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Sovereign Default and FDI Transactions: Evidence from Argentina*

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Abstract

This paper investigates the effect of sovereign debt default on foreign direct investment (FDI) transactions by US firms into Argentina following the Argentine sovereign default in 2019–20. Using the synthetic control approach, we find that the number of FDI transactions decreased by approximately 60% after the Argentine default with a particularly pronounced decline in the non-manufacturing sector. By examining the changes in the number of transactions, we provide a more precise picture of the cost of sovereign default, capturing the FDI activity of small firms better.

JEL Classification Codes: F13, F21, F34

Key words: Foreign Direct Investment; Sovereign Default; Synthetic Control; Argentina

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1 Introduction

One of the puzzles in sovereign debt is why sovereigns repay debts when foreign creditors have limited ability to enforce repayment due to the lack of international bankruptcy law enforcement. Several studies suggest the potential costs of sovereign default that make sovereigns hesitate to default. Eaton and Gersovitz (1981) and Arellano (2008) emphasize financial exclusion from international credit markets, while Bulow and Rogoff (1989) highlight trade sanctions as a deterrent. Empirical studies on trade disruption as a cost of sovereign default, such as Rose (2005) and Martinez and Sandleris (2011), show mixed results. Arteta and Hale (2008), Fuentes and Saravia (2010), and Phan (2017) emphasize the cost of sovereign default through the reduction of foreign direct investment (FDI), noting the risk of expropriation and asymmetric information can lead to a decline in FDI. However, these studies mainly focus on the aggregate value of FDI, which might overlook firm-level heterogeneous responses of foreign investment.

In this paper, we examine firm-level greenfield FDI in the context of sovereign default, focusing on the number of FDI transactions from US firms to Argentina after the Argentine sovereign default in 2019–20. Utilizing fDi Markets data, where large firms typically report the amount of actual investment while small firms tend not to, we focus on the *number* of transactions instead of the *value* of FDI. This approach avoids issues with large transactions by a few large firms, providing a clearer picture of the cost of sovereign default and more accurately capturing the FDI activity of small US firms. Given that small (and young) firms are central to job creation and future economic recovery, it is crucial to emphasize the cost of sovereign default in terms of the number of transactions rather than the aggregate value of FDI.[1]

To investigate firm-level FDI behavior, we use the synthetic control method (Abadie, Diamond, and Hainmueller, 2010, 2015; Abadie and Gardeazabal, 2003) to construct an appropriate counterfactual for what would have happened to US investment in Argentina in the case of debt repayment in 2019–20. Argentina announced the start of debt restructuring in December 2019 and completed the restructuring by exchanging old and new debt with foreign creditors in September 2020.[2] The US is one of the main creditor countries and a major trading partner with Argentina. Given the economic difficulties caused by the Argentine sovereign default, we are motivated to study US firms' decisions to enter Argentina after default. We find that the number of new greenfield FDI transactions by US firms in Argentina decreased by approximately 60% after the Argentine default compared to the counterfactual in 2021 and 2022, suggesting small firms were more adversely affected in exiting the market. These results are robust to placebo tests with different pre-treatment periods, restricted donor pools based on factors like FTAs and US sanctions, and synthetic difference-in-differences method. Notably, much of the decrease in the number of FDI transactions from US firms was accounted for by the non-manufacturing sector. These results indicate that the cost of sovereign default may be substantial due to the

[1] Cororaton et al. (2011) and Siemer (2019) study that employment effects from small firms are one of the main reasons for sluggish recovery following the Great Recession in the US.

[2] Asonuma and Trebesch (2016) document a monthly default and restructuring dataset, including start and end dates of 197 sovereign default spells and debt restructurings with foreign banks/bondholders from 1970–2020.

exit of foreign investment activity following the default, highlighting one of the reasons for a sovereign's reluctance to default

2 Methodology and data

In this study, we define firms' FDI activity by the number of greenfield investment transactions, sourced from the Financial Times' fDi Markets database. Once a new FDI transaction is announced, it is recorded in the fDi Markets database, allowing us to track when firms undertake FDI activities. Table 1 presents the descriptive statistics of FDI transactions into Argentina by US firms in our data. Our analysis period spans from 2003 to 2022, with 2003 set as the initial year due to the availability of FDI data beginning that year. As discussed in the previous section, we use the number of FDI transactions rather than their value. As noted by Breinlich et al. (2020), it is likely that large FDI transactions are reported more frequently. Specifically, the average investment amount of transactions reported as $94 million, when considering only the actual reported amounts, is greater than the average investment amount of $47 million when including imputed values.[3] Moreover, we observe that FDI investment is right-skewed, with the average investment value of FDI ($47 million) being greater than the median investment value ($10 million). Considering these facts, the use of number rather than value of FDI transactions has the additional advantage of preventing the analysis from being dominated by a small number of large FDI transactions and better capturing the behavior of small firms.

Table 1: Descriptive Statistics

Greenfield investment from the US to Argentina in 2003–2022	
Average number of transactions per year	22.8
Average value per transaction, US Dollar millions (all, including imputed value)	47.3
Average value per transaction, US Dollar millions (actual reported value only)	93.9
Median value per transaction, US Dollar millions (all, including imputed value)	9.5
Median value per transaction, US Dollar millions (actual reported value only)	24.6
Share of non-imputed (actual) values	25.7%

Note: Because firms do not always disclose information on the amount of investment, the fDi Markets imputes values information for transactions where the actual investment amount is not reported, using information from similar transactions (Breinlich et al. 2020).

We use the synthetic control method (SCM) suggested by Abadie and Gardeazabal (2003), Abadie, Diamond, and Hainmueller (2010, 2015) to analyze the effect of the Argentine sovereign default on US firms' greenfield investment in Argentina. The SCM is particularly well-suited for settings where a single unit is exposed to an event or policy change. The SCM provides a suitable counterfactual, called a synthetic control, for what would have happened to US firms' investments in Argentina in the absence of the Argentine sovereign default, using a weighted

[3]The number of FDI transactions with the actual investment amount reported is only about 26% of the total number of FDI transactions.

average of the outcomes for untreated units. The weights are chosen so that the synthetic control closely matches the actual outcome of the treated unit in a pre-treatment period. In our study, Argentina, where a sovereign default occurred in 2019, is the treated unit or treated country. The outcome of the treated unit is the number of US firms' FDI transactions into Argentina (US-Argentina FDI). The pre-treatment period spans from 2003 to 2018, while the post-treatment period spans from 2019 to 2022, within the entire sample period from 2003 to 2022. We measure the treatment effects as the difference between the actual number of US firms' FDI transactions and synthetic control since the sovereign default in Argentina.

To implement the SCM, we use several predictors of FDI transactions: bilateral distances between the US and FDI destination countries, the GDPs, the per capita GDPs, and the price level ratio of PPP conversion factor to market exchange rate of FDI destination countries, and a dummy variable representing the Free Trade Agreement (FTA) relationship between the US and FDI destination countries. Table 2 compares the actual value of the treated unit with those of the synthetic control in the pre-treatment period. It shows that the synthetic control series closely matches the actual FDI transaction series in the pre-treatment period.[4] In the baseline model, we use 158 countries as a donor pool (a set of potential untreated units) from which the synthetic control is constructed.[5] For a robustness check, we analyzed the effects of sovereign default on FDI transactions by restricting the donor pool to isolate the effects of other events or factors as much as possible by excluding comprehensive FTA countries with the US, sovereign default countries in the sample period, and countries in the US comprehensive sanction list in sample period.[6]

Table 2: Predictor Balance

Variable	Treated	Synthetic	Variable	Treated	Synthetic
log(GDP, in US dollars)	26.64	25.96	Number of Transactions (2008)	34	30.45
log(GDP per capita, in US dollars)	9.11	9.36	Number of Transactions (2009)	28	25.67
log(distance, km)	9.05	8.60	Number of Transactions (2010)	21	24.31
Price level ratio of PPP conversion	0.53	0.74	Number of Transactions (2011)	38	31.20
factor to market exchange rate (US = 1)			Number of Transactions (2012)	27	28.31
FTA dummy	0	0.44	Number of Transactions (2013)	24	24.44
Number of Transactions (2003)	15	13.39	Number of Transactions (2014)	15	21.21
Number of Transactions (2004)	14	15.46	Number of Transactions (2015)	15	18.83
Number of Transactions (2005)	9	13.78	Number of Transactions (2016)	29	25.44
Number of Transactions (2006)	19	22.80	Number of Transactions (2017)	19	25.19
Number of Transactions (2007)	32	28.01	Number of Transactions (2018)	38	34.09

[4]We obtain GDPs, per capita GDPs, and the price level ratio of PPP conversion factors to market exchange rates from the World Bank (World Bank Open Data), and the distance and FTA dummy variables from CEPII and WTO website.

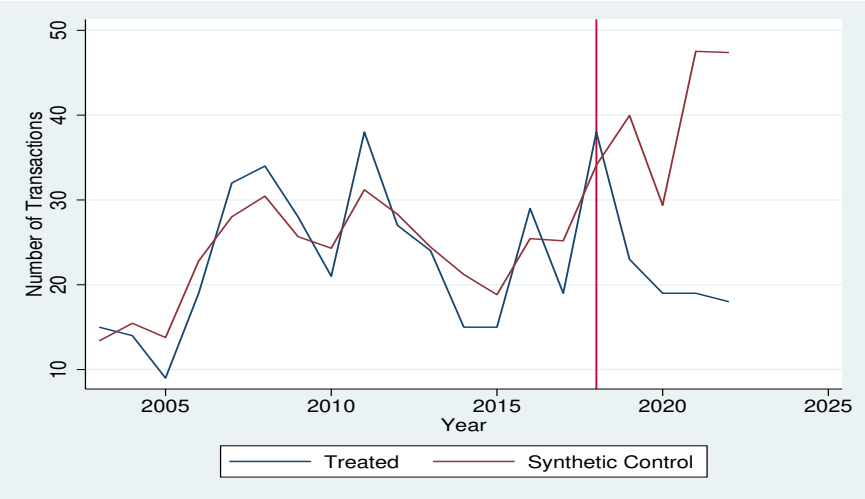
[5]we exclude Russia and Ukraine, which have been at war since 2022, and China, which has been engaged in a serious trade conflict with the US since 2018.

[6]Data on FDI and all predictors are available for 158 countries. See appendix for the list of country for the baseline and restricted donor pool.

3 Estimation results

3.1 Baseline results

Figure 1: US-Argentina FDI counts (actual vs. synthetic control)



Notes: This figure plots the actual US-Argentina FDI transaction series (blue line) and the corresponding synthetic control series (red line). The vertical line indicates 2018, and the subsequent year, 2019, indicates the start of the Argentine sovereign default.

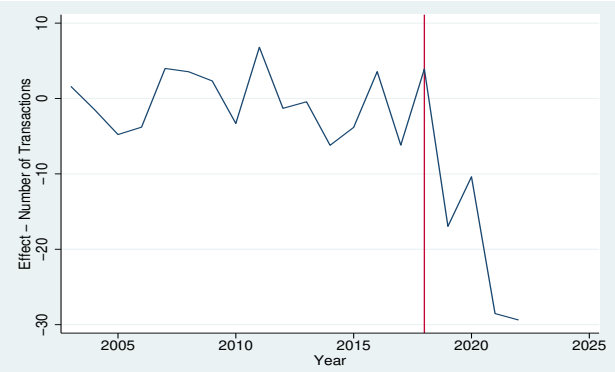
We report the results based on the baseline SCM specification. The SCM algorithm identifies the following FDI transaction series for constructing the synthetic control for the US-Argentina FDI, with the corresponding weights in parentheses: US-Peru FDI (40.4%), US-Costa Rica FDI (23.1%), US-Switzerland FDI (20.3%), US-Spain FDI (10.1%), US-Brazil FDI (3.7%), US-Slovakia FDI (2.5%). All other countries' FDI series are assigned a zero weight. Consequently, the significant series used to create the synthetic control primarily consist of FDI transactions from the US into Central and South American countries such as Peru, Costa Rica, Brazil, accounting for approximately 70% of the total weight.

Figure 1 shows the actual US-Argentina FDI series compared to the synthetic control series. Prior to the Argentine sovereign default, the synthetic control closely tracks the actual US-Argentina FDI, demonstrating that the synthetic control is appropriate. After 2018, however, the actual US-Argentina FDI declines compared to the synthetic control. The gap between the two series widens considerably in 2021 and 2022. Considering the severity of the COVID-19 pandemic in 2020, it is believed that the effects began to appear more substantially after 2020 due to confounding factors such as lockdown, travel restriction, and other related issues.

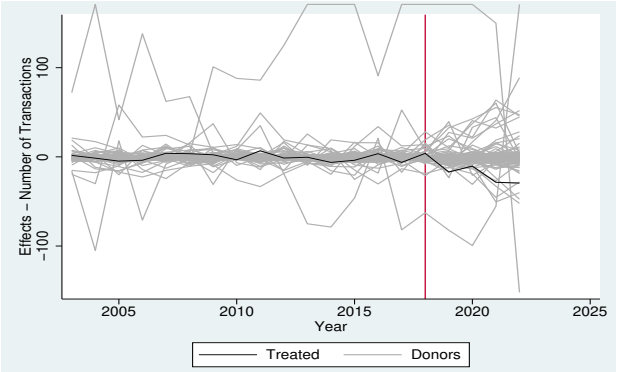
The differences between the curves in Figure 1 are plotted in Figure 2 (i). It indicates that the Argentine sovereign default in 2019–20 resulted in an estimated reduction of about 30 US-Argentina FDI transactions in 2021 and 2022. Figure 2 (ii) shows the trends in the gap between the actual US-Argentina FDI and the synthetic control (the black solid line) and the gaps of placebos (the faint gray lines) where the SCM is applied to each untreated country separately.

Figure 2: Difference between the actual FDI counts & synthetic control

(i) US-Argentina FDI counts



(ii) US-Argentina FDI counts & untreated FDI counts



Notes: In (i), the blue solid line is the difference between the actual USA-Argentina FDI series and the corresponding synthetic control series depicted in Figure 1. The vertical line indicates 2018, and the subsequent year, 2019, indicates the start of the Argentine sovereign default. In (ii), the black solid line is the difference between the actual USA-Argentina FDI and the corresponding synthetic control series. The faint lines are the placebo difference lines where the SCM is applied to each untreated country.

With a few exceptions, the post-treatment gap between the actual US-Argentina FDI and the synthetic control is larger than the gaps for other untreated countries after 2018. Table 3 presents the treatment effects, p-values, and standardized p-values for each post-treatment year. P-values can be calculated based on the permutation inference framework (Abadie, Diamond, and Hainmueller, 2010; Abadie and Cattaneo, 2018). The results indicate that the p-value is less than 0.1 for both 2021 and 2022.

Table 3: Post-treatment Results

Year	Treatment effects	p-values	Standardized p-values
2019	-16.96	0.063	0.152
2020	-10.38	0.108	0.152
2021	-28.53	0.076	0.044
2022	-29.38	0.063	0.076

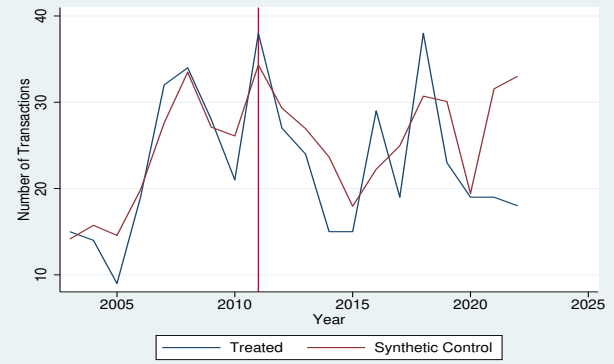
3.2 Robustness analysis

Placebo pre-treatment period. We conduct a robustness analysis by establishing a fake pre-treatment period. In the baseline model, the pre-treatment period is from 2003 to 2018. For the robustness check, we set up a fake pre-treatment period from 2003 to 2011, based on the observation that the period right after 2011 shows a similar trend in FDI transactions to the period from 2019 to 2022. As a result, while shortening the pre-treatment period, we extended the post-treatment period.

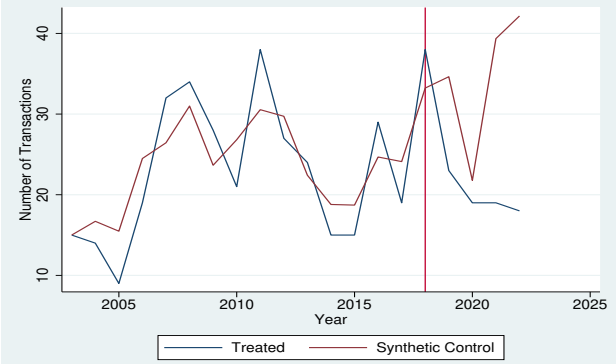
As shown in Figure 3 (i), the synthetic control behaves similarly to actual US-Argentina FDI before and after 2012, which is a fake initial treatment year. This supports the effectiveness of the SCM algorithm in our study. However, we still observe a substantial gap between the two series in 2021 and 2022. Despite the shortened pre-treatment period, this finding aligns with the baseline results shown in Figure 1.

Figure 3: US-Argentina FDI counts (actual vs. synthetic control)

(i) Placebo pre-treatment period



(ii) Restricted donor pool

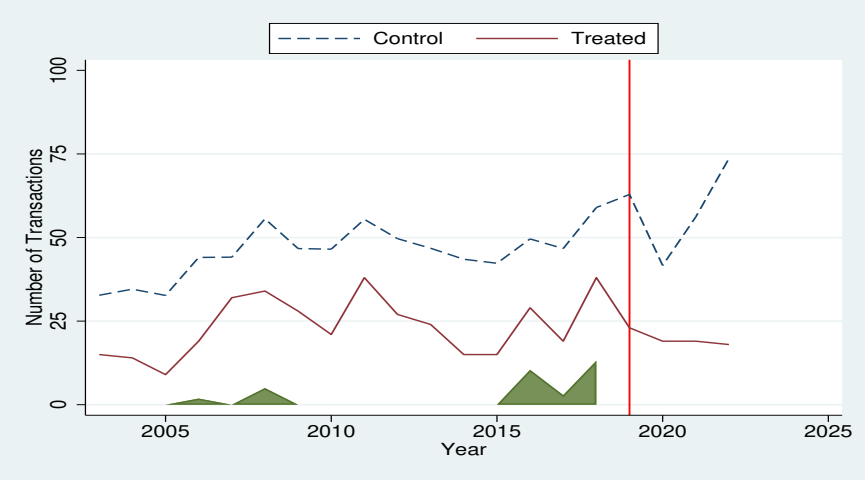


Notes: Figure 3 (i) plots the actual US-Argentina FDI transaction series (blue line) and the corresponding synthetic control series (red line). The vertical line indicates 2011, and the subsequent years indicate the fake post-treatment periods. Figure 3 (ii) plots the actual US-Argentina FDI transaction series (blue line) and the corresponding synthetic control series (red line) when we repeat the baseline model analysis using restricted donor pool. The vertical line indicates 2018, and the subsequent year, 2019, indicates the start of the Argentine sovereign default.

Restricted donor pool. To ensure the validity of our SCM results, it is crucial that untreated countries remain unaffected by the Argentine sovereign default itself and other contemporaneous shocks. In our baseline model, we already exclude Russia, Ukraine and China. For the robustness check, we exclude countries where socio-economic events might have influenced FDI decisions by US firms from the donor pool. Considering the potential long-term effects of FTAs on FDI transactions, countries that had signed comprehensive FTAs with the US are excluded from the donor pool. Additionally, we exclude countries that experienced sovereign default during the sample period and those on the US comprehensive sanction list during the sample period. The results, as shown in Figure 3 (ii), using the restricted donor pool, exhibit a very similar pattern to baseline results shown in Figure 1.

Synthetic Difference-in-Differences. We also employ synthetic difference-in-differences (SDID) as suggested by Arkhangelsky et al. (2019), which is a hybrid method combining Difference-in-Differences (DID) and SCM, using the same dataset employed in our baseline model. SDID determines unit weights to align the pre-treatment trends in the outcome of untreated units with the treated unit and also finds time weights that balance pre-treatment and

Figure 4: US-Argentina FDI counts (actual vs. SDID synthetic control)



Notes: This figure plots the actual US-Argentina FDI transaction series (red solid line) and the corresponding SDID synthetic control outcome trends (blue dotted line). The vertical line indicates 2019, which indicates the start of the Argentine sovereign default. The green plot at the bottom is time-specific weights.

post-treatment periods for the untreated unit. Similar to DID, it accounts for both unit fixed effects and time fixed effects.

Figure 4 illustrates that the actual US-Argentina FDI series (red solid line) and the synthetic control series (blue dotted line) are parallel before the Argentine sovereign default, but they increasingly diverge afterward. This is consistent with our baseline results presented in Figure 1. The average treatment effect on the treated (ATT) is estimated to be -17.73, with a p-value of 0.094, which is less than 0.1.

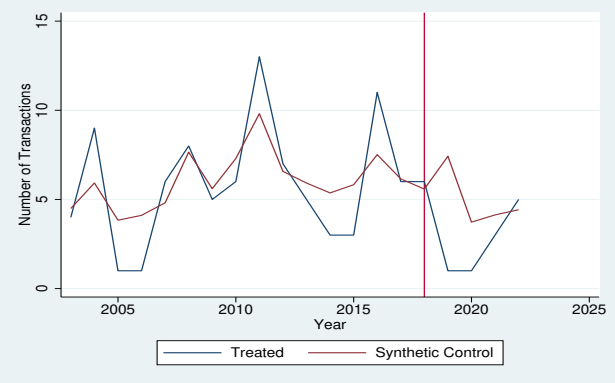
3.3 Additional results

Manufacturing versus Non-manufacturing. We have demonstrated that our baseline results are robust across various specifications. In this section, we provide additional results to identify which sector experienced a reduction in US firms' FDI transactions in Argentina. To this end, we split the entire sample into FDI transactions in the manufacturing sector and those in the non-manufacturing sector. We then apply the SCM to each sector.

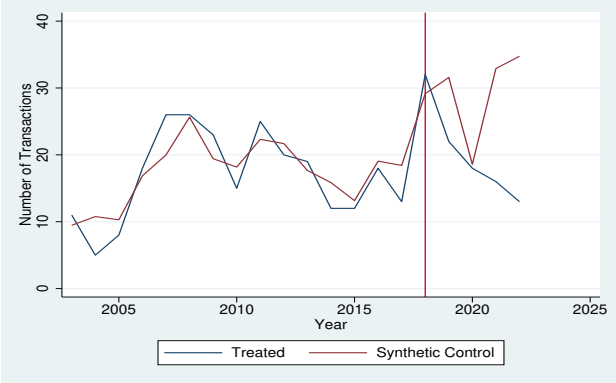
The results for the manufacturing sector are presented in Figure 5 (i), and the results for the non-manufacturing sector are presented in Figure 5 (ii). While there is no systematic difference between the number of actual FDI transactions and the synthetic control for the manufacturing sector, we observe the substantial gap between the two series for the non-manufacturing sector, similar to Figure 1. These findings indicate that the overall effect of the Argentine sovereign default on the US firms' FDI activity is primarily driven by the non-manufacturing sector.

Figure 5: US-Argentina FDI counts per sector (actual vs. synthetic control)

(i) Manufacturing sector



(ii) Non-manufacturing sector



Notes: These figures plot the actual US-Argentina FDI transaction series (blue line) and the corresponding synthetic control series (red line) for both sectors. The vertical line indicates 2018, and the subsequent year, 2019, indicates the start of the Argentine sovereign default.

4 Conclusion

Using the SCM, this paper demonstrates that the Argentine sovereign default in 2019–20 led to a reduction in the number of greenfield FDI transactions undertaken by US firms into Argentina. By focusing on the number of FDI transactions, we are able to prevent the analysis from being dominated by a small number of large transactions and capture the behavior of small firms better, suggesting that small US firms were more likely to exit from Argentina following the sovereign default. Additionally, the decrease in FDI transactions is more pronounced in the non-manufacturing sector. These findings provide that the cost of a sovereign default, in terms of FDI can be substantial when considering the number of transactions rather than simply the aggregate value of FDI.

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Appendix A Datasets

Table A1: List of countries for the baseline model

Africa	Angola Burundi Benin Botswana Cameroon Comoros Cape Verde Cote d'Ivoire Algeria Egypt Ethiopia Gabon Ghana Guinea Gambia Equatorial Guinea Kenya Libya Morocco Madagascar Mozambique Mauritania Mauritius Namibia Niger Nigeria Rwanda Senegal Sierra Leone South Africa Eswatini Chad Togo Tunisia Tanzania Uganda Zambia Zimbabwe Democratic Republic of Congo Republic of the Congo
Asia	Armenia Azerbaijan Bangladesh Bahrain Brunei Cyprus Georgia Hong Kong India Indonesia Iran Iraq Israel Japan Jordan Kazakhstan Kuwait Kyrgyzstan Cambodia South Korea Laos Sri Lanka Maldives Myanmar Mongolia Nepal Oman Pakistan Palestine Philippines Qatar Saudi Arabia Singapore Tajikistan Thailand Turkey Turkmenistan UAE Uzbekistan Vietnam
Europe	Albania Austria Belgium Bulgaria Bosnia-Herzegovina Belarus Croatia Czech Republic Denmark Estonia Finland France Germany Greece Hungary Iceland Ireland Italy Latvia Lithuania Luxembourg Malta Moldova Netherlands North Macedonia Norway Poland Portugal Romania Slovakia Slovenia Spain Sweden Switzerland United Kingdom
North America	Antigua and Barbuda Bahamas Barbados Belize Bermuda Canada Costa Rica Dominica Dominican Republic El Salvador Grenada Guatemala Haiti Honduras Jamaica Mexico Nicaragua Panama Saint Kitts & Nevis Saint Lucia Saint Vincent and the Grenadines Trinidad & Tobago
South America	Argentina Bolivia Brazil Chile Colombia Ecuador Guyana Paraguay Peru Suriname Uruguay
Oceania	Australia Fiji Micronesia New Zealand Papua New Guinea Samoa Solomon Islands

Table A2: List of countries excluded for restricted donor pool

FTA with US	Australia, Bahrain, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Guatemala, Honduras, Israel, Jordan, South Korea, Morocco, Mexico, Nicaragua, Oman, Panama, Peru, Singapore, El Salvador
Sovereign Default	Barbados, Belize, Cote d'Ivoire, Dominica, Dominican Republic, Ecuador, Greece, Grenada, Moldova, Mongolia, Mozambique, Republic of Congo, St. Kitts and Nevis, Suriname, Gambia, Uruguay, Zambia
Sanction	Iran