long-term bonds are imperfect substitutes for some investors and these investors will pay more (lower the yields) on long-term bonds if they become scarce. A sale of U.S. bonds by the PRC would produce mostly portfolio balance effects, which might be half the total effect of a Fed asset purchase.

90 percent since 2009, so we can scale down that 15-basis-point portfolio balance effect of a $1 trillion sale to about 8 basis points on medium- to long-term bonds. And the Chinese would be selling securities across the yield curve, so that would weaken and spread out the effect on yields, producing an effect of perhaps 5 basis points across the curve.

This back-of-the-envelope calculation indicates that a PRC sale of $1 to $3 trillion of U.S. assets would probably have a relatively small effect (5 to 15 basis points), mildly raising U.S. yields across the curve. The issue would be complicated somewhat by the fact that the PRC sales would presumably be done over a short period of time while the LSAP took place over a period of years. Flooding the market with Treasuries would very likely produce additional price effects in the short term. The substantial psychological effect would certainly roil markets but would probably be short-lived. The overall impact would be unwelcome but manageable. The Fed would likely respond to such sales by intervening to ensure market functioning and prevent knock-on effects.

Of course, by driving down the price of Treasuries, such a PRC fire sale would significantly reduce the value it reaps from the asset sale. The question of what it would do with the funds reaped from the sales is also unanswered. Presumably, the PRC authorities would also risk loss from sanctions if they put the funds into the assets of any other western economy. The authorities could invest some of the funds into precious metals, such as gold or silver, but large purchases would have large price effects on relatively modestly sized markets in which much of the potential supply is used for jewelry or is effectively locked up in the foreign exchange reserves of western countries.[12] In other words, the PRC would have limited options for rebalancing its portfolio in the short run.

4. INTERNATIONAL TRADE

"The spirit of trade cannot coexist with war, and sooner or later this spirit dominates every people." —Immanuel Kant

"For the only way in which a durable peace can be created is by world-wide restoration of economic activity and international trade."—James Forrestal

Shares of International Trade

While financial markets would react first, a major war in the western Pacific—or even anticipation of such a war—would soon very severely affect trade in goods and services. Leaving aside the direct destruction of ships and port facilities, commercial shipping would likely find it hard to get private insurance to sail in a war zone. No country would have all its trade cut off, of course, and some countries, such as the U.S., would still be able to do most of its international trade because most U.S. trade does not go through the western Pacific. Still, countries involved in the conflict would see their trade reduced by varying degrees.[13]

The first three columns of Table 3 show the exports, imports, and total trade (exports plus imports) as a percentage of world GDP for each of six political regions that might be involved in the conflict: Australia, China, Japan, South Korea, Taiwan, and the U.S. Each subpanel of Table 3 shows the figures

12. Although there is very substantial daily trading activity in gold, the total amount of gold that is potentially available to be purchased is modest. The World Gold Council estimates that the above-ground stock of gold is 212,582 tonnes (metric tons) as of February 1, 2024. Of that, 22 percent is in bars, coins, and gold-backed exchange-traded funds. The total value of *all* these bars and coins would be only $4.124 trillion, at a value of $2,500 an ounce. In comparison, as of June 2024, there is about $35 trillion of U.S. Treasury debt outstanding, and the market capitalization of the S&P 500 is about $46 trillion.

13. Fajgelbaum and Khandelwal (2022) study the economic impacts of a much less drastic reduction in trade caused by the imposition of tit-for-tat tariffs in the U.S.–China trade conflict of 2018-20. They conclude that the tariffs did lower real income in both countries but by small magnitudes relative to GDP.

Table 3

Trading Patterns

1	2	3	4	5	6	7	8
Country	Trading partner	X/GDP^W	M/GDP^W	(X + M)/ GDP^W	X/GDP^N	M/GDP^N	(X + M)/ GDP^N
Australia	World	0.4	0.3	0.7	24.5	18.5	42.9
Australia	China	0.1	0.1	0.2	6.1	5.0	11.1
Australia	Japan	0.1	0.0	0.1	3.1	1.1	4.2
Australia	S. Korea	0.0	0.0	0.0	1.5	1.1	2.6
Australia	USA	0.0	0.0	0.0	0.7	1.9	2.6
China	World	3.4	2.6	5.9	20.0	15.1	35.1
China	China	0.5	0.2	0.7	3.2	1.0	4.2
China	Japan	0.2	0.2	0.3	0.9	1.1	2.0
China	South Korea	0.2	0.2	0.3	1.0	1.0	2.0
China	USA	0.1	0.2	0.3	0.5	1.3	1.8
Japan	World	0.7	0.8	1.5	17.6	21.2	38.9
Japan	China	0.1	0.2	0.3	3.4	4.5	7.9
Japan	Japan	0.1	0.1	0.2	3.3	2.1	5.4
Japan	South Korea	0.0	0.1	0.1	0.4	2.1	2.5
Japan	USA	0.0	0.0	0.1	1.2	0.9	2.1
South Korea	World	0.7	0.7	1.4	41.0	43.9	85.0
South Korea	China	0.2	0.1	0.3	9.4	9.3	18.6
South Korea	Japan	0.1	0.1	0.2	6.6	4.9	11.5
South Korea	South Korea	0.0	0.1	0.1	1.8	3.3	5.1
South Korea	USA	0.0	0.0	0.1	1.1	2.7	3.8
Taiwan	World	0.5	0.4	0.9	62.7	57.2	119.8
Taiwan	China	0.1	0.1	0.2	15.8	11.0	26.8
Taiwan	Japan	0.1	0.0	0.1	9.8	5.9	15.7
Taiwan	South Korea	0.0	0.1	0.1	4.4	7.1	11.5
Taiwan	USA	0.0	0.0	0.1	2.9	4.5	7.4
USA	World	2.1	3.5	5.6	8.1	13.2	21.3
USA	China	0.4	0.5	0.8	1.4	1.8	3.1
USA	Japan	0.3	0.5	0.8	1.3	1.8	3.1
USA	South Korea	0.2	0.6	0.8	0.6	2.3	2.9
USA	USA	0.1	0.2	0.2	0.3	0.6	0.9

NOTE: The table shows trade statistics for six countries that might be involved in a conflict in the event of a PRC invasion of Taiwan. Each subpanel shows the figures for each country's trade with the world and its top four trading partners. The first column shows the base country. The second column shows the world and next top four trading partners for each country. Columns three through five show the base country's exports, imports, and total trade (X + M) as percentages of world GDP (GDP^W). Columns six through eight show the base country's exports, imports, and total trade (X + M) as percentages of national GDP (GDP^N). Data are as of 2022.

for a specific country with the world and its top four trading partners. For example, the first subpanel of Table 3 shows that Australia does the most trade with the PRC, Japan, South Korea, and the U.S., in that order. The fifth column (labeled $(X + M)/GDP^W$) of the first row of Table 3 shows that Australia's total international trade with the rest of the world comprises 7/10th of 1 percent of world GDP.

The numbers in columns three to five of Table 3 measure the extent to which exports (X), imports (M), and total trade (X + M) of these countries is important to the global economy. The largest numbers in the total trade column (labeled $(X + M)/GDP^W$) are world trade for China, the U.S., and Japan, whose respective total trade are equal to 5.9 percent, 5.6 percent, and 1.5 percent of world GDP, respectively. These are substantial figures, indicating that disruption of this trade would be felt well beyond each of these countries.

To show the importance of international trade to each country, columns six through eight show the base country's exports, imports, and total trade (X + M) as percentages of national GDP. Total trade as a share of national GDP is often considered a good measure of *openness* to international trade. China, the U.S., and Japan, whose total trade equaled the largest shares of world GDP, also have total trade that equal the smallest shares of national GDP at 35.1 percent, 21.3 percent, and 38.9 percent, respectively.

Trading Patterns

The countries with the largest trade shares of world GDP also tend to have the smallest trade shares of national GDP—that is, the smallest *openness*. Larger economies, such as China and the U.S., can rely on domestic sources for a great many goods and services, while smaller economies are less diversified and find it cheaper to turn to foreign sources and markets. That is, larger economies tend to be less open, or more *closed*. Note that openness is measured relative to the size of the economy, so large economies such as China, the U.S., and Japan can be less open but still major trading nations.

Geography matters too. Countries tend to trade the most with geographically close neighbors. For example, Table 3 shows that these western Pacific Rim countries tend to trade with their neighbors in the western Pacific Rim, including the more distant but economically large U.S. The U.S. trades a great deal with its North American neighbors, Canada and Mexico, but also with the more distant but very large Chinese economy.

A serious armed conflict in the western Pacific would not only stop trade between the belligerent sides but also greatly reduce trade even within coalitions because of the danger to commercial shipping. Because the economies of the western Pacific are naturally each other's biggest trading partners, a war in the western Pacific would most seriously affect the economies of western Pacific nations, whether or not they participate in the hostilities. But the size of the affected economies indicates that such a conflict would be a major negative economic event for the whole world.

A conflict would also seriously hurt smaller Asian economies such as Malaysia, the Philippines, Singapore, and Vietnam. Although Table 3 omits these nations because of the relatively small size of their economies, they are heavily dependent on trade with all the larger economies listed in Table 3. Not all trade would be physically stopped; for example, Vietnam and the PRC have a land border over which trade could continue. But the disruption of certain trading routes would surely shut down others in the complex patterns of supply chains.

Major Exports by Country

One way in which a conflict over Taiwan would impact the world economy would be by cutting off supplies of particular goods that are significantly sourced from countries involved in the conflict. For example, the Russian invasion of Ukraine created international shortages of grain and fertilizer because Russia and Ukraine are heavily involved in the production of those products. The impact of the COVID-19 pandemic on auto manufacturing provides another example of the fragility of supply chains. Initially,

Table 4

Major Exports by Country

1	2	3	4
Country	**Export**	**% of X^W**	**% of GDP^N**
Australia	Mineral substances not elsewhere specified	80.4	0.5
Australia	Iron ores and concentrates	56.9	5.1
Australia	Coal; briquettes, ovoids, and similar solid fuels	45.6	5.9
Australia	Aluminum oxide; aluminum hydroxide	33.4	0.4
Australia	Rape or colza seeds	30.3	0.3
China	Tricycles, scooters, pedal cars, and wheeled toys	70.5	0.3
China	Luminaires and light fittings included	67.8	0.3
China	Telephone sets, including smartphones	44.2	1.3
China	Electric accumulators, including separators	44.1	0.3
China	Automatic data processing machines, magnetic or optical reader	43.6	1.0
Japan	Machines and apparatus for the manufacture of semiconductors	23.5	0.7
Japan	Bulldozers, graders, levelers, scrapers, angledozers, and mechanical shovels	21.1	0.3
Japan	Iron or non-alloy steel	15.4	0.3
Japan	Motor cars and other motor vehicles	11.2	2.0
Japan	Commodities not specified	7.7	1.3
South Korea	Salts of oxometallic or peroxometallic acids	73.3	0.7
South Korea	Flat panel display modules	26.8	1.2
South Korea	Cruise ships, excursion boats, ferryboats, cargo ships, and barges	22.4	0.9
South Korea	Discs, tapes, solid-state non-volatile storage devices, smart cards, and other media	19.8	0.9
South Korea	Electronic integrated circuits	10.6	6.8
Taiwan	Electronic integrated circuits	17.3	24.1
Taiwan	Machinery; parts and accessories	13.4	2.5
Taiwan	Screws, bolts, nuts, coach screws, screw hooks, rivets, etc.	12.4	0.8
Taiwan	Circuits; printed	12.2	0.9
Taiwan	Discs, tapes, solid-state non-volatile storage devices, smart cards, and other media	12.2	1.2
USA	Commodities not specified	21.1	0.6
USA	Petroleum oils and oils from bituminous minerals, not crude	14.6	0.5
USA	Petroleum gases and other gaseous hydrocarbons	14.1	0.4
USA	Petroleum oils and oils obtained from bituminous minerals	14.0	0.5
USA	Human blood; animal blood for therapeutic, prophylactic, or diagnostic uses	13.4	0.2

NOTE: The table shows the major exports of six countries that might be involved in a conflict in the event of a PRC invasion of Taiwan. The third column shows the value of the export category as a percentage of world exports (X^W) of that product, while the fourth column shows the value of the exports from that country in that category as a percentage of national GDP (GDP^N). Data are as of 2022.

Table 5

SPR Coverage of Oil Imports

Country	Total days of import coverage	Days covered by industry stocks	Days covered by public stocks
Australia	59	59	0
Japan	191	76	116
Korea	241	125	117

NOTE: The table shows the number of days of normal oil imports in the petroleum reserves of Australia, Japan, and South Korea. Days covered by industry and public stocks may not sum exactly to total because of rounding.

SOURCE: International Energy Agency.

vehicle assembly plants closed for health reasons, which caused a temporary decline in the demand for computer chips used in cars. Chip manufacturers responded by shifting chip production to other sectors, such as consumer electronics. As car manufacturing returned to normal, demand for chips for cars rose strongly, and a serious shortage of chips for cars developed (Wayland, 2021).

Table 4 describes the exports of the countries that might be caught up in a potential conflict over Taiwan. Column three shows the value of the country's exports in that category as a percentage of world exports of that category (labeled % of X^W). This statistic indicates the importance of that source of the good or service to the world economy, while the fourth column shows the value as a percentage of national GDP (% of GDP^N), which indicates the importance to the exporting national economy.

The first subpanel of Table 4 shows that Australia is a major commodity exporter, with its contributions making up a large portion of world exports of several categories of goods, including iron, coal, aluminum oxide, and rape/colza seeds. Likewise, China is a very important source of several types of manufactures, including smartphones and data processing machines. Japan produces significant shares of many types of heavy machinery and equipment for producing semiconductors.[14] South Korea produces a majority of world exports of salts of oxometallic or peroxometallic acids, which are used in the production of chemical products, including fertilizers, plastics, and rubber, as well as manufactures such as flat panel displays and ships. Taiwan is most famous for exporting computer chips but also exports other electronic equipment and machine parts. The U.S. is an important exporter of several types of petroleum products and human and animal blood for medical use.

A slowdown or halt of Taiwan's semiconductor exports might disrupt global economic activity as much as or more than any other single effect (Jones et al., 2023; Vest, Kratz, and Goujon, 2022). Taiwan produces much of the world's supply of semiconductors, including 92 percent of the most advanced logic chips. The loss of these chips would seriously impair the production of many products, including computers, phones, automotives, medical and telecommunication equipment, and machinery for mining or farming.[15] These products include both intermediate inputs and final consumption goods.

14. Semiconductors, which include integrated circuits or microchips, are crucial components of electronic devices such as smartphones, radios, televisions, computers, video games, and medical equipment. They are made from semiconductive materials such as silicon, germanium, or gallium arsenide. The manufacturing process adjusts the conductivity of these materials by adding small amounts of impurities (Jones et al., 2023).

15. Jones et al. (2023) detail how a reduction or elimination of Taiwanese semiconductor exports would specifically affect the U.S. economy. These authors note the importance of semiconductors for aircraft and automobiles, as well as other computer and scientific equipment. They also detail the reasons that the complexities of the global production chain, differing types of semiconductors, and uses of semiconductors make it difficult to measure the effect on the U.S. economy. Finally, these authors report that domestic suppliers have very limited ability to expand production to replace Taiwanese chips.

Commodity Imports

Countries at war need commodities, most obviously oil, to fuel their economies. Australia, China, Japan, and the U.S. each have strategic petroleum reserves (SPRs). Table 5 shows February 2024 data from the International Energy Agency on coverage of oil imports by reserve stocks. As of February 2024, the Australian government had 59 days of oil imports stockpiled. The U.S. is not included in Table 5, because it is a net petroleum exporter; but, as of February 2024, the U.S. SPR had about 360 million barrels, with a daily U.S. consumption of about 20 million barrels.[16]

Taiwan is almost completely dependent on imported energy, although it is seeking to develop renewable resources (Boone, 2023). The government of Taiwan contracts SPR services through two corporations, the publicly held CPC Corporation Taiwan and the privately held Formosa Petrochemical Corporation of Formosa Plastics Group. These firms together store at least 60 days (i.e., 64 mm bbl), but these reserves are vulnerable to PRC missile attacks (Boone, 2023).

China does not reveal the size of its SPR, but Bloomberg News (2016) reported that China's SPR had about 400 million barrels in 2016, with a total capacity of 511 million barrels. At the same time, China's normal oil imports were about 11.4 million barrels per day in December 2023, which was about 70 percent of domestic consumption (Cossins-Smith, 2024). Hypothetically, if China's SPR actually holds, say, 480 million barrels, then the PRC's SPR would provide about 42 days of normal imports.

All the potential belligerents appear to have adequate oil reserves to cover six or more weeks of imports. Pre-crisis efforts to top off their reserves or ration usage would make these reserves last even longer.

5. EFFECTS ON THE U.S. AND WORLD ECONOMIES

Stimulative or Disruptive?

The conventional wisdom among non-economists is that war is stimulative, and it can be stimulative under some circumstances, particularly when the expenditures are large and the economy is initially in recession. The classic example of this came during World War II, when U.S. real GDP, measured in 2017 dollars, rose from $1.215 trillion in 1938 to $2.525 trillion in 1944, a whopping 13 percent annual growth rate over six years (U.S. Bureau of Economic Analysis, 2024). But any stimulation comes at a cost, however, producing higher taxes both initially and to pay the debt.

The initial economic effects of a conflict over Taiwan would certainly be very disruptive because of the fragility of modern supply chains. As discussed previously, imports from and exports to and from western Pacific nations would be greatly reduced, disrupting export businesses and cutting off intermediate goods that are crucial to the production of final goods.

Precautionary Savings

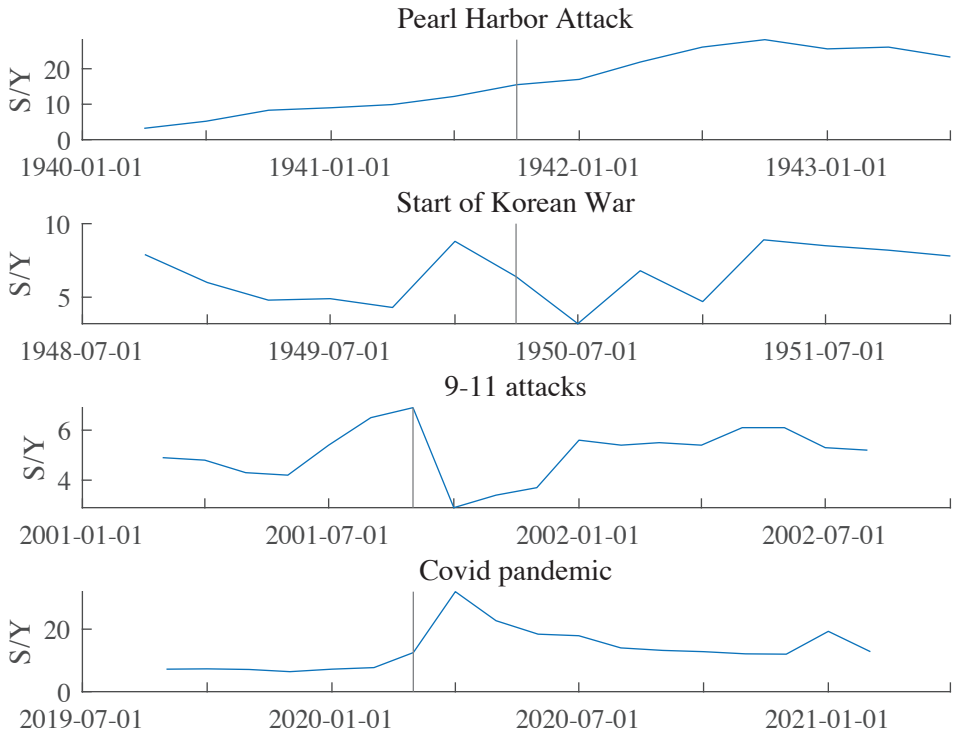
"Epileptics know by signs when attacks are imminent and take precautions accordingly; we must do the same in regard to anger."—Seneca the Younger

One might think that a big rise in uncertainty could raise personal savings rates as consumers save more to insure against possible reductions in consumption and imported goods, which would be more expensive or unavailable as shipping becomes riskier and more expensive. The historical evidence on that proposition is mixed, however. Figure 3 displays personal savings as a percentage of disposable income (i.e., the personal savings rate) around the Pearl Harbor attack in December 1941, the start of

16. Neely (2024) lays out potential reasons for keeping an SPR.

Figure 3

Personal Savings Rates Around the Pearl Harbor Attack, the Start of the Korean War, the 9/11 Attacks, and the Start of the COVID-19 Pandemic



NOTE: The figure displays personal savings as a percentage of disposable income (S/Y) around the Pearl Habor attack in December 1941, the start of the Korean War in June 1950, the 9/11 terrorist attacks in September 2001, and the start of the COVID-19 pandemic in March 2020. The first two panels display quarterly data, while the third and fourth show monthly data.

SOURCE: NBER Macro history database and FRED, Federal Reserve Bank of St. Louis.

the Korean War in June 1950, the 9/11 terrorist attacks in September 2001, and the COVID-19 pandemic outbreak in March 2020.

The top panel shows that personal savings did rise in the wake of the Pearl Harbor attack, but that it had been rising for the prior 18 months, during which World War II was being fought in Europe and Asia. This rise in personal savings in 1940-42 is consistent with growing concern about potential U.S. involvement in World War II.

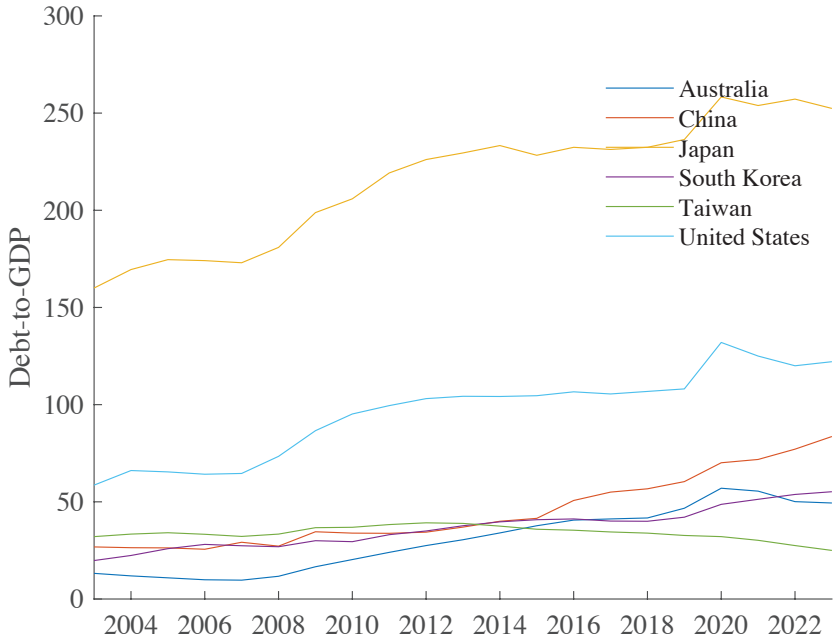
The second panel shows that savings declined in the third quarter of 1950, which would have been coincident with growing appreciation of the seriousness of the Korean conflict. It is not clear why savings had been so high in 1950Q1 and 1950Q2, although an admittedly speculative possibility is that consumers feared a return of the Great Depression (Caplan, 1956) and therefore saved in response to the 1948-49 recession that had ended in November 1949. Savings actually fell in the first full quarter after the outbreak of the Korean war but rose in the following quarters.

Using monthly data, the third panel shows a rise in savings in August/September 2001, which Marquis (2002) attributes to tax rebates, but a decline in the savings rate in October through December 2001.

Finally, the fourth panel shows a dramatic increase in the savings rate following the start of the COVID-19 pandemic in March 2020. This rise in savings was probably fueled by a combination of factors: precautionary motives (fear), a rise in disposable income in the form of government transfers to

Figure 4

Central Government Debt-to-GDP Ratios



NOTE: The figure displays personal savings as a percentage of disposable income (S/Y) around the Pearl Habor attack in December 1941, the start of the Korean War in June 1950, the 9/11 terrorist attacks in September 2001, and the start of the COVID-19 pandemic in March 2020. The first two panels display quarterly data, while the third and fourth show monthly data.

SOURCE: NBER Macro history database and FRED, Federal Reserve Bank of St. Louis.

cushion the economic effects of the pandemic, and a lack of opportunity for many types of consumption, such as travel.

In summary, there is, at best, mixed evidence that an incipient war or other crisis increases precautionary saving, although none of these four cases is a perfect analogy to the beginning of an armed conflict over Taiwan.

Fiscal and Monetary Policy

"Though the consumption even of a wasteful government cannot keep pace with the accumulation of individuals, the consumption of war can easily outstrip it."—James Mill, *Commerce Defended*

Any armed conflict in the western Pacific would require large fiscal outlays to buy ammunition, weapons, and other supplies. The attempt to supply Ukraine with weapons to fight the Russian invasion makes it seem very likely that the excess demand for weapons would far exceed the ability of defense contractors to quickly supply those needs at any price. Indeed, it has become very difficult to rapidly increase production of even fairly simple munitions, such as artillery shells, much less sophisticated guided weapons (Babb and Yarysh, 2024). The difficulty of rapid expansion or development of military capabilities is not a new problem. Secretary of Defense Donald Rumsfeld described it as follows: *"You go to war with the Army you have, not the Army you might want or wish to have at a later time"* (Record and Rumsfeld, 2011).

Still, a conflict over Taiwan would be very expensive, likely costing at least hundreds of billions of dollars for the larger combatants, as well as reducing normal tax revenue from trade and production channels, so initial fiscal conditions would be relevant. But the fiscal situations of several of the countries

Table 6

Share of Global Manufacturing Output

Rank	Country	% Share of Global manufacturing output
1	China	28.4
2	United States	16.6
3	Japan	7.5
4	Germany	5.8
5	India	3.3
6	South Korea	3.0
7	Italy	2.3
8	France	1.9
9	United Kingdom	1.8
10	Indonesia	1.4

NOTE: The table shows the shares of global manufacturing output of the top 10 nations by that metric.

SOURCE: Adapted from Safeguard Global; https://www.safeguardglobal.com/resources/top-10-manufacturing-countries-in-the-world-2023/ . Accessed May 2024.

are already fairly serious by a reasonable measure of fiscal constraint: central government debt-to-GDP ratios. Figure 4 uses IMF data on debt-to-GDP ratios for the six countries we have been considering—Australia, the People's Republic of China, Japan, South Korea, Taiwan, and the U.S. Among these figures for central government debt for 2023, Japan had the largest debt-to-GDP ratio of the group and second largest in the world, at 252.4 percent, and the U.S. is second (in the group) with a ratio of 122.1 percent.[17] Japan and the U.S. have been able to borrow large amounts of money because they are wealthy countries, and their governments are perceived as stable by international markets. Surprisingly, the People's Republic of China has a debt-to-GDP ratio of 83.6 percent, which is quite high for a country with its level of per capita GDP. This is surprising because emerging markets typically have relatively low debt-to-GDP ratios. China's very strong exports doubtless contribute to its ability to run a fiscal deficit.

That is, in addition to accommodative monetary policy, one would expect very large deficit spending, as well as possible declines in GDP with the economic disruptions. The combination of these factors would very likely cause a spike in inflation and calls for wage and price controls.

Industrial Output

The complex nature of modern weapons and the likelihood that a conflict over Taiwan will be weeks or months long, rather than many years, means that vast and fast conversion of the U.S. to a war economy seen during World War II would probably not be possible. Only a long-term conflict expected to last many years would produce significant structural changes.

If a conflict did last for years, the U.S. would no longer have the significant advantage in manufacturing output that it had during the Second World War. Table 6 shows that, as of 2023, China has the largest share—by far—of global manufacturing (28.4 percent), exceeding the manufacturing output of the U.S. (16.6 percent) and Japan (7.5 percent) combined.

17. As Chien and Stewart (2023) explain, Japan's gross debt condition exaggerates its fiscal burden because Japan's government holds many financial assets. That is, Japan's *net* debt was much lower, at only 114 percent of GDP in 2022. The same is true of the U.S. to a lesser degree. The net debt of the U.S. government was only 78 percent in 2022.

In shipbuilding, the change in relative U.S. productive capacity has been even more striking. According to UNCTADstat, China, South Korea, and Japan produced nearly all ships in the world in 2023. China produced 50.7 million gross tons; South Korea produced 28.3 million gross tons; and Japan produced 15.4 million gross tons (UNCTADstat, 2014-23). For comparison, the U.S. produced 0.1 million gross tons. Other measures of shipping production, such as compensated gross tonnage, which adjusts for the complexity of the ships produced, also imply that China, South Korea, and Japan have nearly all the global productive capacity to produce ships.

A Comparison with COVID-19

The most recent shock to the global economy that might be comparable to an invasion of Taiwan would be the COVID-19 pandemic. Martin, Sánchez, and Wilkinson (2023) describe the effect of COVID-19 on the global economy. As in the COVID-19 pandemic, a conflict over Taiwan would disrupt international trade, but the disruption would be focused to an extreme degree in the western Pacific, as opposed to the global disruption seen during the pandemic.

The disruption of international trade would reduce output and employment in tradeable sectors of the countries of the region very substantially, but a conflict over Taiwan would not disrupt purely domestic economic activities in the way that the COVID-19 pandemic did. Plunging output in tradeable sectors would not be confined to nations directly involved in the conflict, however, but would spread internationally through disruption of supply chains and to non-tradeable sectors of all countries in the same way.

As during the COVID-19 pandemic, a conflict over Taiwan would prompt substantially increased government spending, although the type of spending would differ. COVID-19 spending had been primarily to support incomes of individuals and businesses, while spending during an armed conflict would focus on military expenditures, although other spending to support tradable sectors would be very likely. Haas, Neely, and Emmons (2020) describe how central banks employed lower interest rates and asset purchases to cushion the impact of COVID-19 on financial markets and the broader economy. Monetary authorities would likely take similar actions for similar reasons in the event of a conflict over Taiwan.

In the longer run, the combination of these supply disruptions and stimulatory measures would likely produce higher debt and higher inflation, with some delay.

6. CONCLUSION

This article has examined the economic consequences of a conventional armed conflict in the western Pacific that would be precipitated by an invasion or blockade of Taiwan by the People's Republic of China. Specifically, the article borrows the assumptions of Cancian, Cancian, and Heginbotham (2023) about the potential scope and outcome of such a conflict.

The Chinese authorities would probably seek to substantially reduce their relatively large holdings in U.S. securities prior to a conflict to avoid sanctions. Fortunately, even a large owner such as China holds only a small portion of U.S. Treasury and/or corporate debt, so PRC sales would likely have only a very modest effect on U.S. interest rates.

It is likely that expectations of such a conflict would first appear in western asset prices. It is very possible, even likely, that these asset prices would partially anticipate such a conflict, as they did to some degree for the Russian invasion of Ukraine (Neely, 2022). Expectations of such a conflict would provoke a flight to quality, which would be led by particularly astute investors. Stock prices would likely fall, while those of safer assets, such as government bonds, would probably rise. Western investors and corporations doing business in the PRC would seek to repatriate their assets to the extent that they could,

given the PRC's extensive capital controls. Commodity prices might well decline if curtailment in shipping and productive activity reduces demand for commodities, such as oil, sufficiently.

The countries that would likely be involved in a conflict over Taiwan are some of the largest trading nations, and the shutdown of sea lanes in the western Pacific would severely impact global trade, not just for the nations involved. There would be serious negative shocks to the global production chain of many types of goods, especially those that use electronic components. Most prominent among these goods would be aircraft, automobiles, and heavy machinery for construction and mining.

The destruction of human and physical capital, as well as defaults from the loss of trade and dislocation of economic activity, might create serious problems for non-Chinese banks that are exposed to loan losses in the region. Costs of supporting the banking system or compensating depositors for losses would add to the high fiscal costs of the war.

Central banks would probably support financial markets, the banking system, and their governments' fiscal expenditures by lowering short-term interest rates and perhaps with special lending programs and/or purchases of medium and long-term government bonds.

A war over Taiwan would be far more disruptive to domestic economic activity than stimulative. The eruption of hostilities might produce an increase in precautionary savings, although it is hard to find clear evidence of this pattern in the starts of previous major military conflicts, such as the Pearl Harbor attack or the start of the Korean War.

Any war over Taiwan would produce large fiscal costs, which would add to the large, existing government debts of Japan, the U.S., and China. Persistently increased defense expenditures and long-term hindrance of international trade would probably further magnify this fiscal burden.

In summary, even a short-term conflict over Taiwan would produce enormous human costs, as well as serious long-term economic consequences, including long-term disruption to trade relations, destruction of much human and physical capital, and potentially a costly long-term arms buildup to deter further wars.

REFERENCES

Arnold, Aaron and Daniel Salisbury. "The Sanctions-Busting Architects: Moscow's Preparations for the West's Sanctions." *Lawfare*, March 4, 2024. https://www.lawfaremedia.org/article/the-sanctions-busting-architects-moscow-s-preparations-for-the-west-s-sanctions.

Babb, Carla and Ostap Yarysh. "Without More Funds, US Unable to Hit Ammunition Production Goals." *Voice of America*, March 1, 2024. https://www.voanews.com/a/without-more-funds-us-unable-to-hit-ammunition-production-goals/7510881.html.

BBC. "China and Taiwan: A really simple guide." *BBC*, January 7, 2024a. https://www.bbc.com/news/world-asia-china-59900139.

BBC. "What are the sanctions on Russia and have they affected its economy?" *BBC*, 23 February 2024b. https://www.bbc.com/news/world-europe-60125659.

Bermudez, Keith, Grace Chio, Xirui Gao, Zhengqian He, Alyse LaVoie, Tenzin Taklha, Mina Watanabe, and Bruce Wu. "Modeling Economic Warfare Between a US-led Coalition and China over Taiwan." Colombia School of International and Public Affairs, 2023. https://www.sipa.columbia.edu/sites/default/files/2023-05/For_Publication_Eurasia_Janow_0.pdf.

Blanchette, Jude, Gerard DiPippo, and Christopher B. Johnstone. "Scared Strait: Understanding the Economic and Financial Impacts of a Taiwan Crisis." Center for Strategic & International Studies, December 13, 2023. https://www.csis.org/analysis/scared-strait-understanding-economic-and-financial-impacts-taiwan-crisis.

Bloomberg News. "Oil Bulls Beware Because China's Almost Done Amassing Crude." June 30, 2016. https://www.bloomberg.com/news/articles/2016-06-30/oil-bulls-beware-because-china-s-almost-done-amassing-crude.

Boone, Merlin. "Securing Taiwan's Black Gold: A Crude Analysis." *Global Taiwan Brief*, Vol 8, Issue 17, September 6, 2023. https://globaltaiwan.org/2023/09/securing-taiwans-black-gold-a-crude-analysis/.

Brooke, James. "Japan's Figures Officially Show a Contraction." *New York Times*, September 8, 2001. https://www.nytimes.com/2001/09/08/business/japan-s-figures-officially-show-a-contraction.html.

Cancian, Mark F., Matthew Cancian, and Eric Heginbotham. "The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan." Center for Strategic & International Studies, January 9, 2023. https://www.csis.org/analysis/first-battle-next-war-wargaming-chinese-invasion-taiwan.

Caplan, Benjamin. "A Case Study: The 1948-1949 Recession." In *Policies to Combat Depression*, 27-58. NBER, 1956. https://www.nber.org/system/files/chapters/c2798/c2798.pdf.

Chen, Yu-chin and Kenneth Rogoff. "Commodity currencies." *Journal of International Economics* 60, no. 1 (2003): 133-160. https://scholar.harvard.edu/files/rogoff/files/51_jie2003.pdf.

Chien, YiLi and Ashley H. Stewart. "What Lessons Can Be Drawn from Japan's High Debt-to-GDP Ratio?" Federal Reserve Bank of St. Louis *On the Economy Blog*, November 14, 2023. https://www.stlouisfed.org/on-the-economy/2023/nov/what-lessons-drawn-japans-high-debt-gdp-ratio.

Congressional Research Service. Russia's War on Ukraine: Financial and Trade Sanctions, February 22, 2023. https://sgp.fas.org/crs/row/IF12062.pdf.

Cossins-Smith, Annabel. "China's Crude Oil Imports Hit Record High." *Offshore Technology*, January 12, 2024. https://www.offshore-technology.com/news/china-crude-oil-imports-record-high-2023/.

Fajgelbaum, Pablo D. and Amit K. Khandelwal. "The Economic Impacts of the US–China Trade War." *Annual Review of Economics* 14, no. 1 (2022): 205-228.

Gagnon, Joseph, Matthew Raskin, Julie Remache, and Brian Sack. "The Financial Market Effects of the Federal Reserve's Large-Scale Asset Purchases." *International Journal of Central Banking* 7, no. 1 (2011): 45-52. https://www.ijcb.org/journal/ijcb11q1a1.pdf.

Green, M.J. and B.S. Glaser. "What Is the U.S. 'One China' Policy, and Why Does It Matter?" Center for Strategic and International Studies, January 13, 2017. https://www.csis.org/analysis/what-us-one-china-policy-and-why-does-it-matter.

Haas, Jacob, Christopher J. Neely, and William R. Emmons. "Responses of international central banks to the COVID-19 crisis." Federal Reserve Bank of St. Louis *Review* (2020). http://dx.doi.org/10.20955/r.102.339-84.

Heath, Timothy R., Sale Lilly, and Eugeniu Han. "Can Taiwan Resist a Large-Scale Military Attack by China? Assessing Strengths and Vulnerabilities in a Potential Conflict." RAND Corporation, June 27, 2023. https://www.rand.org/pubs/research_reports/RRA1658-1.html.

HSBC Global Research. "Emerging Markets Currency Guide 2016: An Essential Companion." January 2016. http://bg.panlv.net/report/1e1692068457e0b7.html.

International Monetary Fund. "World Economic Outlook— Steady but Slow: Resilience amid Divergence." April 30, 2024. https://www.imf.org/en/Publications/WEO/Issues/2024/04/16/world-economic-outlook-april-2024.

Jones, Lin, Sarah Krulikowski, Nathan Lotze, and Samantha Schreiber. "US Exposure to the Taiwanese Semiconductor Industry." U.S. International Trade Commission, November 2023.

Kimball, D. and F. Xiao. "Effectiveness and Effects of China's Capital Controls." In Conference: WTO, China, and the Asian Economies, IV, Economic Integration and Economic Development, University of International Business and Economics (June 2006): 24-25. https://faculty.washington.edu/karyiu/confer/beijing06/papers/xiao-kimball.pdf.

Kondo, Masaki and Iris Ouyang. "China Sells Record Sum of U.S Debt Amid Signs of Diversification." *Bloomberg News*, May 15, 2024. https://www.caixinglobal.com/2024-05-17/china-sells-record-sum-of-us-debt-amid-signs-of-diversification-102197125.html#:~:text=Beijing%20offloaded%20%2453.3%20billion%20of%20Treasury%20and%20agency,away%20from%20American%20assets%20as%20trade%20tensions%20persist.

Lawrence V., Susan. "Taiwan: The Origins of the U.S. One-China Policy." Congressional Research Service, September 27, 2023. https://crsreports.congress.gov/product/pdf/IF/IF12503.

Liu, Mingyue. "From 'Strategic Ambiguity' Toward 'Strategic Clarity': US Taiwan Policy under Biden Presidency." *Academic Journal of Management and Social Sciences* 3, no. 1 (2023): 1-3. https://doi.org/10.54097/ajmss.v3i1.9050.

Majaski, Christina. "Yuan vs. Renminbi: What's the Difference?" *Investopedia*, May 15, 2024. https://www.investopedia.com/articles/forex/061115/yuan-vs-rmb-understanding-difference.asp.

Marquis, Milt. "What's Behind the Low U.S. Personal Saving Rate?" Federal Reserve Board of San Francisco, March 29, 2002. https://www.frbsf.org/research-and-insights/publications/economic-letter/2002/03/what-is-behind-the-low-us-personal-saving-rate/.

Martin, Fernando M., Juan M. Sánchez, and Olivia Wilkinson. "The Economic Impact of COVID-19 Around the World." Federal Reserve Bank of St. Louis *Review*, Second Quarter 2023, pp. 74-88. https://www.stlouisfed.org/publications/review/2023/03/09/the-economic-impact-of-covid-19-around-the-world.

McKinnon, Ronald I. and Wallace E. Oates. *The Implications of International Economic Integration for Monetary, Fiscal, And Exchange-Rate Policy*, no. 16. International Finance Section, Department of Economics, Princeton University, 1966.

Neely, Christopher J. "The Giant Sucking Sound: Did NAFTA Devour the Mexican Peso?" Federal Reserve Bank of Saint Louis *Review* 78, no. 4 (July/August 1996): 33-48. https://doi.org/10.20955/r.78.33-48.

Neely, Christopher J. "An Introduction to Capital Controls." Federal Reserve Bank of St. Louis *Review* 81, no. 6 (November/December 1999): 13-30. https://doi.org/10.20955/r.81.13-30.

Neely, Christopher J. "The Federal Reserve Responds to Crises: September 11th Was Not the First." Federal Reserve Bank of St. Louis *Review* 86, no. 2 (March/April 2004): 27-42. https://doi.org/10.20955/r.86.27-42.

Neely, Christopher J. "Using Implied Volatility to Measure Uncertainty About Interest Rates." Federal Reserve Bank of St. Louis *Review* 87, no. 3 (May/June 2005): 407-425. https://doi.org/10.20955/r.87.407-426.

Neely, Christopher J. "Unconventional Monetary Policy Had Large International Effects." *Journal of Banking and Finance* 52 (March 2015): 101-11. https://doi.org/10.1016/j.jbankfin.2014.11.019.

Neely, Christopher J. "Chinese Foreign Exchange Reserves, Policy Choices, and the U.S. Economy." Federal Reserve Bank of St. Louis *Review* 99, no. 2 (Second Quarter 2017): 207-231. https://doi.org/10.20955/r.2017.207-231.

Neely, Christopher J. "Financial Market Reactions to the Russian Invasion of Ukraine." Federal Reserve Bank of St. Louis *Review* 104, no. 4 (Fourth Quarter 2022): 266-96. https://doi.org/10.20955/r.104.266-96.

Neely, Christopher J. "Why Have a Strategic Petroleum Reserve?" Federal Reserve Bank of St. Louis *Economic Synopses*, March 20, 2024. https://doi.org/10.20955/es.2024.5.

Norris, Floyd. "The Markets: Stocks and Bonds; Stocks Slump on Fears Economy Won't Recover Quickly." *New York Times*, September 8, 2001. https://www.nytimes.com/2001/09/08/business/the-markets-stocks-and-bonds-stocks-slump-on-fears-economy-won-t-recover-quickly.html.

O'Brien, Robert. "Stocks Tread Water, End Flat but Investors Remain Wary." *Wall Street Journal*, September 10, 2001. https://www.wsj.com/articles/SB1000124933137738889.

Obstfeld, Maurice and Alan M. Taylor. "The Great Depression as a Watershed: International Capital Mobility Over the Long Run," in Michael D. Bordo, Claudia D. Goldin, and Eugene N. White, eds., *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century*. University of Chicago Press (1998): 353-402. https://doi.org/10.3386/w5960.

People's Republic of China. "White Paper: The Taiwan Question and China's Reunification in the New Era." The Taiwan Affairs Office of the State Council and The State Council Information Office, August 8, 2022. http://us.china-embassy.gov.cn/eng/zgyw/202208/t20220810_10740168.htm.

People's Republic of China State Administration of Foreign Exchange. "Official Reserve Assets." 2024. www.safe.gov.cn/en/2021/0203/2045.html.

Pierson, David and Sam Dean. "Russia has spent years preparing for international sanctions." *Los Angeles Times*, February 25, 2022. https://www.latimes.com/world-nation/story/2022-02-25/russia-ukraine-sanctions-china.

Record, Jeffrey and Donald Rumsfeld. "Known and Unknown: A Memoir." *Strategic Studies Quarterly* 5, no. 3 (2011): 144–46. http://www.jstor.org/stable/26272136.

Rose, Jonathan. "Yield Curve Control in the United States, 1942 to 1951." Federal Reserve Bank of Chicago *Economic Perspectives*, no. 2 (October 2021). https://www.chicagofed.org/publications/economic-perspectives/2021/2.

Setser, Brad W. "A Few Words on China's Holdings of U.S. Bonds." Council on Foreign Relations, January 17, 2018. https://www.cfr.org/blog/few-words-chinas-holdings-us-bonds.

Setser, Brad W. "How to Hide Your Foreign Exchange Reserves—A User's Guide." Council on Foreign Relations, June 29, 2023a. https://www.cfr.org/blog/how-hide-your-foreign-exchange-reserves-users-guide.

Setser, Brad W. "China Isn't Shifting Away from the Dollar or Dollar Bonds." Council on Foreign Relations, October 3, 2023b. https://www.cfr.org/blog/china-isnt-shifting-away-dollar-or-dollar-bonds.

Sevastopulo, Demetri, Kana Inagaki, and Kathrin Hille, "Joe Biden Pledges to Defend Taiwan Militarily if China Invades." *Financial Times*, May 23, 2022. https://www.ft.com/content/f4435be6-61bf-4565-8f19-60b69ebc41de.

UNCTADstat. "Ships Built by Country of Building, Annual." 2014-23. https://unctadstat.unctad.org/datacentre/dataviewer/US.ShipBuilding.

U.S. Bureau of Economic Analysis. "Real Gross Domestic Product [GDPCA]." Retrieved on June 18, 2024. https://fred.stlouisfed.org/series/GDPCA.

U.S. Department of Defense. "Military and Security Developments Involving the People's Republic of China: 2023 Annual Report to Congress." Office of the Secretary of Defense, 2023. https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-military-and-security-developments-involving-the-peoples-republic-of-china.pdf.

U.S. Department of the Treasury. "Securities (B): Portfolio Holdings of U.S. and Foreign Securities." Updated March 31, 2024. https://home.treasury.gov/data/treasury-international-capital-tic-system-home-page/tic-forms-instructions/securities-b-portfolio-holdings-of-us-and-foreign-securities.

Vest, Charlie, Agatha Kratz, and Reva Goujon. "The Global Economic Disruptions from a Taiwan Conflict." The Rhodium Group, December 14, 2022. https://rhg.com/research/taiwan-economic-disruptions/.

Wayland, Michael. "How Covid Led to A $60 Billion Global Chip Shortage for The Auto Industry." *CNBC*, February 11, 2021. https://www.cnbc.com/2021/02/11/how-covid-led-to-a-60-billion-global-chip-shortage-for-automakers.html.

Wen, Yi. "Explaining China's Trade Imbalance Puzzle." Federal Reserve Bank of St. Louis Working Paper Series no. 018 (2011). https://files.stlouisfed.org/files/htdocs/wp/2011/2011-018.pdf.