The Political Economy of International Reserve Accumulation: Self-Insurance or Mercantilism?

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Why do countries accumulate international reserves? The massive accumulation of reserves in recent years, particularly by East Asian countries, has been associated with "global imbalances," such as a persistent US current account deficit and perverse capital flows from developing to developed countries. However, the reasons for this reserve accumulation remain contentious. We argue that countries that lack political influence in the International Monetary Fund (IMF) are pursuing precautionary reserve accumulation as a means of self-insurance. Using the synthetic control method and difference-in-differences estimation, we show that reserve accumulation accelerates for countries when they experience political or economic events that negatively affect their perceived relationship with the IMF. In contrast, there is limited evidence that transitions to export-oriented policies increase reserves: this calls into question prevailing mercantilist explanations for reserve accumulation.

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Global imbalances have emerged as a puzzling feature of the contemporary international economic order. The United States has been running trade deficits since 1976, but the deficit sharply expanded after 1997 to previously unprecedented levels exceeding 3% of GDP.[2] Concurrently, major economies in East Asia expanded their trade surpluses and stockpiled large quantities of US dollar reserves.[3] The combination of US current account deficits and the fixed and undervalued exchange rates, reserve accumulation, and current account surpluses of East Asian countries became known as "Bretton Woods II," a new order monetary order akin to the first Bretton Woods System established after World War II.[4]

These imbalances are substantively important. The perception that the US is "being taken advantage of" by major trading partners emerged as a central theme of Donald Trump's unconventional 2016 presidential campaign, and his administration has sought to reduce US trade deficits through aggressive means, such as retaliatory tariffs.[5] However, even before the emergence of Trump, global imbalances were cited as producing perverse consequences for the global economy. Heavy demand for US Treasury securities in the mid-2000s by reserve-accumulating countries may have contributed to the 2008 subprime crisis by keeping intermediate-term interests low despite the Federal Reserve's attempts to raise interest rates.[6] Reserve accumulation by developing countries, such as those in Asia, also represents a perverse

[2] World Bank, External balance on goods and services (% of GDP), World Bank National Accounts Data.
[3] In 2017, the holdings of international currencies in South Korea, Taiwan, Thailand and Indonesia were all at record levels at 384.8 billion, 451.5 billion, 196 billion, 129 billion US dollars, respectively. China remains the largest holder of foreign reserves. (https://www.bloomberg.com/news/articles/2017-09-13/yellen-s-asia-peers-hoard-currencies-as-fed-countdown-continues)
[4] Dooley, Folkerts-Landau and Garber 2003
[5] See, for example, Peter Navarro, "The Era of American Complacency on Trade Is Over," *The New York Times*, 6-8-2018; Bob Davis and Jon Hilsenrath, "How the China Shock, Deep and Swift, Spurred the Rise of Trump," *Wall Street Journal*, 8-11-2016
[6] Roubini and Setser 2005, Bernanke 2006, Kohn 2005, Rudebusch, Sack and Swanson 2007

flow of capital from capital-scarce countries into low-yielding assets such as US Treasury securities and gold.[7]

Despite these substantive consequences, the rise and persistence of global imbalances remain puzzling. The predominant theoretical explanation for East Asian reserve accumulation and trade surpluses is the mercantilist account, which sees these distortions as outcomes of export-oriented policies.[8] The underlying logic is that Asian central banks purchase foreign exchange to keep their currencies weak and thus promote exports. This view is also consistent with the rhetoric of Trump and his economic advisors, such as Peter Navarro, who sees US trade deficits as a consequence of unfair and illegal trade policies by Asian countries.[9] If this perspective if correct, correcting global imbalances requires pressuring Asian countries to abandon export-promotion policies and play "fair" vis-à-vis their US competitors.

However, there is another potential explanation for global imbalances based on precautionary motivations. Cross-national variation in reserve accumulation can be explained by political imbalances in the International Monetary Fund (IMF).[10] Specifically, countries that expect unfavorable treatment by the IMF – due to political underrepresentation or weak ties with countries that either formally or informally dominate the institution – may pursue precautionary reserve accumulation as a means of self-insurance against balance of payments crises. In order to accumulate reserves, these countries undervalue their currencies and run large current account surpluses. If this explanation is correct, the most effective way to reduce global imbalances is to

[7] Summers 2007
[8] Aizenmann and Lee 2005, Dooley, Folkerts-Landau and Garber 2003, de Beaufort Wijnholds and Sondergaard 2007. Economists have also proposed alternative explanations based on other economic variables, such as a global savings glut (Bernanke 2005), distortions in domestic policies followed in the United States and abroad (Obstfeld and Rogoff 2009), a global shortage in reliable and tradable assets (Gourinchas et al. 2008), asymmetries in financial market depth (Mendoza et al. 2007).
[9] Navarro and Autry 2011
[10] Lipscy and Lee 2019

remedy political imbalances in the IMF by, for example, increasing the voting power of Asian states or hiring more Asian nationals into leadership positions in the institution. Engaging in trade wars with Asian countries is likely to prove counterproductive, as this will only intensify suspicions about the IMF, which is often seen as dominated by the USA.[11]

Is Asian reserve accumulation due primarily to export-oriented trade policies or precautionary motivations associated with limited influence over the IMF? This question poses a tricky problem of causal inference. It is typically difficult to separate mercantilist and precautionary motives empirically due to the fact that associated policy outcomes are essentially identical: undervalued exchange rates, current account surpluses, and international reserve accumulation. In this paper, we solve this problem by leveraging key historical events that clearly separate the two motivating factors and using difference-in-differences estimation and the generalized synthetic control method. To isolate the impact of export-orientation, we examine whether transitions to export-oriented industrialization (EOI) were associated with reserve accumulation. To isolate the impact of precautionary motivations, we consider key events that altered perceptions about a country's relationship with the IMF. For most countries we examine, this event is the 1997-1998 Asian Financial Crisis, during which the IMF adopted what many Asian policymakers saw as an overly stringent approach supported by the US Treasury. In the case of Taiwan, we consider the country's expulsion from the IMF in 1980, which eliminated any prospect of receiving support from the institution.

Using a difference-in-differences estimation, generalized synthetic control, and country case studies, we find strong support for precautionary motivations, while support for the mercantilist theory is limited. Events associated with changing perceptions toward the IMF are

[11] Stone 2011

associated with large, statistically significant increases in reserve accumulation. In contrast, we could not identify any instances where transitions to EOI are associated with a clear shift in reserves. This calls into question the conventional wisdom that reserve accumulation in East Asia is a consequence of the region's export-oriented policies.

Disentangling Mercantilist and Precautionary Motivations

It is difficult to empirically disentangle mercantilist and precautionary explanations for reserve accumulation: though the motivations differ, the policy mixes associated with each are observationally identical. Whether a country's policymakers are primarily interested in boosting exports or accumulating reserves, we would expect to observe the same pattern of undervalued exchange rates, export surpluses, and increasing reserves. Because high-growth East Asian economies have typically adopted export-oriented industrialization policies, scholars have gravitated towards mercantilist motivations as the most plausible explanation for reserve accumulation in the region.[12]

Although the policy outcomes associated with mercantilist and precautionary motivations are observationally indistinguishable, it is still possible to draw inferences about the primacy of each motive. Our approach leverages key historical junctures that selectively heightened the salience of one of the motivations. The countries included in our analysis are high-growth East Asian economies conventionally associated with export-oriented developmental policies: the Asian Tigers (Korea, Taiwan, Singapore), South East Asian newly

[12] See, among others, Aizenmann and Lee 2005, de Beaufort Wijnholds and Sondergaard 2007, Dooley, Folkerts-Landau and Garber 2003

industrialized countries (Indonesia, Malaysia, Thailand), and China.[13] These countries are useful as they have been subject to both EOI transitions and IMF shocks, but the timing is reasonably well established by existing literature and non-overlapping.

For the precautionary theory, we need to identify critical junctures that shifted how a country's policymakers perceive their relationship with the IMF. If the precautionary motivation is paramount, countries should calibrate their level of reserves based on expectations about how readily they will be able to access support from the IMF and under what conditions. For one case, identifying this juncture is straightforward: Taiwan was expelled from the IMF in 1980, eliminating any possibility of support from the institution. If the precautionary theory is correct, this should trigger reserve accumulation as a means of self-insurance.

For the other countries, we use the Asian Financial Crisis of 1997-98 as a critical juncture. The IMF's response to the crisis shocked many policymakers in the region, who saw the IMF as excessively harsh and acting at the behest of the US Treasury rather than objectively assessing the economic fundamentals of the crisis economies.[14] As John Lipsky, former first deputy managing director of the IMF, noted, "Global economic efficiency would have been enhanced if the IMF had been able to provide the insurance demanded by [Asian] countries, but doubts about the amount of available financing and the conditions attached to this financing have encouraged self-insurance."[15] The Asian Crisis was therefore a less extreme version of what happened to Taiwan: while East Asian countries were not formally expelled from the institution,

[13] We omit Japan, which is a creditor state and hence lacking in a precautionary / IMF treatment, and Hong Kong, for which there are data availability issues.
[14] E.g., Sakakibara 2000, Blustein 2003, Lee 2006, Lipscy 2003
[15] "Asia, the Financial Crisis, and Global Economic Governance," Speech by John Lipsky, first deputy managing director of the International Monetary Fund, at the 2009 Federal Reserve Bank of San Francisco Conference, Santa Barbara, California. October 20, 2009
< https://www.imf.org/en/News/Articles/2015/09/28/04/53/sp102009>

they began to act as if turning to the institution was no longer a politically viable option. This was sharply illustrated during the 2008 global financial crisis, when no East Asian countries turned to the IMF, despite several – notably Korea and Singapore – coming under considerable stress.[16] Hence, based on precautionary motives, we expect an increase in reserve accumulation among East Asian countries starting in 1998. We code the IMF shock as having affected all ASEAN+3 countries, which is consistent with the subsequent politics of the region, such as the creation of the Chiang Mai Initiative. However, we omit Japan as the country is unlikely to require IMF financing as a creditor state. Because financial crises can cause policy changes for reasons aside from changing perceptions about the IMF,[17] to distinguish the effects of changing beliefs about the IMF from impacts of a major financial crisis per se, we examine several other crisis episodes in the empirical section.

For the mercantilist theory, we use the transition from import-substitution industrialization (ISI) to export-oriented industrialization (EOI) as a critical juncture. If mercantilism is the primary reason for East Asian reserve accumulation, the initiation of EOI – which emphasizes export promotion through currency undervaluation and various policy interventions – should be associated with an increase in the pace of reserve accumulation. For consistency, we identify the shift to EOI based on dates identified in the 1993 World Bank East Asian Miracle report.[18] Table 1 summarizes the year of shift from ISI to EOI for the East Asian economies included in this paper as well as the coding for the year of IMF shock. Because the precise year of transition to EOI is not always a matter of consensus in the literature, [19] we

[16] Broz 2014
[17] e.g., Pepinsky 2014, Gourevitch 1986
[18] World Bank 1993
[19] For example, Haggard 1990 places the EOI transition somewhat later for Taiwan (1960), Korea (1964), and Singapore (1967).

perform robustness checks that shift the transition year in the empirical analysis to show that our results are not driven by the precise choice of EOI transition year.

Country	Transition to EOI	IMF Shock
Taiwan	1958	1980
Korea	1961	1998
Singapore	1965	1998
Malaysia	1986	1998
Thailand	1980	1998
Indonesia	1986	1998
China	1978	1998

Table 1: EOI Transition and IMF Shock Year for East Asian Economies (Coded from World Bank Miracle Report)

Empirical Analysis

To evaluate our theoretical predictions, we analyze EOI transitions and IMF shocks as "treatments" that could potentially alter a country's pattern of reserve accumulation. We begin by using a common method, difference-in-differences estimation. We then use estimation strategies that relax some of the restrictive assumptions of difference-in-differences models. All of the methods produce similar conclusions: there is limited evidence that EOI transitions are

associated with reserve accumulation, while IMF shocks are associated with large, positive shifts in reserves.

Difference-in-differences Analysis

Our panel dataset covers 180 countries from 1960-2015. We use a generalized difference-in-differences estimation, controlling for year and country fixed effects across all OLS specifications. The key dependent variable is reserves/GDP.[20] We also reran the specifications using reserves/imports and the absolute levels of reserves and found similar results. In terms of the independent variables, we code export orientation as a dichotomous variable according to the years listed in Table 1. The variable is coded as zero until the EOI transition year, at which point all subsequent values are switched to one. Analogously, precautionary motivations are coded as zero and then switched to one after the exogenous shocks related to the IMF discussed earlier: 1980 for Taiwan, and 1998 for other East Asian countries. As control variables, we draw on existing research on cross-national variation in the size of reserves and include the following: GDP/capita, GDP, GDP growth rate, trade deficit, a dummy variable for currency peg, currency undervaluation, and a dummy for OECD status.[21]

Note that the independent variables are coded positively for East Asian countries only. EOI was pioneered in East Asia, and it is relatively straightforward to identify policy transitions based on existing work.[22] Toward the end of the 20th century, many other developing countries

[20] World Bank, World Development Indicators.
[21] See more extensive discussion in Lipscy and Lee 2019
[22] For sure, there is some controversy about the precise year of EOI transition in Asian countries. Our results are not dependent on the specific transition years chosen: we tried moving the EOI transition year backward and forward within a 5-year window, and in no case was EOI transition associated significantly with an increase in reserves.

adopted EOI after observing Asian developmental success, but the timing for each country is less established.[23] Though we intend to expand the number of countries coded for EOI transitions in future analyses, we believe the current coding is unlikely to produce highly misleading results. The difference-in-differences estimation allows us to examine both the short-term impact and long-term impact of Asian EOI transitions: if the proliferation of EOI increased reserve accumulation among non-Asian countries, this will tend to bias down the long-term, but not short-term, impact of Asian EOI transitions on reserves. Similarly, we only code IMF shocks for East Asian countries, for which there are two, well-established events that altered perceptions about future relations with the institution: Taiwan's 1980 expulsion and the 1997-98 Asian Crisis. Insofar as we are ignoring shocks that had a similar effect in other countries (or if the Asian Crisis signaled the unreliability of the IMF to a broader set of countries), this will tend to create a bias against findings consistent with the precautionary story. In other words, the direction of bias should cut against the findings we report below.

The results are presented in Table 2. There is some potential concern that some of our control variables, such as currency undervaluation and trade deficit, are "post-treatment," i.e. endogenous to EOI or precautionary motivations. The first column therefore presents a model without control variables, and the second includes all control variables. Both models produce very similar results. In both models, EOI is not meaningfully associated with reserves/GDP. On the other hand, the dummy for IMF shock and the interaction of EOI and IMF shock are both meaningfully associated with reserves/GDP. These findings suggest that export orientation on its own is not associated with reserve accumulation, while events that alter a country's relationship with the IMF are strongly associated with reserve accumulation. The positive coefficient on the

[23] We could not locate an authoritative source that codes EOI transitions for a broader set of countries.

interaction terms suggests IMF shocks are associated with particularly large movements in reserves in countries adopting EOI. This suggests that precautionary and mercantilist motivations can *reinforce* each other,[24] but reserve accumulation only takes off in cases where a strong precautionary motive is present.

One potential concern with our measure of IMF shock is that we are capturing a response to financial crises or IMF interventions that are outside our argument. For example, experiencing a crisis may make economic policymakers more cautious moving forward, or the IMF itself may encourage reserve accumulation as part of prudent macroeconomic policymaking. To examine this possibility, we performed a placebo test in which we coded "as if" treated countries that experienced financial crises and IMF interventions during roughly the same era as the Asian countries examined above: Mexico 1994, Russia 1998, Brazil 1998, and Turkey 1999. Our premise is that these countries would not exhibit a dramatic change in reserve accumulation behavior after IMF intervention, as they had either extensive prior history with the IMF or received favorable treatment by virtue of their geopolitical or economic importance. The empirical results confirm this: based on the models presented in Table 2, there is no statistically meaningful association between IMF intervention for these countries and subsequent reserve accumulation. This supports our premise that what happened in East Asia was not simply a major financial crisis or IMF intervention, but a basic shift in how these countries perceived the IMF.

[24] Steinberg 2014 argues that coalitions of groups separately supporting each motivation tend to produce reserve accumulation.

Table 2: Difference-in-Differences Estimation – Reserves/GDP (OLS)

Indep/Dep Variables	Reserves/ GDP	Reserves/ GDP
EOI Transition	0.02	0.01
	(0.13)	(0.01)
IMF Shock	0.07*	0.06*
	(0.02)	(0.02)
EOI Transition* IMF Shock	0.20*	0.20*
	(0.01)	(0.01)
Control Variables	N	Y
Country Fixed Effects	Y	Y
Year Fixed Effects	Y	Y
n	7727	4906

Note: Numbers in parenthesis are standard errors. Star denotes a coefficient at least two standard errors removed from zero.

An important assumption of the difference-in-differences model is that "treated" and "non-treated" countries should be subject to common trends in reserves/GDP. For example, if reserves/GDP are trending higher for countries prior to experiencing an IMF shock, it would be indicative of endogeneity: e.g. perhaps the shock was itself triggered by some underlying policy or economic shift. Following Artur's approach,[25] we reran our empirical specifications including indicator variables for leads and lags of EOI and IMF shock to examine if reserves/GDP exhibits changes consistent with such endogeneity. Specifically, we omit the independent variables and instead include dummy variables for t-4, t-3, t-2, t-1, t=0, t+1, t+2, t+3, and t>3, where t=0 is the

[25] Artur 2003.

year a country shifted from zero to one with respect to the independent variable in question (EOI transition or IMF shock). Each indicator variable is only coded as one in the relevant year, with the exception of t>3, which is coded 1 for all years subsequent to t=3.

The substantive results are presented in Figure 1 and Figure 2. As shown in Figure 1, transitions to EOI are not temporally associated with an increase in reserves/GDP. When countries initiate EOI (t=0), there is no noticeable change in reserves. Any association between higher reserves and EOI comes much later (t>3). On the other hand, the association between IMF shocks and reserve accumulation is immediate, with a sharp increase in reserves/GDP at t=0 that is sustained in subsequent years. Importantly, reserves/GDP are not significantly different from zero during t<0 for countries experiencing an IMF shock, although the point estimates are somewhat elevated. This is evidence against potential endogeneity concerns: these countries did not start accumulating reserves prior to experiencing an IMF-related shock. The temporal pattern of reserve accumulation is consistent with precautionary motivations playing a central role in reserve accumulation decisions.

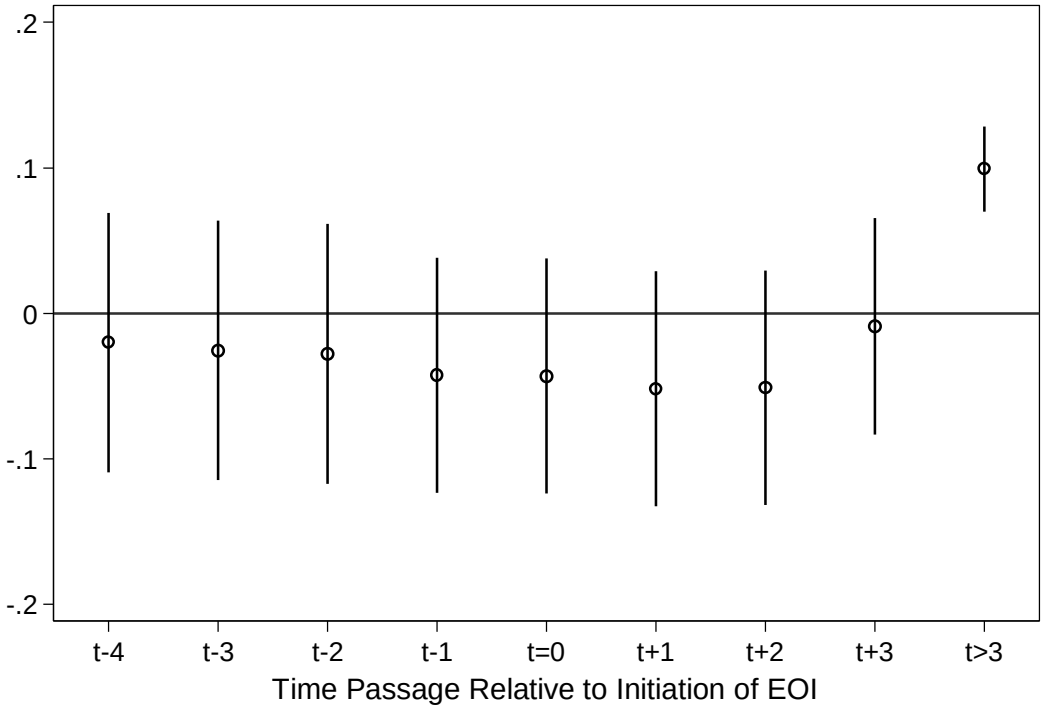

Figure 1: Estimated Impact of Export Oriented Industrialization on Reserves/GDP for Years Before, During, and After Initiation

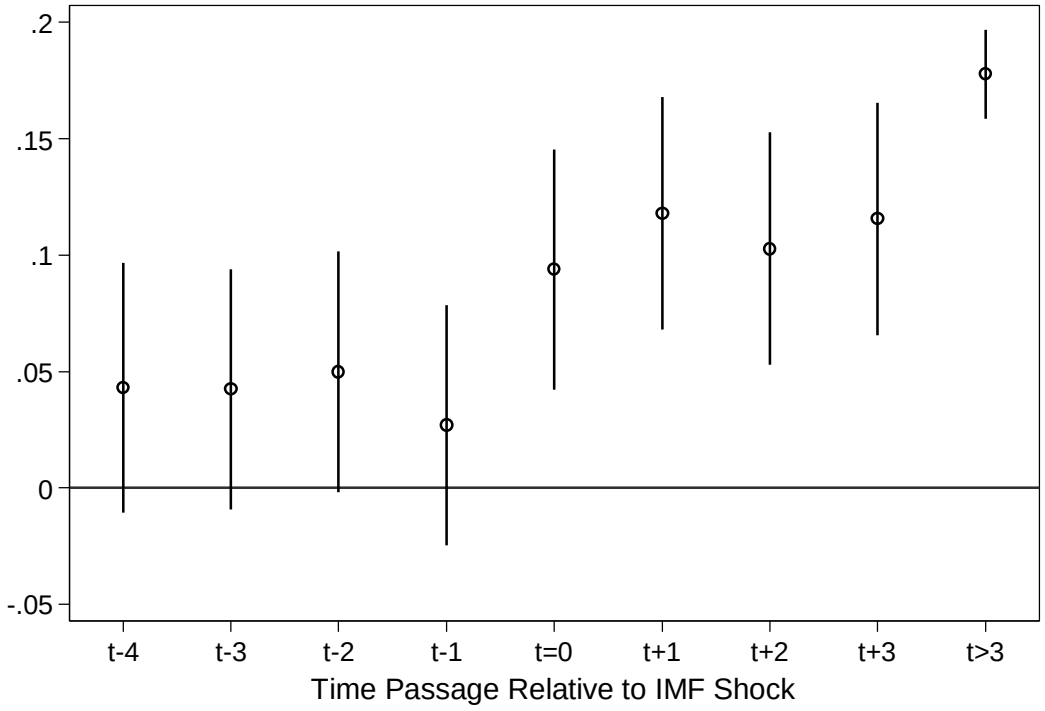

Figure 2: Estimated Impact of IMF Shock on Reserves/GDP for Years Before, During, and After Shock

Generalized Synthetic Control

The difference-in-differences model produces results consistent with our premise that precautionary, not mercantilist, motivations have been critical in East Asian reserve accumulation. As we noted, the point estimates for $t < 0$ in Figure 2 are not statistically distinguishable from zero, but the point estimates are somewhat elevated. This could indicate a potential violation of the parallel trends assumption. Given the history of the East Asian countries we examine, this raises the possibility that EOI, which temporally preceded IMF shocks, was at least modestly associated with elevated levels of reserves prior to the IMF shocks.

To examine this possibility further, we make use of the generalized synthetic control method, which relaxes the parallel trends assumption.[26] The synthetic control method constructs a control case that closely resembles the treatment country based on key predictors.[27] For example, synthetic China is created using the weighted average of potential control countries, which matches the parameters of key predictors of international reserves in the period leading up to the treatment year. This allows for the comparison of reserve accumulation between China and "synthetic China" in the post-treatment years. The method was originally developed to examine the economic impact of terrorism in the Basque country,[28] and it has subsequently been applied to consider the effects of various political changes such as German reunification,[29] economic liberalization,[30] and security treaties.[31]

The generalized synthetic control method extends synthetic control to cases of multiple treated units and variable treatment periods, as is the case for our analysis.[32] Like the synthetic control method, generalized synthetic control uses pre-treatment treated outcomes to choose weights for control units and generates post-treatment counterfactuals using cross-sectional correlations between treated and control units. The method accounts for time-varying confounders that might lead to violations of the parallel trends assumption in a traditional difference-in-differences model.

In the analysis, we use the same data as earlier, covering 180 countries from 1960-2015. The dependent variable again is international reserves as a share of GDP. Results are similar

[26] Xu 2017
[27] Abadie, Diamond and Hainmueller 2010
[28] Abadie and Gardeazabal 2003
[29] Abadie, Diamond and Hainmueller 2015
[30] Billmeier and Nannicini 2013
[31] Beckley, Horiuchi and Miller 2018
[32] Xu 2017

when we use alternative measures, such as reserves measured in months of imports and the absolute level of reserves in current US dollars. The control countries are effectively all countries for which data on reserves and the relevant control variables are available during the time period of interest. The independent and control variables are the same as those used in the previous section.

The results for the EOI treatment are presented in Figure 3. For this analysis, we should note that Taiwan and Korea are dropped as their transitions to EOI occur very early on in our dataset and do not allow for the estimation of counterfactuals based on prior years. We will discuss the patterns of reserve accumulation for these countries in the case study section, which are consistent with the results presented here. The figure depicts the trend in reserves/GDP for the treated countries in our sample (solid line), along with the estimated level of reserves/GDP in the counterfactual scenario in which these countries had not shifted to EOI (dotted line). As the figure shows, reserves/GDP for treated countries and the estimated counterfactual closely track each other before and after treatment. This suggests that transitions to EOI have not been associated with a meaningful increase in reserves/GDP compared to the counterfactual case.

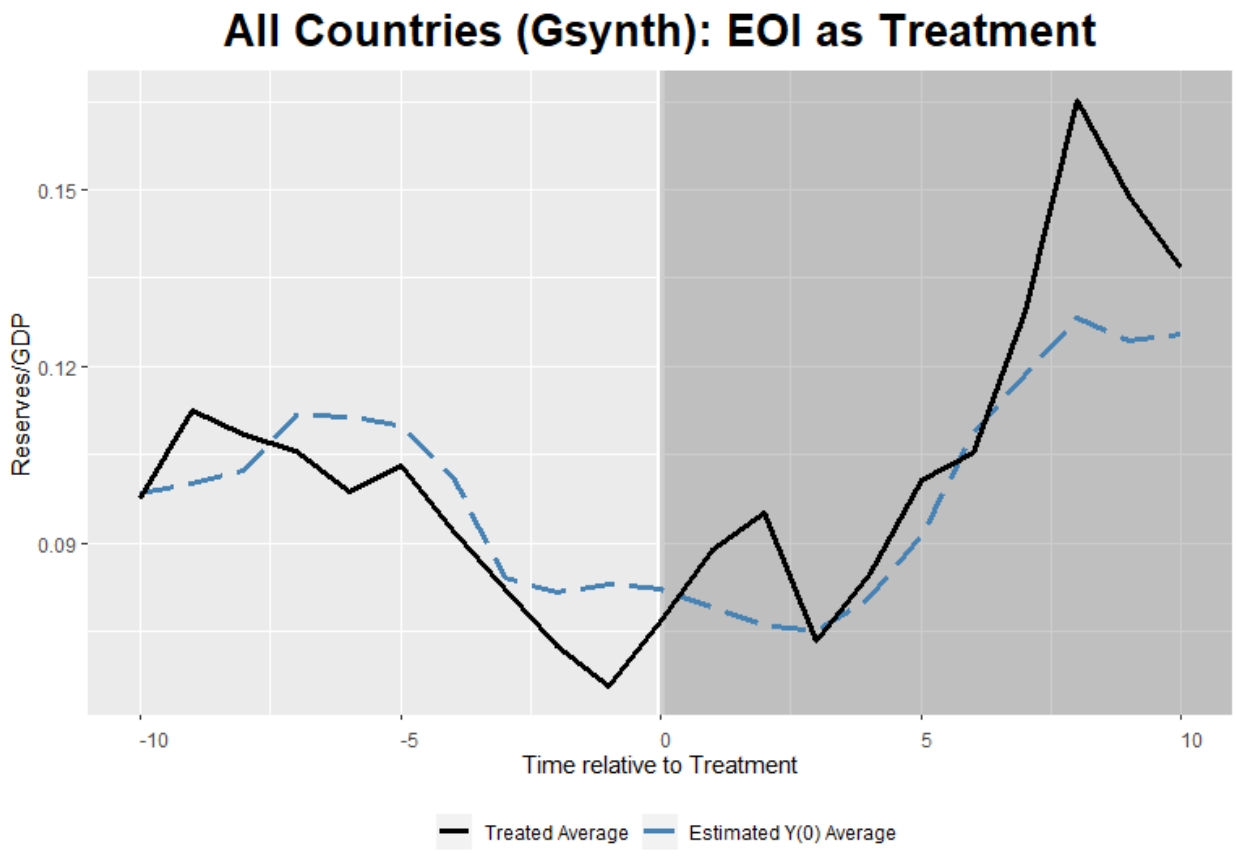

Figure 3: The Effect of EOI Transitions on Reserves/GDP (Generalized Synthetic Control)

The results for the IMF shock treatment are presented in Figure 4. Like the EOI treatment, reserves/GDP for the treated and counterfactual countries track each other closely prior to treatment. However, unlike the EOI results, we observe an immediate and substantial increase in reserves after the IMF shock. While the treated countries exhibit a sharp and sustained increase in reserves, the counterfactual trend is slightly declining.

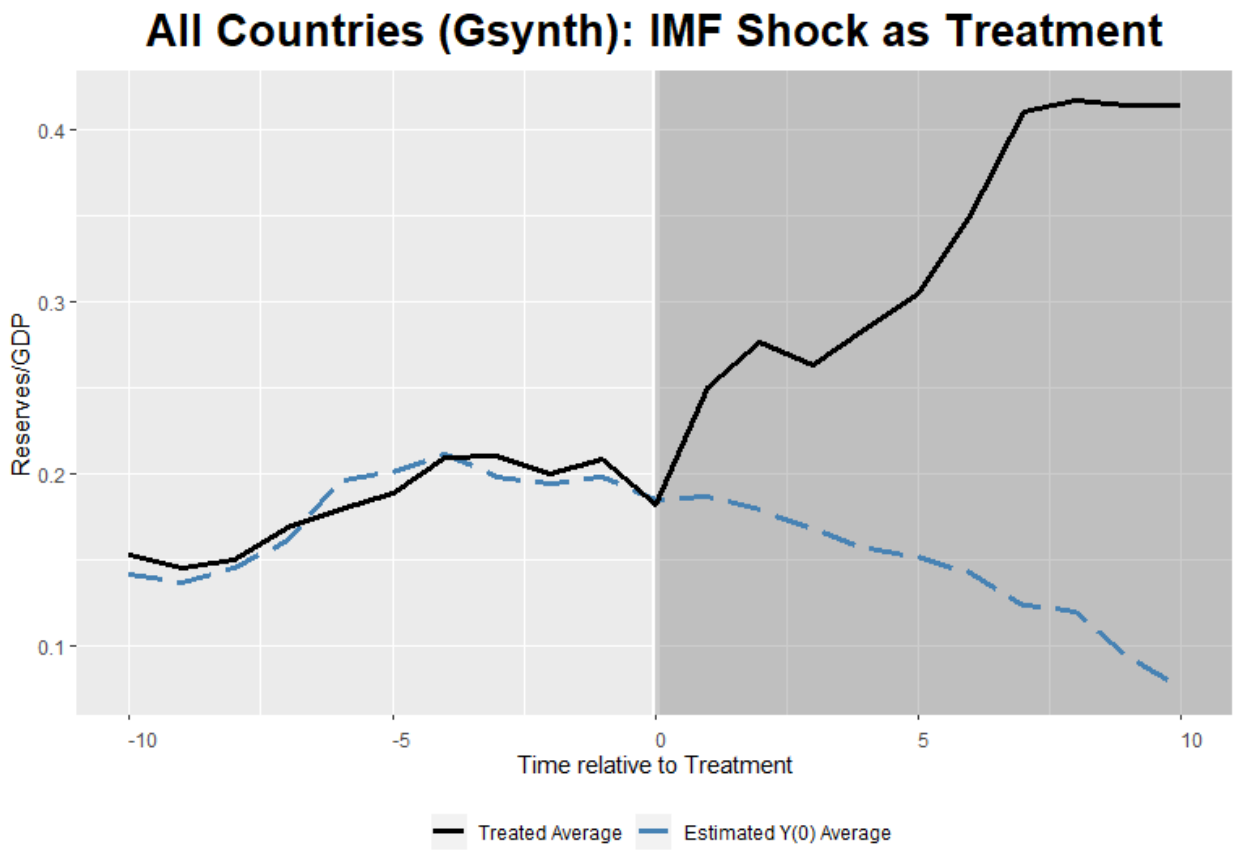

Figure 4: The Effect of IMF Shocks on Reserves/GDP (Generalized Synthetic Control)

Another method of performing causal inference in a panel setting is the matrix completion method. Rather than the interactive fixed effects model of the generalized synthetic control method, matrix completion effectively imputes the "missing" data for the counterfactuals of interest ("untreated" outcomes for treated countries) from the matrix structure of the panel.[33] We repeated the analysis above using the matrix completion method, and the results were largely analogous as shown in Figure 5 and Figure 6.

[33] Athey et al. 2018

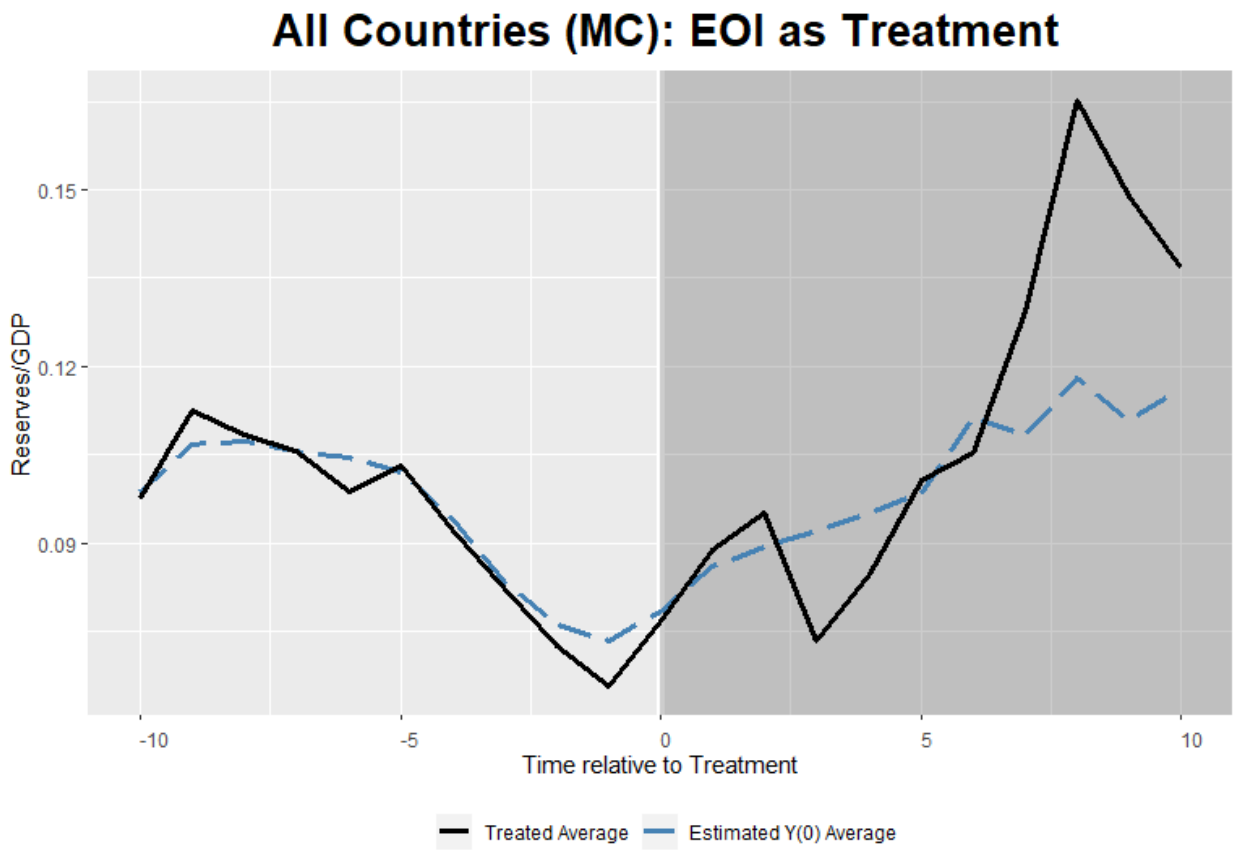

Figure 5: The Effect of EOI Transitions on Reserves/GDP (Matrix Completion)

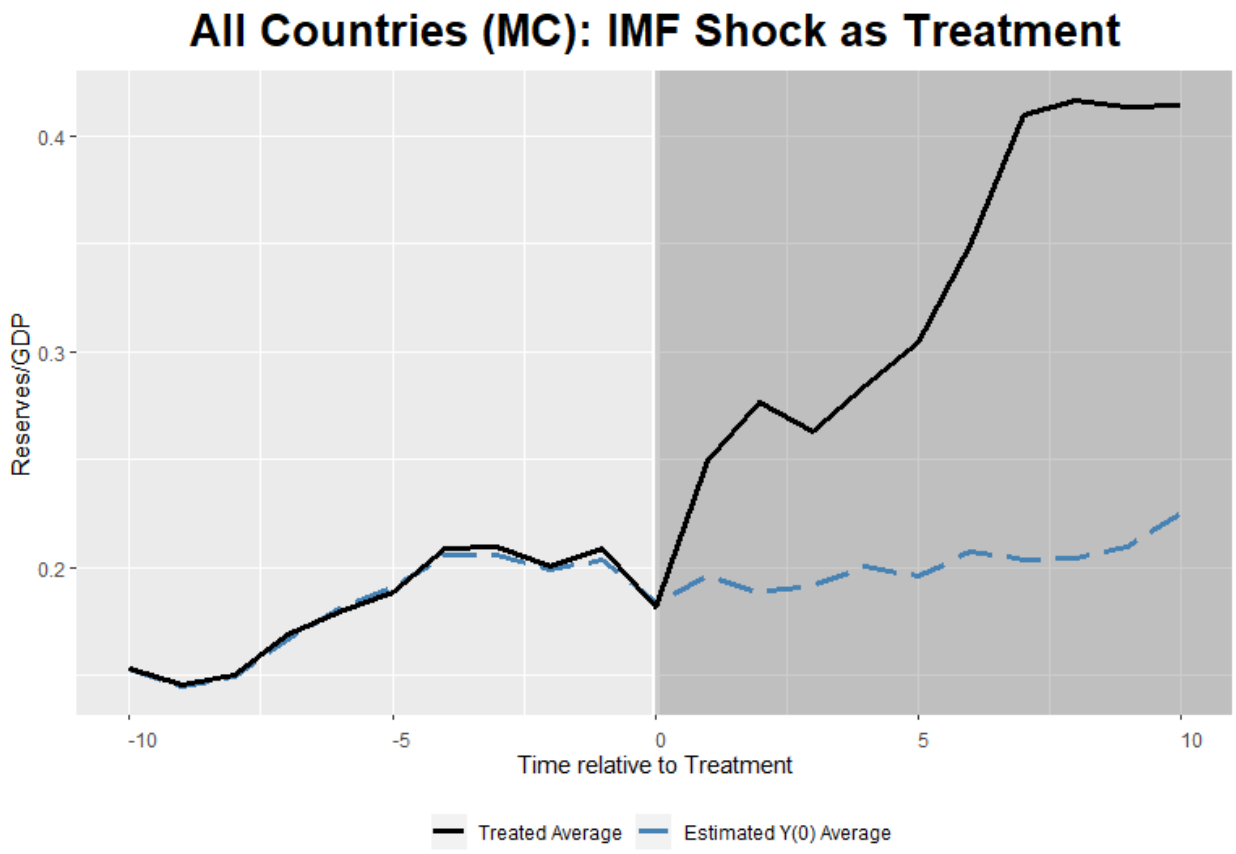

Figure 6: The Effect of IMF Shocks on Reserves/GDP (Matrix Completion)

Country Cases

In this section, we examine the reserve accumulation policies of several countries of interest: Taiwan, Korea, Thailand, and China. Taiwan and Korea were part of the "Asian Tigers" that adopted EOI early on, but they were also associated with notable events that altered their

perceptions about the IMF. Thailand adopted EOI somewhat later as a South East Asian NIC.[34] China is a substantively important country due to the magnitude of its economy and reserves. It is also arguably a "hard case" for our argument, as China is often seen as a mercantilist country, whose economy was only modestly affected by the Asian Crisis.

We do not necessarily expect reserve accumulation to be motivated by the same factor in all countries in our sample. Prima facie, it is plausible that both mercantilist and precautionary motivations have been important. It is also possible that some countries have been more motivated by mercantilism while others have been motivated by precautionary incentives. As we will show, however, the evidence in favor of mercantilist motivations is strikingly weak, while there is greater support for precautionary motivations.

Taiwan

Taiwan is unique among the countries examined in that its relationship with the IMF changed through expulsion.[35] In 1980, Taiwan was expelled from the IMF due to a sovereignty dispute with the People's Republic of China. Importantly for empirical purposes, the expulsion was involuntary, and there was considerable ex ante uncertainty about the timing and final disposition of Taiwan: until the last minute, US negotiators were in China to advocate for an arrangement that would allow Taiwan to remain in the institution under a different credentials.[36] Hence, to test the precautionary hypothesis, we apply the generalized synthetic control method

[34] A compelling case could be made for including other Southeast Asian countries like Indonesia, Malaysia, or Singapore. We focus on Thailand primarily for space constraints and the fact that this was the first country affected by the Asian Financial Crisis.
[35] We discuss the Taiwan case in much greater detail in Lipscy and Lee 2019
[36] Summary of Conclusions of a Presidential Review Committee Meeting, Nsc Institutional Files (H-Files), Box 79, Prc 136, U.S.–China Economic Relations, 3/27/80

using 1980 as the treatment year. After this year, Taiwan would not be able to rely on the IMF at all in the event of a balance of payments crisis.

Figure 7 depicts the results. As the figure shows, after 1980, reserves/GDP for Taiwan increased sharply, while reserves/GDP for synthetic Taiwan were essentially flat. The increase in Taiwan's reserves was substantively significant, increasing from less than 10% of GDP to close to 80% of GDP at the peak. In the dataset, there is no country that exhibits a comparable increase in reserves starting in 1980.

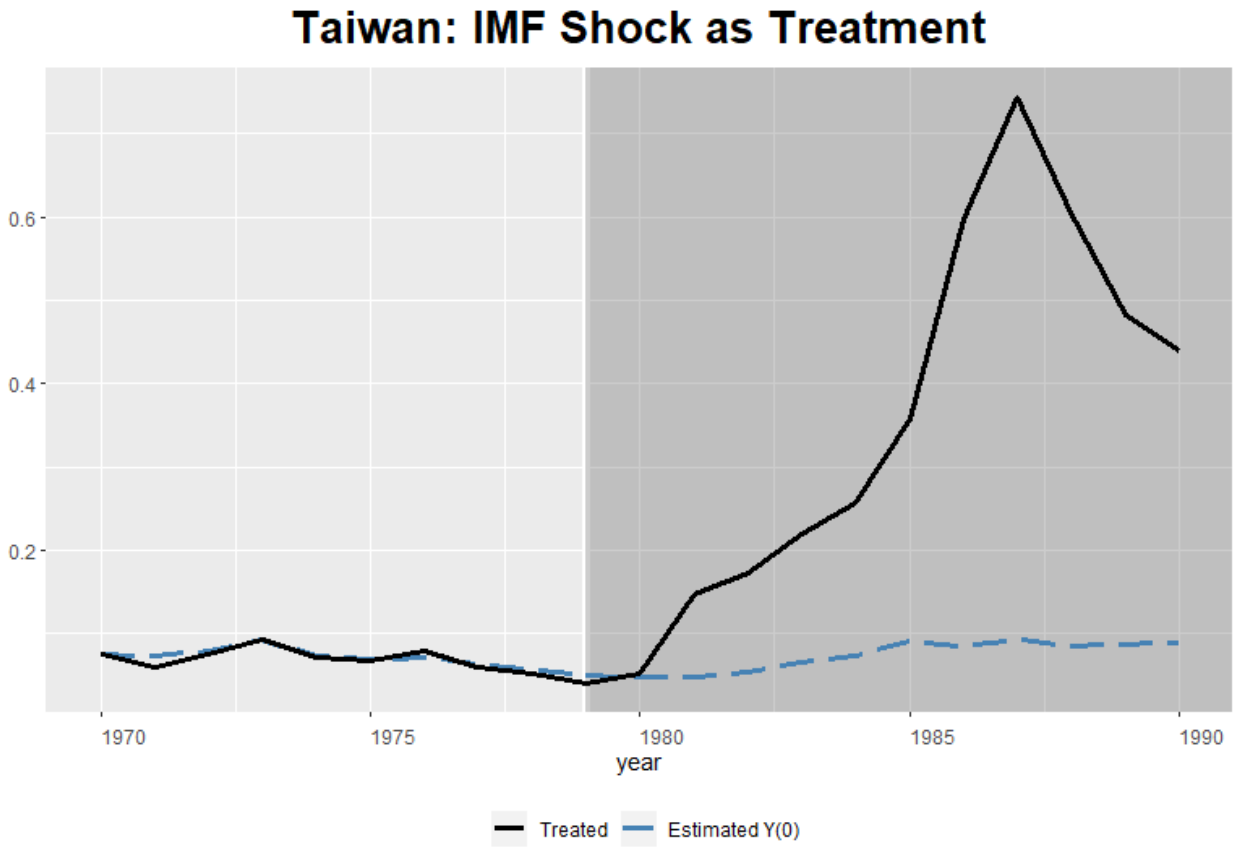

Figure 7: Trends in international reserves/GDP in Taiwan vs. synthetic Taiwan using 1980 as the treatment year

Taiwan's shift from ISI to EOI took place in 1958-1960.[37] Unfortunately, we do not have comprehensive data on reserves going back to the 1950s for a sufficient number of other countries to apply the synthetic control method to Taiwan's shift to EOI. However, data on Taiwan's reserves starting in 1960 are available and strongly suggest that there was no change in Taiwan's reserve accumulation behavior after the adoption of EOI. As Figure 8 shows, Taiwan's reserves remained low and stable at around 5% of GDP after the initiation of EOI for two decades. Reserves only took off after 1980, the year of IMF expulsion.

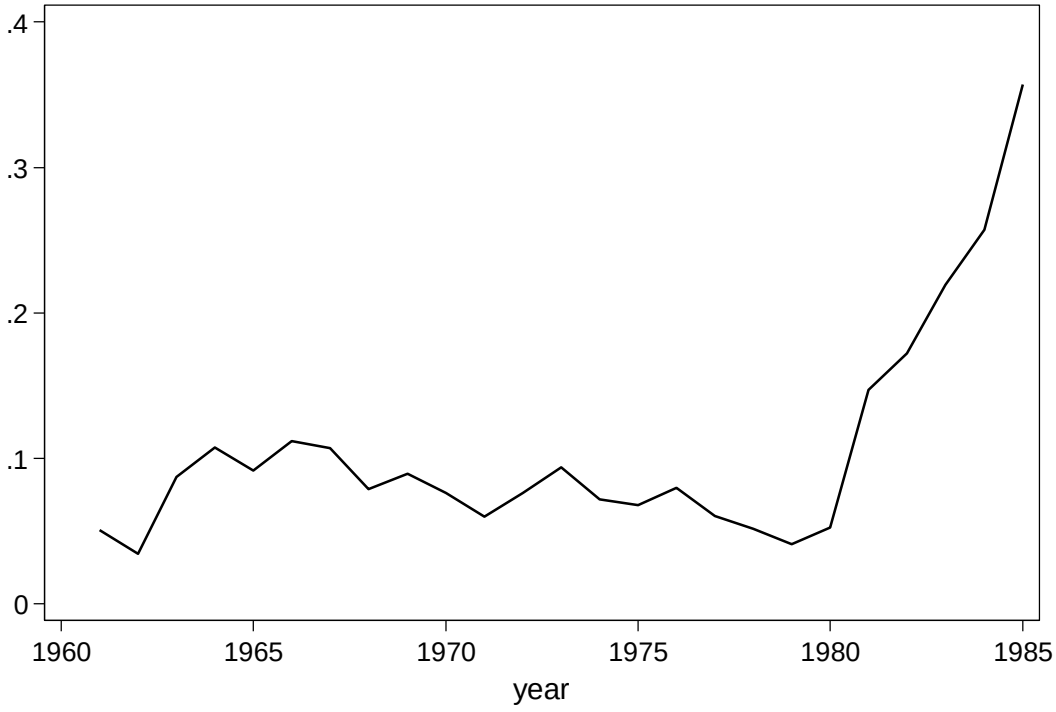

Figure 8: Trends in international reserves/GDP in Taiwan in 1960-1990

[37] World Bank 1993, van Dijck, Verbruggen and Linnemann 1987, 49; Rigger 2013, 49; Zhang 2003

Korea

Unlike Taiwan, the remaining countries in this section were not expelled from the IMF at any point and remain members in good standing. Hence, we use the Asian Financial Crisis as the "treatment" that altered perceptions about each country's relationship with the IMF. If the precautionary hypothesis is correct, perceptions about the IMF's harsh treatment of Asian countries in 1997-98 should have led to an increase in reserves as a means of self-insurance. The results for Korea are depicted in Figure 9. As the figure shows, Korea and synthetic Korea track each other very closely until 1998, at which point a large gap opens up: Korean reserve accumulation took off dramatically after IMF involvement in 1997-98. Qualitative evidence is also consistent with the precautionary motive being an important factor for Korean reserve accumulation. The 1997 crisis is widely known as the "IMF Crisis" and second national humiliation after Japanese colonization in Korea, and ever since then, considering IMF support has been seen as political suicide for Korean leaders.

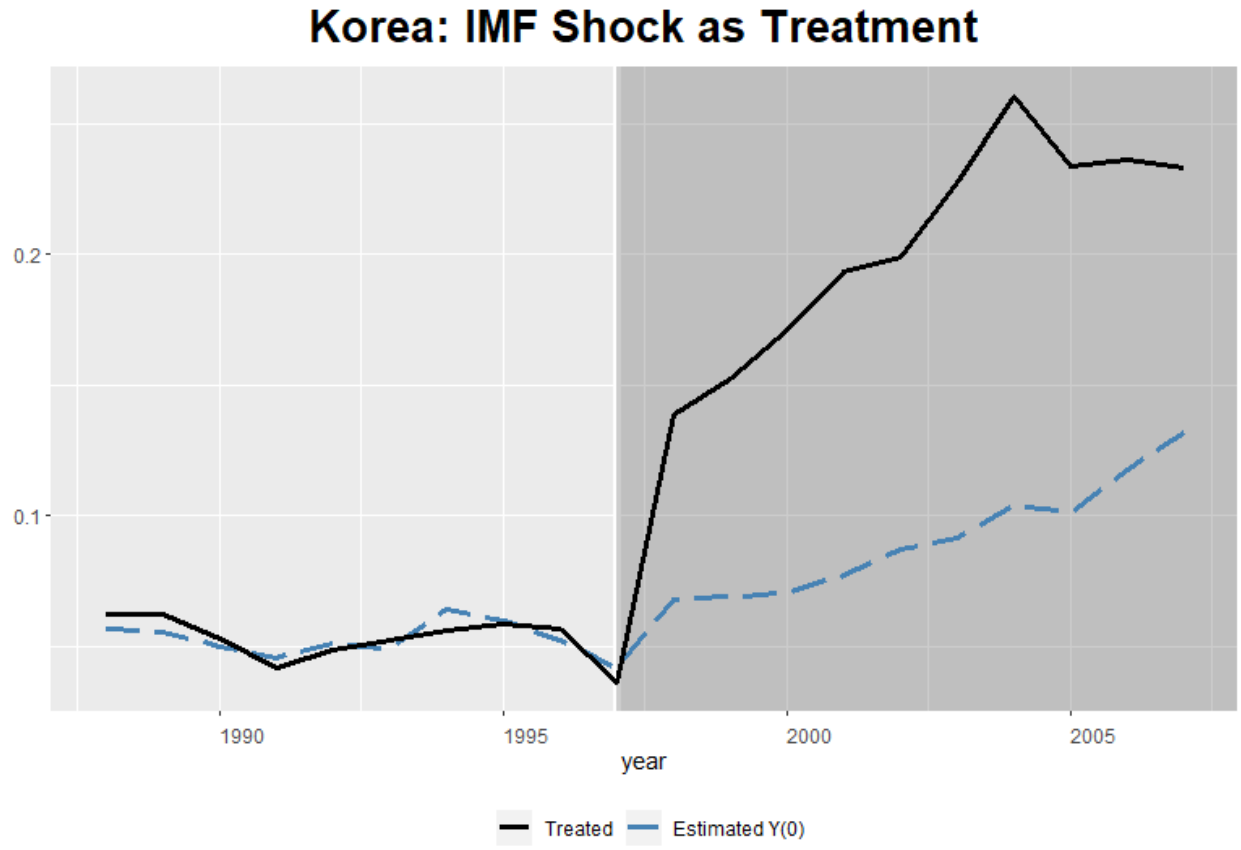

Figure 9: Trends in international reserves/GDP in Korea vs. synthetic Korea using 1998 as the treatment year

Like Taiwan, Korea's switch to EOI came relatively early in 1961, making it impossible to perform analysis using the synthetic control method.[38] However, as Figure 10 shows, it is implausible based on the raw data that Korea's switch to EOI was associated with a shift toward meaningful reserve accumulation. Korea's reserves/GDP were essentially flat between 1960 and the mid-1990s at a relatively low level of around 5% of GDP. This was a period of famous export-oriented growth that propelled the Korean economy from war-ravaged destitution to OECD

[38] World Bank 1993, 124.

membership in 1996. The Korean case demonstrates clearly that reserve accumulation is not inherently associated with export-oriented policies.

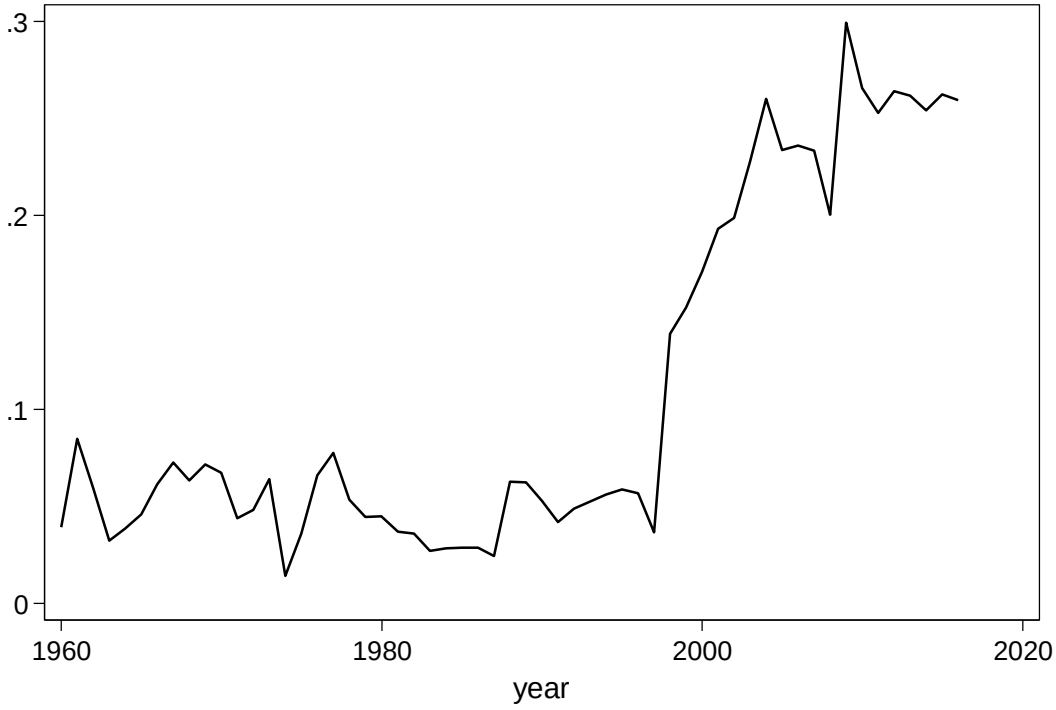

Figure 10: Trends in international reserves/GDP in South Korea in 1960-2010

Thailand

Our results also suggest that Thai reserve accumulation is driven by precautionary motives. Figure 11 shows that Asian financial crisis in 1997 is associated with a sharp increase in Thailand's reserves/GDP. While Thailand and synthetic Thailand closely resemble each other prior to 1998, a large gap opens in 1998. However, as can be seen in Figure 12, there is no evidence supporting the mercantilist hypothesis. Thailand did not experience an upturn in reserves following its

adoption of EOI in 1980. The volume of reserves/GDP continued to decline in Thailand in 1980 and following years. Moreover, Thailand's reserves/GDP remained lower than those of synthetic Thailand in the years following 1980 until around 1989.

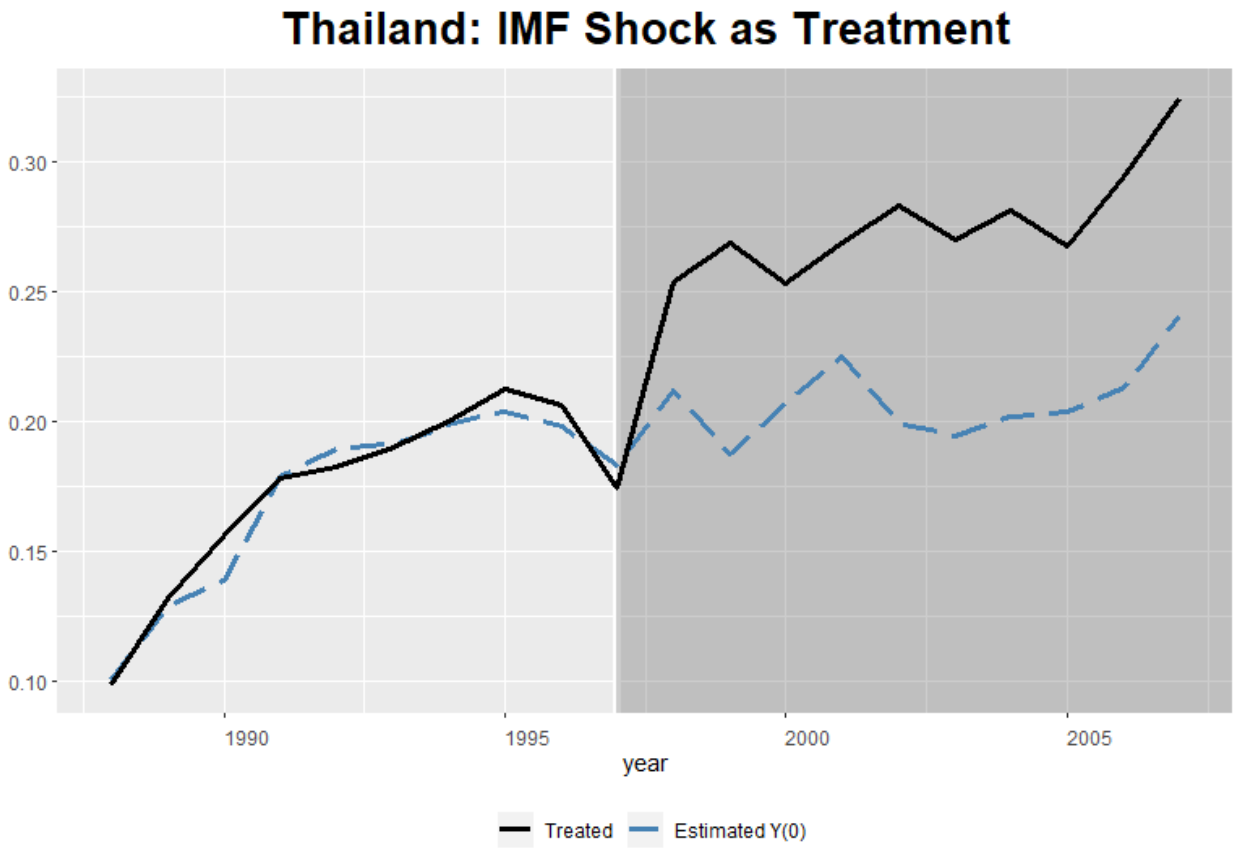

Figure 11: Trends in international reserves/GDP in Thailand vs. synthetic Thailand using 1998 as the treatment year

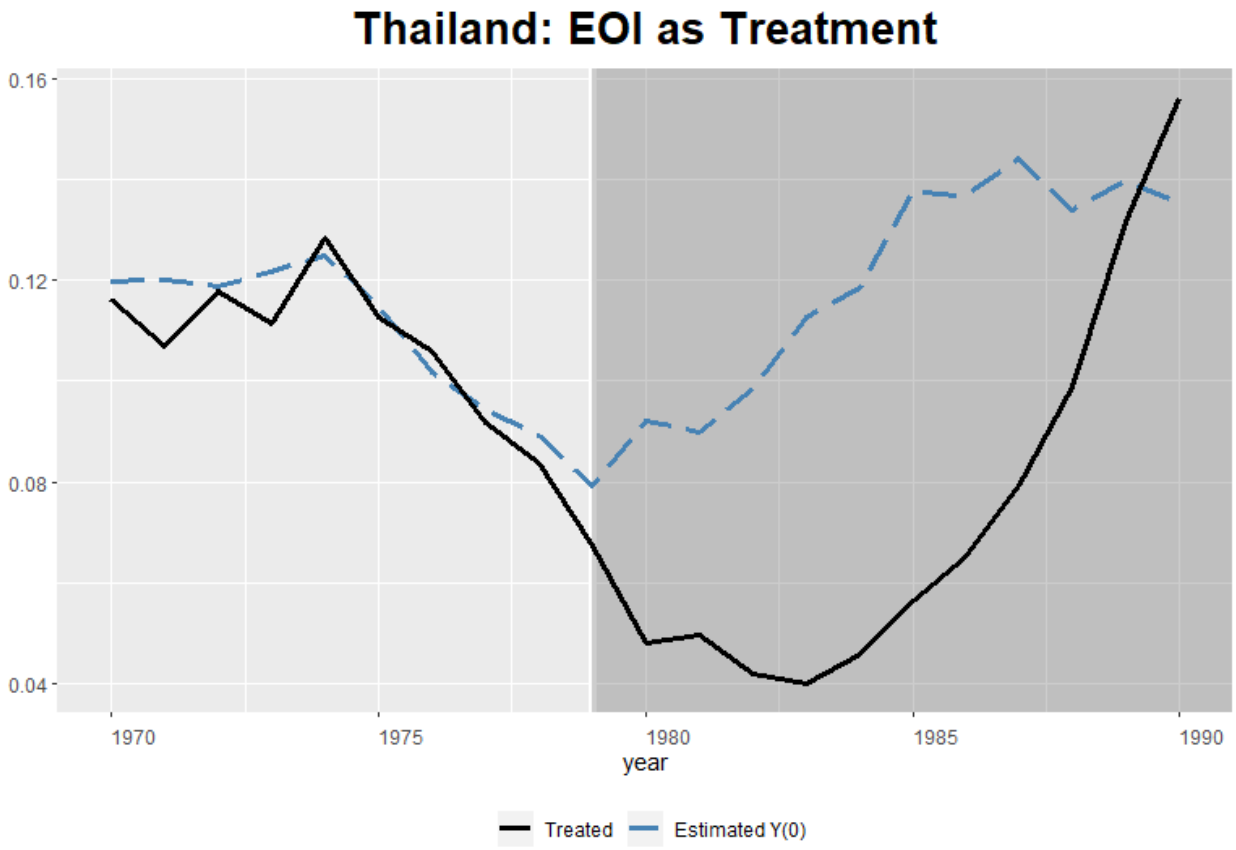

Figure 12: Trends in international reserves/GDP in Thailand vs. synthetic Thailand using 1980 as the treatment year

China

China represents a "hard case" for our argument. China is often criticized as the quintessential example of a country adopting mercantilist policies.[39] In addition, China weathered the 1997-98 Asian Financial Crisis relatively unscathed, though policymakers note that the crisis

[39] Navarro and Autry 2011

highlighted the fact that relying on the IMF was not politically viable and hence the need to strengthen domestic resources.[40]

Nonetheless, the results for China are similar to those presented above for other countries. Figure 13 tests the precautionary hypothesis using 1998 as the treatment year. As the figure shows, Chinese reserves closely match the counterfactual until 1998, at which point a large gap opens up. Figure 14 tests the mercantilist hypothesis using 1978, the beginning of Deng Xiaoping's reforms and China's EOI as identified by the World Bank, as the treatment year. If the mercantilist hypothesis is correct, we would expect China's reserves to start increasing with the advent of EOI. However, there is no observable treatment effect of EOI on Chinese reserves/GDP.

[40] Personal Interview, NDRC (China) Official, June 2010

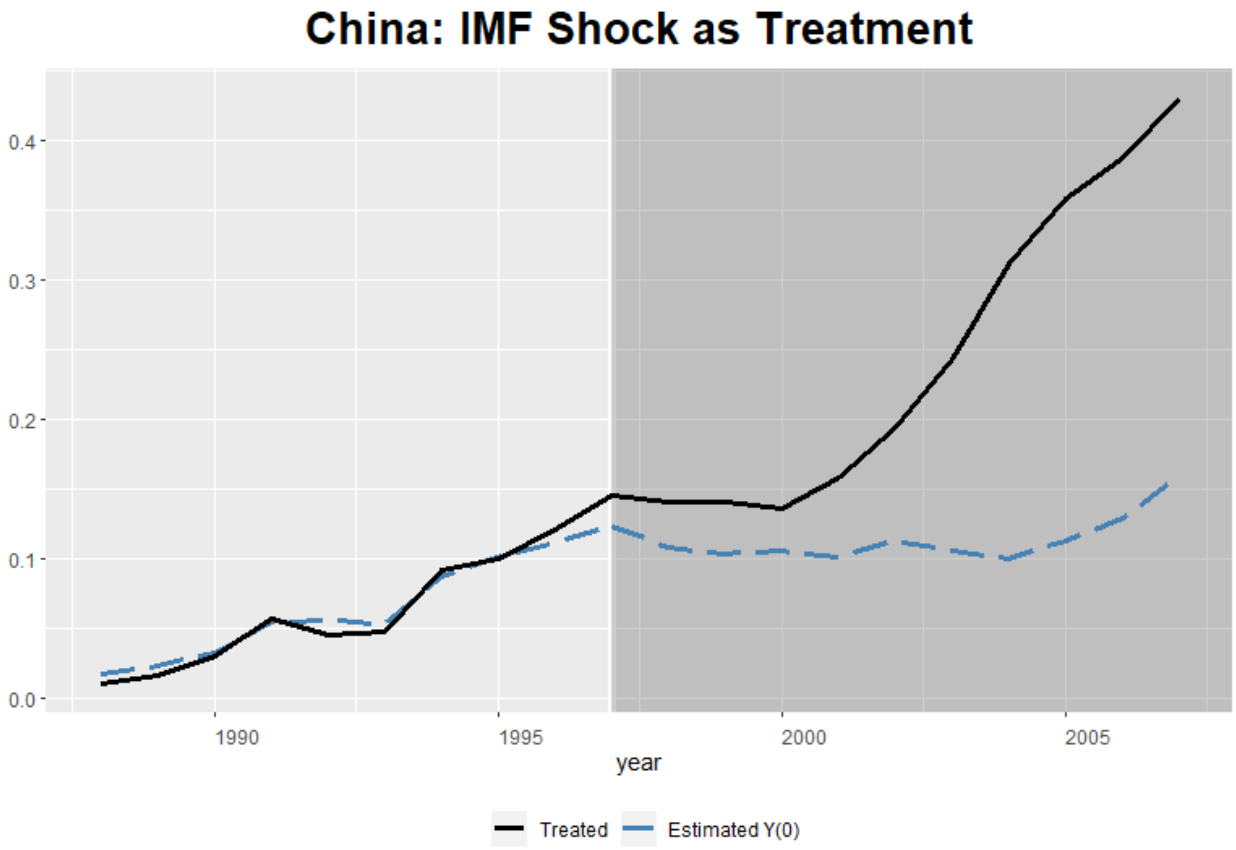

Figure 13: Trends in international reserves/GDP in China vs. synthetic China using 1998 as the treatment year

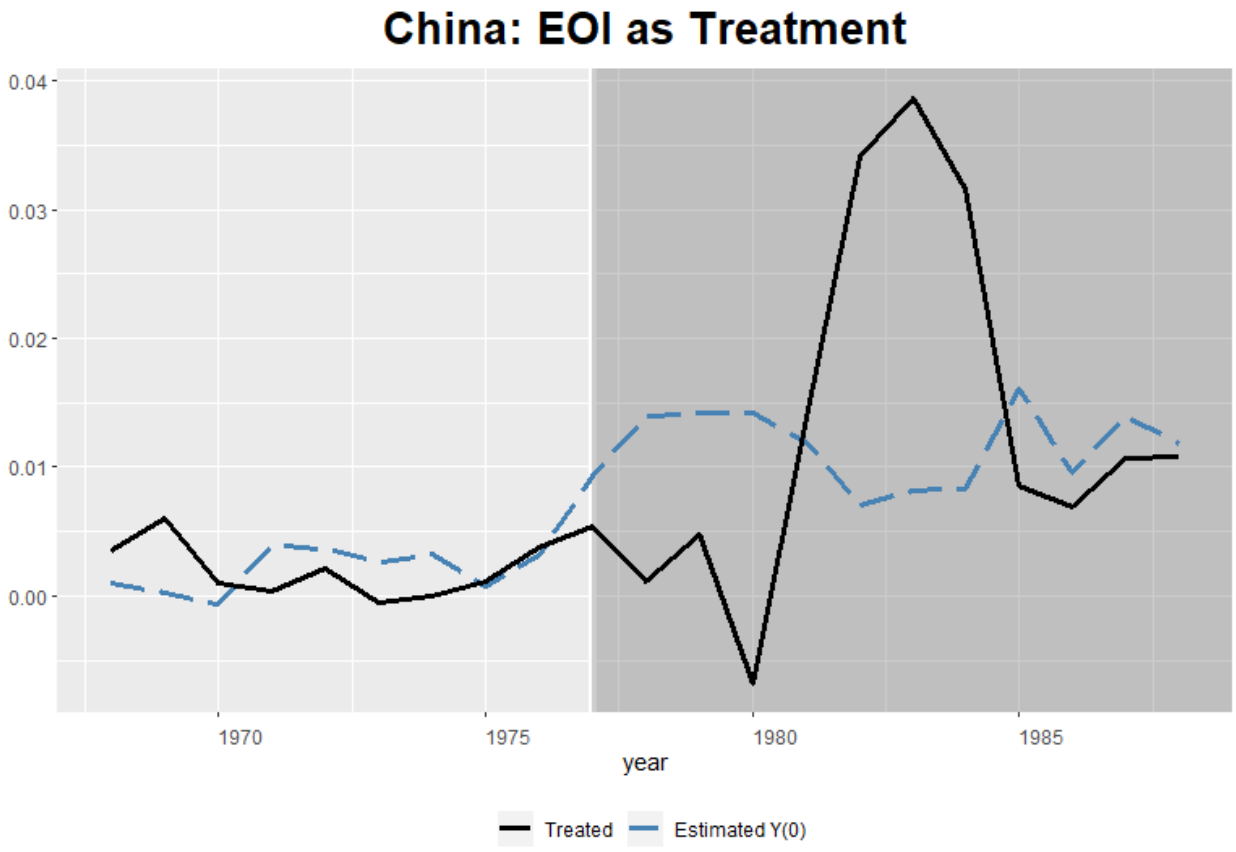

Figure 14: Trends in international reserves/GDP in China vs. synthetic China using 1978 as the treatment year

Conclusion

The conventional wisdom holds that reserve accumulation in East Asia is primarily due to mercantilism and export-oriented policies. Using multiple methods, we find that the evidence in favor of the mercantilist explanation is surprisingly weak: we could not identify any countries where the transition to export-oriented industrialization was accompanied by a positive shift in reserve accumulation. On the other hand, there is considerably stronger evidence in favor of precautionary motivations for reserve accumulation. Taiwan clearly accelerated reserve accumulation after its expulsion from the IMF. Other countries in the region sharply accelerated reserve accumulation after the 1997-98 Asian Financial Crisis, which generated the perception that the IMF would not treat Asian countries fairly. Our statistical results show that events that adversely affect perceptions about the reliability of the IMF as the lender of last resort are associated with increased reserve accumulation, while transitions to export-oriented development are not.

One substantive implication of these findings is that threatening countries with retaliatory tariffs – as is being done by the Trump administration – will not be an effective way to remedy global imbalances. Such measures may actually make countries more suspicious of US intentions and by implication the IMF, compelling even greater reserve accumulation and trade surpluses. A more plausible remedy is to reassure countries that mistrust the IMF and thereby mitigate incentives to pursue precautionary self-insurance: IMF membership for Taiwan – perhaps under a different name such as Chinese Taipei – and quota and personnel reform to increase the voice of underrepresented countries.[41]

[41] However, see Lipscy 2015 on why this is often politically difficult.

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