Federal Reserve Currency Swaps:
Economics or Politics?

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Introduction

- Between 2007 and 2010 the Federal Reserve injected more than USD 500 Bn into several foreign central banks (CB) through Central Bank Liquidity Swap Lines.

- Liquidity Swap was the single biggest component of ILLR policies.

- 14 CBs received swap lines. Request for swap lines by at least 7 other CBs turned down. The criteria of selection and rejection of requests is not clear.

- This paper investigates these selection criteria, whether economic or political factors motivated the selection and rejection of requests by the Fed.

Currency Swap Lines

- An arrangement whereby foreign CBs can get USD in exchange for their domestic currency for a stipulated time at a fixed exchange rate.

- At the end of the stipulated period the CBs will have to sell the USD back to Fed in exchange for the domestic currency at the previously fixed exchange rate.

- The upper limit of Swap lines is fixed for each CB and varies considerably between the various CBs.

- CBs of EMEs were also asked to keep their assets with the Fed as a guarantee. The arrangement also hedges the Fed against exchange rate depreciation.
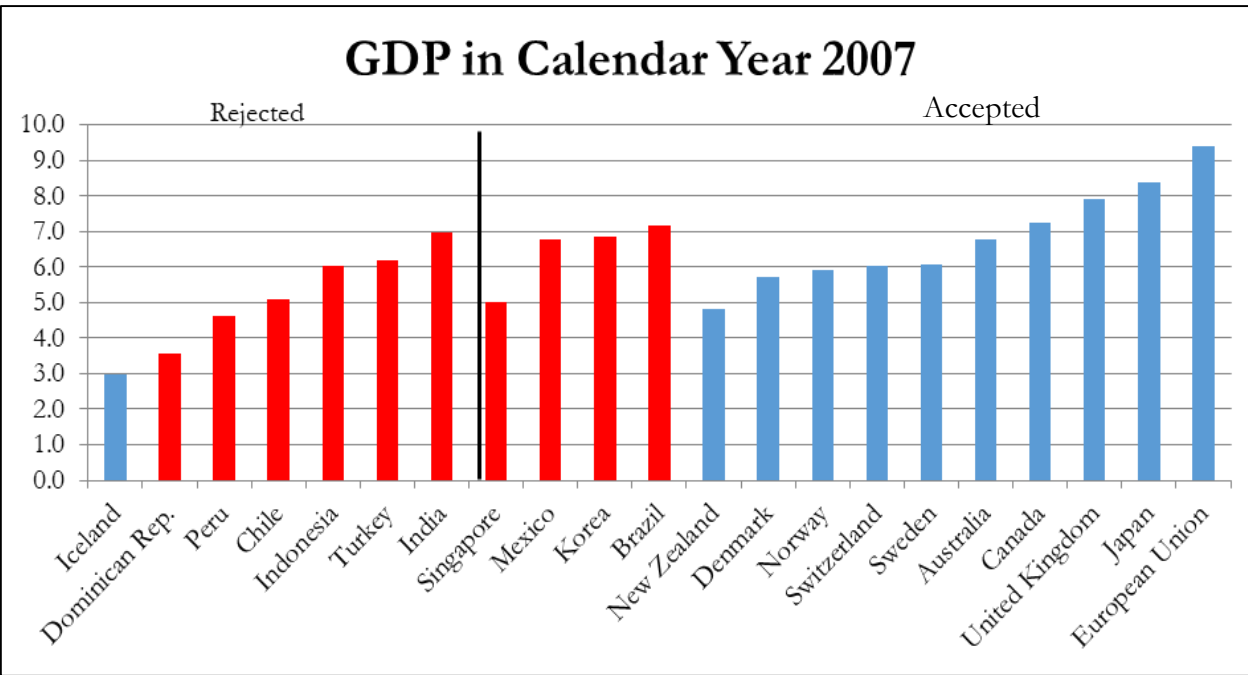
Currency Swap Lines

- Swap lines were extended to 14 CBs including 4 EMEs. These are the ECB, the CBs of UK, Japan, Norway, Denmark, Sweden, Switzerland, Canada, Australia, New Zealand, Brazil, Mexico, South Korea, and Singapore.

- The Swap limits varied considerably among recipients – ECB (USD 240 B), Japan (USD 120 B), UK (USD 80 B), Switzerland (USD 60 B). All the rest less than USD 30 B.

- The Swap limits of ECB, New Zealand, Australia, Sweden, and UK almost as much as their Forex reserves in 2007. This shows the significance of the Swap Lines.

- Requests for Swap was rejected for at least 7 countries – India, Chile, Indonesia, Iceland, Peru, Turkey, and Dominican Republic.

Criteria for selection of CBs to receive Swap Lines

- The selection and rejection criteria of request for Swap Lines have not been clearly stated by the Fed. The arbitrariness has created scope for speculation.

- Deliberations inside the FOMC meetings during the period does not throw light on the issue. Issues like boundary problems were raised in the FOMC meetings as well.

- The Fed finally specified a set of financial and economic parameters in 2011 on which the Swap partners were selected.

    (i) An economy's financial mass, (ii) if the country was a Global financial centre, (iii) importance as a trading partner of the US, (iv) record of sound economic management by the country's CB, (v) level of forex reserves, (vi) exposure of US banks to the foreign economy.
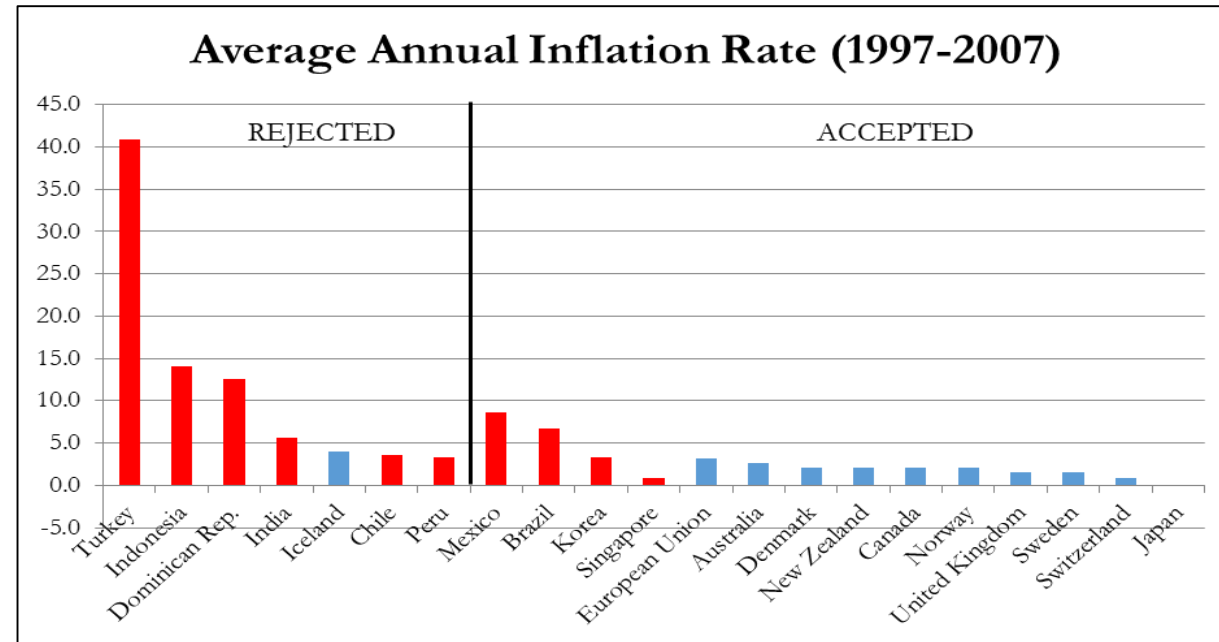
Criteria for selection of CBs to receive Swap Lines

- However, even based on these criteria some candidates especially from the EMEs seem to be more deserving of a swap line than those selected.

- The following charts on some of the SIX criteria show that countries like India, Chile, and Indonesia should not have had their Swap request rejected.

- Chile and India had also featured in the FOMC discussions as well, especially regarding boundary problems in selection criteria.

GDP in Calendar Year 2007

Rejected | Accepted

Countries (left to right): Iceland, Dominican Rep., Peru, Chile, Indonesia, Turkey, India, Singapore, Mexico, Korea, Brazil, New Zealand, Denmark, Norway, Switzerland, Sweden, Australia, Canada, United Kingdom, Japan, European Union

Trade with the US in 2007

Rejected | Accepted

Countries (left to right): Iceland, Peru, Dominican Rep., Turkey, Chile, Indonesia, India, Brazil, Singapore, Korea, Mexico, New Zealand, Denmark, Norway, Sweden, Switzerland, Australia, United Kingdom, Japan, European Union, Canada

Average Annual Inflation Rate (1997-2007)

REJECTED | ACCEPTED

Countries (left to right): Turkey, Indonesia, Dominican Rep., India, Iceland, Chile, Peru, Mexico, Brazil, Korea, Singapore, European Union, Australia, Denmark, New Zealand, Canada, Norway, United Kingdom, Sweden, Switzerland, Japan

Source: World Economic Outlook

*All except Inflation rate are in log values

Source: Correlates of War Dataset

*All log values
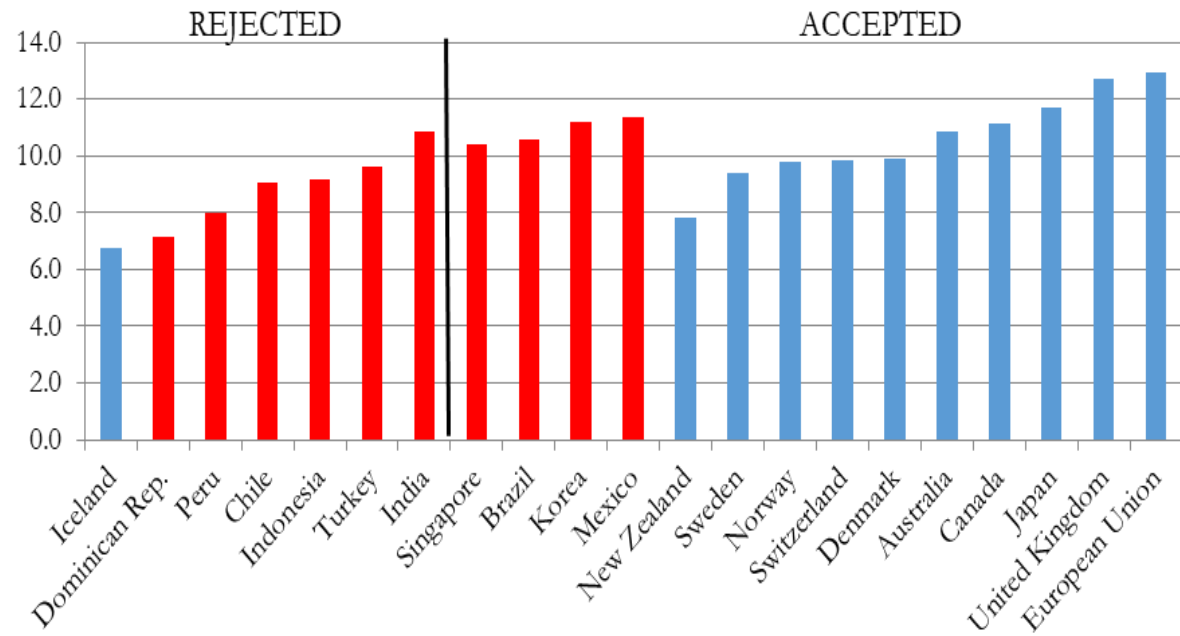
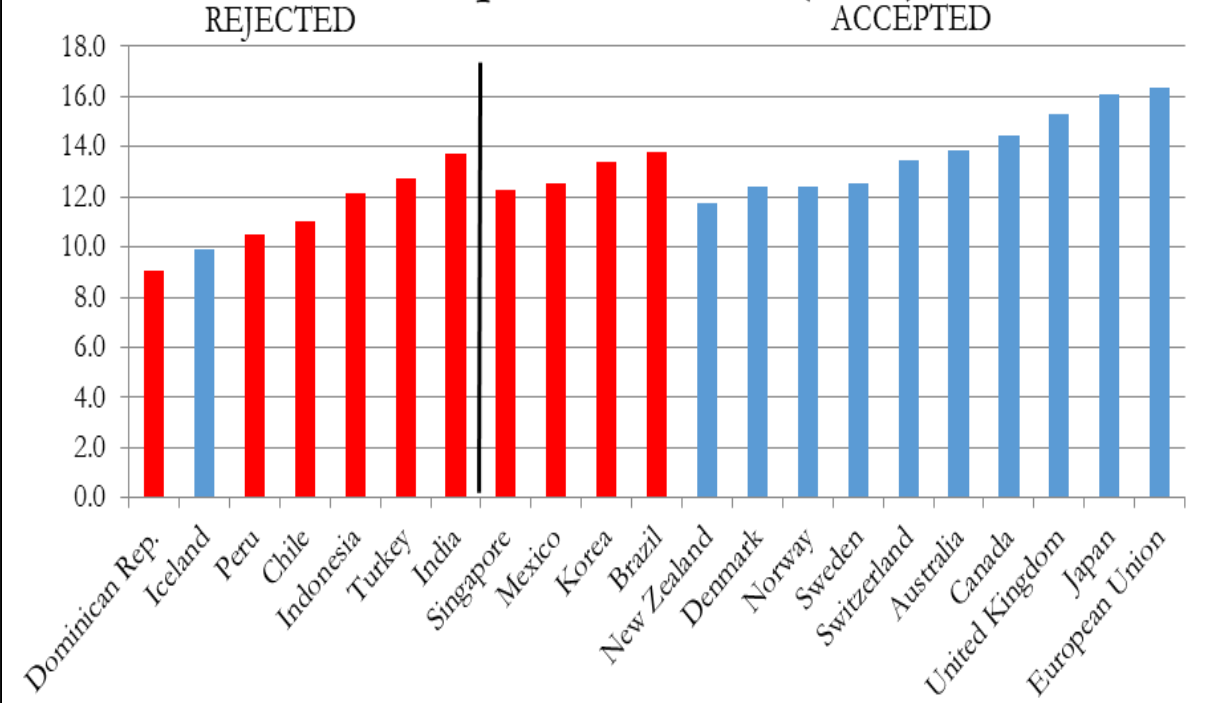Source: Consolidated Banking Statistics, BIS

Source: Financial Structure Database, WB

Rationale for the Dollar Swap Lines

- To understand the criteria for choosing Swap partners, it is important to identify the rationale behind the arrangement.

- Previous literature diverges on this question:

    - The arrangement was a defensive move by the Fed, with mostly economic motives, to protect the US financial system. (McDowell 2012)
    - Apart from economic motives, the Fed also used it as an aggressive tool to promote financial openness in EMEs. (Sahasrabuddhe 2017)

Economic Motive

- The rationale behind the Swap Lines was to ease USD liquidity pressure in foreign financial systems

- The liquidity crunch during the crisis caused short term USD debt markets to dry up.

- Borrowing costs for Foreign banks, which did not have access to Fed's liquidity provisions shot up.

- This can potentially lead to two different situations

    - Foreign banks dump USD assets causing a crash in asset prices. (Goldberg et al 2011)

    - Foreign banks liquidate investments in their countries to service USD liabilities. (Aizenman and Pasricha, 2009)

- Broz (2015) tested both of these economic motives using a cross-country dataset, controlling for the SIX criteria mentioned by the Fed. Results were statistically significant.

Political Motive

- Sahasrabuddhe (2017) argues that the selectivity of extending Swap Lines can be explained by political motive of opening up financial sectors of EMEs.

- She runs a Probit Model on a cross-country dataset and finds significant effect of *de jure* Financial Openness (measured as Chin-Ito) on Probability of Selection as Swap Partners.

- All these econometric studies have a selection problem. Data of all the countries whose swap requests got rejected unavailable. All the studies assume that countries which got accepted would have been offered a Swap deal irrespective of their request.

Contribution of this study

- This study builds upon the work of Sahasrabuddhe.

- We check the robustness of Sahasrabuddhe's specification in 3 ways:
  - We add more control variables which may have been important in Fed's selection criteria
  - The control variables are measured as percentage of respective country's GDP instead of levels as in Sahasrabuddhe.
  - We use several other measures of financial openness apart from the Chin-Ito index used by Sahasrabuddhe.

- We use the Cross-country dataset used by Sahasrabuddhe and fit a Probit Model to find which of the two motives- Political and Economic, mattered.

Control Variables

- Sahasrabuddhe uses each country's Bilateral Trade with the US, GDP, and Liquid Liabilities as control in her specification.

- Following Aizenmann, she adds a measure of "US Exposure" in each country. This is measured as total outstanding USD claims American banks have in each country.

- These variables are all measured at levels (As percentage of Global total.)

- She also controls for Average Inflation Rate of each country between 1997-2007 as a measure of "Sound Economic Management."

Control Variables

- These control variables are supposed to account for the SIX criteria mentioned by the Fed. Broz and Aizenmann also control for these.

- All of these variables are used as control by us.

- Additionally, we add each country's Forex reserves which is not in Sahasrabuddhe but one of the SIX criteria. Countries with adequate Forex reserve may not receive the deal.

Control Variables

- According to Goldberg et al, one of the motives behind Swap Deal was to stop Foreign banks from dumping USD "toxic assets." This is also evident from FOMC discussions.

- We control for total holding of "Asset Backed USD Securities" of the banks of each country to capture this effect.

- In one specification we control for Forex Adequacy as measured by Obstfeld (2010), instead of Forex Reserves.

Control Variables

- Apart from Inflation, all the other variables are counted at levels as well as a percentage of Domestic GDP.

- At levels, the control variables are highly correlated with each other. we follow Sahasrabuddhe and use PCA to create an index to avoid Multicollenearity.

- As percentage of GDP, the variables do not show high correlation and controlled individually.**

Control Variables

- The FOMC deliberations show that there were other concerns expressed by the members such as - the recipient country's Credit Ratings, and if the Swap facility can be used for currency manipulation.

- Accordingly, we test these factors by including Moody's Currency Ratings in one specification.

- In another specification we control for a dummy variable which takes the value 1 if net currency intervention by the central bank exceeded 2% of GDP in a year during the period 2003-2007. Net changes in USD assets used as a proxy for intervention.

Measures of Financial Openness

- Sahasrabuddhe uses the Chin-Ito index to measure financial openness. We use the same index in the first few specifications to measure Openness.

- However, the Chin-Ito index is not updated regularly (Detragiache 2016). We find that the index value for India has not changes since 1978.

- We therefore use alternative indices to test the hypothesis:

  - Two *de jure* indices, namely The Capital Controls Index from IMF AREAER Database and International Capital Flows Index from Detragiache.
  - One *de facto* index, namely The Lane Milesi-Ferretti index.

Empirical Specification

- $\Pr(Swap)_i = \alpha + \beta * Openness_i + \gamma * Inflation_i + \theta * X_i + \epsilon_i$

- X_i consists of variables like GDP, Trade with the US, Forex Reserves, Asset Backed Securities, US Exposure, and Total Liquid Liabilities of country i.

- In Models where these variables are measured at levels, X_i is a scalar of the PCA index called Index of Economic Significance.

- In Models where the variables are measured as % of GDP, X_i is a vector of the variables.

- Robust Standard Errors are used in all the specifications.

Results

Models 1 and 2 are same as Sahasrabuddhe. In Model-3 we add Forex Reserves and Asset Backed Securities in Economic Significance.

Table : 1

	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6
Chin-Ito Openness	1.8288***	2.5870**	1.7515***	0.0380	1.9190***	2.1651**
	(0.4329)	(1.0224)	(0.5347)	(0.6069)	(0.6725)	(0.9444)
Inflation		-0.1366*	-0.1626*	-0.0032	-0.1506*	-0.1298
		(0.0785)	(0.0931)	(0.0075)	(0.0896)	(0.1199)
Economic Significance		0.5874**				0.3855*
		(0.2524)				(0.2144)
Economic Significance-1			0.1804*	0.0722	0.1251	
			(0.0999)	(0.0741)	(0.0808)	
Currency Rating (Moody's)				0.3707***		
				(0.1217)		
Currency Intervention					-0.3823	
					(0.5353)	
Reserve Adequacy						-0.0172
						(0.3612)
N	165	116	100	74	49	36

Control Variables as Percentage of respective country's GDP.

Table : 2

	Model-1	Model-2	Model-3	Model-4	Model-5
Chin-Ito Openness	1.7110***	1.7541***	-0.8585	1.7948*	1.6491**
	(0.5116)	(0.6142)	(0.7300)	(1.0529)	(0.7207)
Inflation	-0.1439	-0.2097**	0.0038	-0.0661	-0.2586**
	(0.0880)	(0.1061)	(0.0124)	(0.1604)	(0.1131)
Liquid Liabilities (M3)#	0.0046	0.0050	-0.0003	0.0175	-0.0012
	(0.0037)	(0.0042)	(0.0058)	(0.0117)	(0.0053)
Exposure of US Banks#	0.0346	0.0256	0.0789	0.4524***	0.0179
	(0.0286)	(0.0437)	(0.0526)	(0.1286)	(0.0517)
Trade with the US#	0.0076	0.0136	0.0223	-0.0272	0.0095
	(0.0184)	(0.0185)	(0.0280)	(0.0318)	(0.0214)
Holding of Asset Backed US securities#		0.0086	-0.1327*	-0.0483	-0.0126
		(0.0449)	(0.0761)	(0.1234)	(0.0532)
Forex Resreve#		-0.0262	-0.0267*		-0.0195
		(0.0171)	(0.0142)		(0.0171)
Currency Rating (Moody's)			0.4980***		
			(0.1794)		
Reserve Adequacy				-0.4976	
				(0.3420)	
Currency Intervention					-0.3389
					(0.6327)
N	114	98	73	35	48

Model -3 in Table-1 and Model-2 in Table-2 are our preferred specifications. We use other measures of Openness instead of Chin-Ito with these specifications.

Table -3

	Model-1	Model-2	Model-3
AREAER Openness Index	1.0927**		
	(0.4636)		
Lane Milesi-Ferretti Openness Index		0.1087	
		(0.0731)	
Detragiache Openness Index			1.3225
			(0.9849)
Inflation	-0.1558*	-0.1691*	-0.2255**
	(0.0916)	(0.0970)	(0.1098)
Economic Significance-1	0.1739*	0.1480	0.1840
	(0.0963)	(0.0963)	(0.1182)
N	99	101	68

# The Measures of Openness lose their statistical significance.

Table : 4

	Model-1	Model-2	Model-3
AREAER Openness Index	0.6442 (0.5136)		
Lane Milesi-Ferretti Openness Index		0.1048 (0.0826)	
Detragiache Openness Index			1.2116 (0.7850)
Inflation	-0.2050** (0.1009)	-0.2358** (0.1161)	-0.0227 (0.0197)
Holding of Asset Backed US securities#	-0.0266 (0.0543)	-0.0534 (0.0535)	0.6289* (0.3251)
Forex Resreve#	-0.0251 (0.0170)	-0.0287* (0.0159)	-0.1125** (0.0455)
Liquid Liabilities (M3)#	0.0066 (0.0045)	0.0061 (0.0045)	0.0295** (0.0131)
Exposure of US Banks#	0.0468 (0.0458)	0.0517 (0.0439)	0.3134*** (0.1089)
Trade with the US#	0.0125 (0.0154)	0.0137 (0.0188)	-0.0400 (0.0386)
N	96	99	68

We create a PCA index of the 3 openness indices, namely AREAER, Detragiache and LMF. We use that index as a measure of openness.

Table-5

	Model-1	Model-2
PCA Index of 3 Openness Indices	1.9009***	1.0177*
	(0.7374)	(0.6858)
Inflation	-0.1001	-0.0682
	(0.1017)	(0.1163)
Economic Significance-1	0.2029**	
	(0.0857)	
Holding of Asset Backed US securities#		0.3706***
		(0.1334)
Forex Resreve#		-0.0719***
		(0.0201)
Liquid Liabilities (M3)#		0.0130
		(0.0085)
Exposure of US Banks#		0.1737*
		(0.0903)
Trade with the US#		-0.0106
		(0.0367)
N	69	68

We generate the Predicted Probabilities of each country based on the two models in Table-5 and plot them for some countries. Clearly, Chile was the most deserving of all the rejected countries.
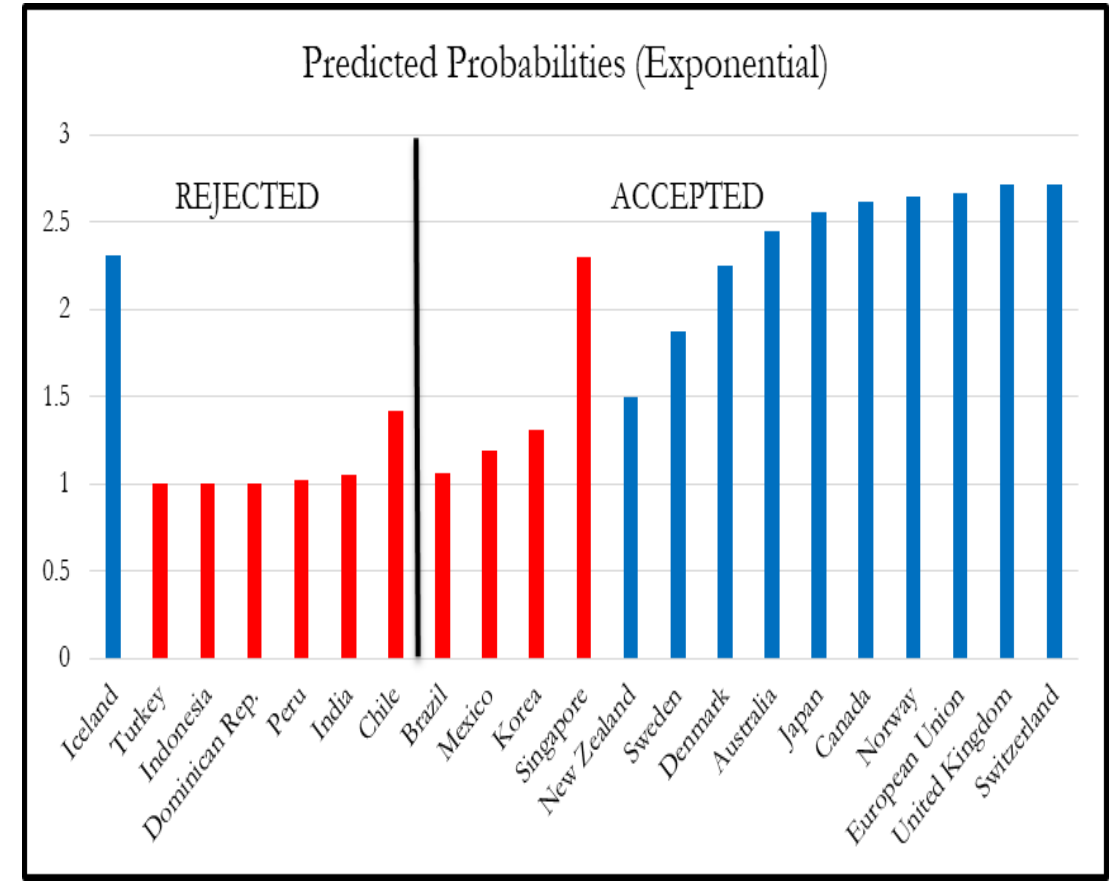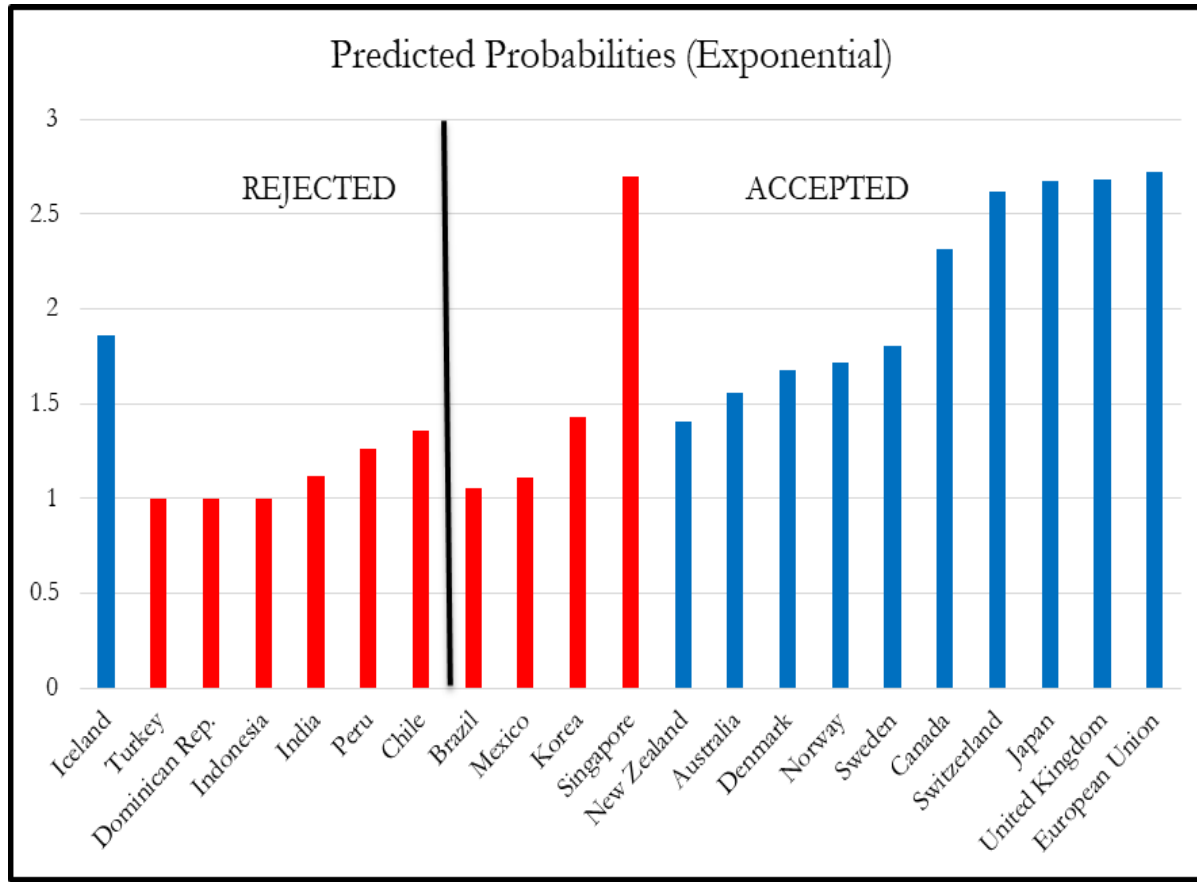
Comments

- One of the major limitation of the study is the inability to clearly identify countries which got rejected. The implicit assumption is that Swap deal would have been offered to the selected countries regardless of whether they asked for it.

- The results show that the Swap Deal was probably motivated by economic consideration to prevent a Global contagion. Political motive, such as opening up of capital accounts was not the primary focus of the arrangement.

- India was perhaps as deserving as Brazil or Mexico to get a Swap deal. However, it cannot be argued that they were more deserving than those countries which got selected.

Thank You