Macroeconomic Policy Impacts under Alternative Trilemma Regimes

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The main objective of this paper

- Investigate whether monetary and fiscal policies are effective in improving macroeconomic performance under certain trilemma regimes—defined by combinations of the three trilemma choices (ERS, FMO, and MPI).
- □ Focus on the impact of monetary and fiscal policies for three "corner regimes":
 - a regime with freely flexible ER, open FM, and independent MP;
 - ii. a regime with fixed ER, closed FM, and independent MP; and
 - iii. a regime with fixed ER and open FM w/out independent MP.



Today's menu

- 1. Locate sample countries in the textbook trilemma triangle.
- 2. Present trends of ERS, FMO, and MPI over time
- 3. Analyze macroeconomic performance under alternative trilemma regimes.
- Conduct econometric analysis to investigate whether monetary and fiscal policies can be effective in influencing macroeconomic performance under alternative trilemma regimes, focusing on EMEs & developing economies for the period 1984-2020.

Trilemma in international finance

- Fundamental to international financial policies
- Helps policymakers to understand the policy constraint each country faces.
 - Countries cannot simultaneously achieve ERS, FMO, and MPI
 - Not always end up with "corner solutions." Can be somewhere inside pf the trilemma triangle
 - Helpful if one can identify where a country is located in the trilemma triangle
- However, few studies have conducted systematic analyses that include all three issues simultaneously or measure the extent of achievement of all three issues (Aizenman-Chinn-Ito [2010], Ito and Kawai [2014])

Trilemma triangle and constraint

Trilemma triangle



Trilemma constraint

A country may simultaneously choose any two, but not all, of the following three: degrees of ERS degrees of FMO degrees of MPI The constraint means: ERS + FMO + MPI = 2,if 0≦ERS,FMO,MPI≦1

New methods of constructing trilemma indexes

Exchange rate stability (ERS) index

- RMSE obtained from estimations based on the Frankel and Wei (1994) framework with the Kawai-Pontines (2016) modification for recent years
- Kawai-Pontines modification used to analyze the role of the RMB

Financial market openness (FMO) index

De facto index of external assets and liabilities adjusted for GDP and trade, based on the Lane and Milesi-Ferretti (2007, 2010, 2017) dataset (Same as Ito-Kawai, 2014)

Monetary policy independence (MPI) index

Relative explanatory power of regressions for the foreign interest rate (based on Obstfeld, et al. [2005]) and for domestic output gap and inflation (Taylor-rule type) Trilemma triangle by income group for three periods



Trilemma triangle for selected Asian economies



Trilemma regimes in the World, 1981-85 and 1991-95

Financially closed

with fixed rates

Trilemma regimes:



1981-85

Trilemma regimes in the World, 2001-05 and 2016-20







Macroeconomic performance by trilemma regime

Advanced economies

	Trilemma regime			No.	Medi	an (y)	SD	(y)	Median (π)		SD (π)		Average
	ERS	FMO	MPI	obs.	Value	Rank	Value	Rank	Value	Rank	Value	Rank	rank
Α	High	Low	High	198	0.52	2	3.12	9	1.04	9	4.39	9	7.25
В	High	Middle	High	94	0.27	4	3.16	10	0.32	8	3.38	7	7.25
С	High	Middle	Middle	66	0.71	1	3.09	8	-0.07	1	4.35	8	4.50
D	High	High	Middle	55	0.18	5	2.38	3	-0.22	5	1.86	3	4.00
Ε	High	High	Low	372	-0.30	8	2.70	6	-0.07	1	1.36	2	4.25
F	Middle	Middle	High	162	0.30	3	2.68	5	0.22	5	4.66	10	5.75
G	Middle	High	High	136	-0.08	7	2.48	4	-0.14	3	2.05	4	4.50
Н	Middle	High	Middle	54	-0.54	10	1.77	1	12.00	10	1.33	1	5.50
1	Low	High	High	141	-0.33	9	2.35	2	-0.26	7	2.43	6	6.00
Μ	Middle	Middle	Middle	139	0.00	6	3.04	7	-0.18	4	2.29	5	5.50



Emerging market & developing economies

	Trilem	nma regim	ne	No.	Medi	an (y)	SD	(y)	Median (π)		SD (π)		Average
	ERS	FMO	MPI	obs.	Value	Rank	Value	Rank	Value	Rank	Value	Rank	rank
Α	High	Low	High	414	0.61	2	4.15	7	-0.53	4	6.11	3	4.00
В	High	Middle	High	215	-0.12	6	2.87	2	-1.42	6	5.73	2	4.00
С	High	Middle	Middle	128	-0.11	5	3.93	5	-0.25	2	9.00	4	4.00
D	High	High	Middle	23	-0.17	7	5.45	10	-2.46	9	4.00	1	6.75
Е	High	High	Low	56	-0.05	4	4.85	9	-1.53	8	13.22	6	6.75
F	Middle	Middle	High	295	0.16	3	3.48	4	0.80	5	17.20	7	4.75
G	Middle	High	High	21	-0.27	8	2.60	1	0.44	3	36.92	9	5.25
Н	Middle	High	Middle	13	0.69	1	3.01	3	-0.15	1	9.46	5	2.50
1	Low	High	High	251	-0.64	10	4.18	8	3.01	10	942.14	10	9.50
Μ	Middle	Middle	Middle	68	-0.63	9	4.00	6	-1.52	7	17.70	8	7.50

Note: y (or π) is the difference between the observed growth (or inflation) rate and the median growth (or inflation) rate of the sample group in each year. The dark and light blue color cells in the average rank column indicate the best and second-best performance, respectively, and dark and light orange color cells indicate the worst and second-worst performance, respectively. *Source*: Authors' computation

Can trilemma regimes affect the impact of monetary and fiscal policies?

- Are monetary and fiscal policy impacts consistent with theoretical predictions made for the three "corner" regimes and the "middle ground" regime?
- Do monetary and policies affect per capita real GDP growth, inflation, and growth and inflation volatilities through monetary and fiscal policies?
 Focus on EMDE in 1984-2020.

$$y_{j,t} = \alpha + D'_{j,t}\gamma + \beta_1 M P_{j,t} + \beta_2 M P_{j,t-1} + \beta_3 D'_{j,t} \cdot M P_{j,t} + \beta_4 F P_{j,t} + \beta_5 F P_{j,t-1} + \beta_6 D'_{j,t} \cdot F P_{j,t} + X_{j,t}'\Theta + v_t + \epsilon_{j,t}$$

 $y_{j,t} = \alpha + D'_{j,t,k}\gamma + \beta_1 M P_{j,t} + \beta_2 M P_{j,t-1} + \beta_3 D'_{j,t,k} \cdot M P_{j,t}$

 $+ \beta_4 F P_{j,t} + \beta_5 F P_{j,t-1} + \beta_6 D'_{j,t,k} \cdot F P_{j,t} + X_{j,t} \Theta + v_t + \epsilon_{j,t}$

- \Box $y_{j,t}$ is per capita output growth, inflation, output growth volatility, and inflation volatility.
- \square *MP*_{*i*,*t*} is a measure for monetary policy.
- \Box *FP_{i,t}* is a measure for fiscal policy.
- \Box $X_{j,t}$ represents a vector of control variables that affect the macroeconomic variables.
- □ Yearly fixed effects are included to control for global shocks.
- □ D_k is the dummy for trilemma regime $k. k \subseteq K\{Flexible, Closed, Currency Union, \& Hexigon\}$

			-				
	Baseline	Model	Model	Model	Model	Model	Model
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Per capita real GDP (t-1)	-0.006	-0.006	-0.005	-0.006	-0.005	-0.005	-0.005
	$(0.001)^{***}$	$(0.001)^{***}$	$(0.001)^{***}$	$(0.001)^{***}$	$(0.001)^{***}$	$(0.001)^{***}$	$(0.001)^{***}$
Broad money growth	0.019	0.018	0.010	0.020	0.018	0.020	0.002
Dioud money growin	(0.014)	(0.016)	(0.015)	(0.014)	(0.014)	(0.014)	(0.018)
Broad money growth (t-1)	0.029	0.029	0.028	0.029	0.030	0.028	0.029
, , , , , , , , , , , , , , , , , , ,	(0.011)***	(0.011)***	(0.011)***	(0.011)***	(0.011)***	(0.011)***	(0.011)***
Government expenditure growth	0.065	0.065	0.064	0.065	0.065	0.064	0.063
1 0	$(0.033)^{**}$	$(0.033)^{**}$	$(0.033)^{*}$	(0.033)**	$(0.033)^{**}$	$(0.033)^*$	$(0.033)^*$
Government expenditure growth (t-1)	0.010	0.010	0.017	0.017	0.016	0.016	0.017
	(0.023)	(0.023)	(0.024)	(0.023)	(0.023)	(0.024)	(0.025)
Gross external debt/GDP (ln, t-1)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
	(0.001)***	(0.001)	(0.001)**	(0.001)***	(0.001)**	(0.001)**	$(0.001)^{\circ}$
Gross savings/GDP (ln, t-1)	(0.023)	(0.023)	(0.027)	(0.023)	(0.023)	(0.027)	(0.027)
	0.004	0.004	0.004	0.004	0.004	0.004	0.004
FDI inflow/GDP (ln)	(0.004	(0.004	(0.004	(0.004	(0.004	(0.004	(0.004
	0.094	0.094	0.094	0.094	0.094	0.094	0.094
Export growth	(0.019)***	(0.019)***	(0.019)***	(0.019)***	(0.019)***	(0.019)***	(0.019)***
	0.004	0.004	0.003	0.004	0.004	0.003	0.002
Trade openness (ln)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
	-0.005	-0.005	-0.009	-0.005	-0.005	-0.012	-0.010
Financial openness (ln)	(0.002)**	(0.003)	(0.003)***	(0.003)*	(0.003)**	(0.005)**	(0.005)**
	0.031	0.031	0.032	0.030	0.031	0.032	0.031
Institutional development (Lack of vulnerability)	(0.011)***	(0.011)***	(0.011)***	(0.011)***	(0.011)***	(0.011)***	(0.011)***
T ¹ · 1 · · ·	-0.027	-0.027	-0.026	-0.027	-0.028	-0.027	-0.026
Financial crisis	$(0.006)^{***}$	(0.006)***	(0.006)***	$(0.006)^{***}$	(0.006)***	(0.006)***	(0.006)***
Elen		-0.001				0.002	-0.002
Flex		(0.004)				(0.004)	(0.005)
PM growth y Floy		0.003					0.018
Divi growin x Piex		(0.019)					(0.021)
Fin Closed			-0.015			-0.008	-0.016
Thi_Closed			$(0.005)^{***}$			(0.004)**	$(0.005)^{***}$
BM growth x Fin Closed			0.050				0.057
Divi glowin x 1 m_closed			$(0.022)^{**}$				(0.025)**
C Union				0.008		0.003	0.006
e_emon				(0.005)		(0.005)	(0.006)
BM growth x C. Union				-0.057			-0.037
				(0.032)*		0.004	(0.034)
Middle					-0.004	-0.001	-0.007
					(0.004)	(0.003)	(0.004)
BM growth x Middle					0.028		0.042
	1.005	1.005	1.005	1.005	(0.025)	1.005	(0.027)
No. of observations $A_{1}^{1} + A_{2}^{2}$	1,005	1,005	1,005	1,005	1,005	1,005	1,005
Adjusted-K ²	0.39	0.39	0.40	0.39	0.39	0.39	0.40
No. of countries	22	55 1084 2020	33	55 1084 2020	33	55 1084 2020	55 1084 2020
Sample period	1984-2020	1984-2020	1984-2020	1984-2020	1984-2020	1984-2020	1984-2020

 Table 2A: Estimation results of the growth rate of per capita real GDP

p.c. Growth Rate

BM = broad money; C_Union = currency union regime dummy; FDI = foreign direct investment; Fin_Closed = financially closed regime dummy; Flex = flexible exchange rate regime dummy; GDP = gross domestic product; Middle = middle ground regime dummy; NEER = nominal effective exchange rate.

Notes: (i) * *p*<0.1; ** *p*<0.05; *** *p*<0.01.

(ii) Time fixed effects are included in the estimation, but not reported to conserve space.

(iii) Per capita real GDP (t-1) is expressed at constant US dollar exchange rates.

	Baseline	Flexible	Closed	Cur. Union	Hex	4 DMs	4 DMs & 4 INTACs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Broad money growth	0.417	0.382	0.488	0.420	0.426	0.416	0.506
, ,	(0.072)***	(0.086)***	(0.076)***	(0.072)***	(0.074)***	(0.072)***	(0.100)***
Broad money growth (t-1)	0.220	0.226	0.221	0.218	0.216	0.219	0.215
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(0.041)***	(0.041)***	(0.041)***	(0.041)***	(0.042)***	(0.041)***	(0.042)***
Government expenditure growth	-0.007	0.018	-0.014	-0.010	-0.015	-0.008	0.003
I B	(0.048)	(0.038)	(0.057)	(0.049)	(0.053)	(0.047)	(0.052)
Government expenditure growth (t-1)	-0.035	-0.027	-0.041	-0.034	-0.033	-0.035	-0.029
· · · · · · · · · · · · · · · · · · ·	(0.040)	(0.036)	(0.044)	(0.040)	(0.039)	(0.040)	(0.040)
Gross external debt/GDP (ln, t-1)	0.000	-0.000	0.001	-0.000	-0.001	0.001	-0.001
(,,,,	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Output gap (t-1)	0.123	0.147	0.157	0.127	0.128	0.128	0.168
1 81()	(0.113)	(0.108)	(0.111)	(0.113)	(0.114)	(0.111)	(0.108)
FDI inflow/GDP (ln)	-0.010	-0.009	-0.010	-0.009	-0.009	-0.009	-0.009
	(0.003)***	(0.003)***	(0.003)***	(0.003)***	(0.003)***	(0.003)***	(0.003)***
Rate of change in NEER	-0.030	-0.031	-0.032	-0.031	-0.030	-0.031	-0.033
	(0.015)**	(0.015)**	(0.015)**	(0.015)**	(0.015)**	(0.016)**	(0.015)**
Trade openness (ln)	-0.002	-0.001	-0.001	-0.001	-0.002	-0.000	0.001
	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)	(0.008)
Financial openness (ln)	0.025	0.023	0.020	0.027	0.025	0.028	0.019
• • • •	(0.006)***	(0.008)***	(0.008)***	(0.006)***	(0.006)***	(0.014)**	(0.012)*
Institutional develop. (Lack of vulnerability)	0.057	0.063	0.064	0.051	0.052	0.055	0.054
	(0.031)*	(0.031)**	(0.031)**	(0.031)*	(0.031)*	(0.031)*	(0.031)*
Financial crisis	0.032	0.027	0.022	0.031	0.035	0.031	0.021
	(0.020)	(0.019)	(0.019)	(0.020)	(0.019)*	(0.020)	(0.019)
Flex		-0.007				-0.000	0.012
		(0.013)				(0.012)	(0.015)
BM growth x Flex		0.127					0.013
		(0.109)					(0.120)
GE growth x Flex		-0.282					-0.260
		(0.189)					(0.194)
Fin_Closed			0.052			0.002	0.054
			$(0.014)^{***}$			(0.008)	(0.017)***
BM growth x Fin_Closed			-0.351				-0.369
			(0.091)***				(0.111)***
GE growth x Fin_Closed			0.059				0.037
			(0.083)				(0.078)
C_Union				0.011		-0.021	0.026
				(0.010)		(0.011)*	(0.013)**
BM growth x C_Union				-0.268			-0.331
				(0.077)***			(0.102)***
GE growth x C_Union				0.089			0.065
				(0.151)			(0.155)
Middle					0.018	-0.003	0.030
					(0.011)	(0.007)	(0.015)**
BM growth x Middle					-0.221		-0.290
					$(0.083)^{***}$		(0.108)***
GE growth x Middle					0.245		0.220
					(0.120)**		(0.121)*
Ν	987	987	987	987	987	987	987
Adj. R2	0.63	0.63	0.65	0.63	0.63	0.63	0.66
# of countries	54	54	54	54	54	54	54
Years covered	1984 - 2020	1984 - 2020	1984 - 2020	1984 - 2020	1984 - 2020	1984 - 2020	1984 - 2020

Table 2-B: Estimation Results of CPI Inflation

BM = broad money; C_Union = currency union regime dummy; FDI = foreign direct investment; Fin_Closed = financially closed regime dummy; Flex = flexible exchange rate regime dummy; GDP = gross domestic product; Middle = middle ground regime dummy; NEER = nominal effective exchange rate.

BM = broad money; C_Union = currency union regime dummy; FDI = foreign direct investment; Fin_Closed = financially closed regime dummy; Flex = flexible exchange rate regime dummy; GDP = gross domestic product; Middle = middle ground regime dummy; NEER = nominal effective exchange rate. Notes: (i) * p<0.1; ** p<0.05; *** p<0.01.

(ii) Time fixed effects are included in the estimation, but not reported to conserve space.

Inflation Rate

	Baseline	Model	Model	Model	Model	Model	Model
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Broad money (BM) growth	0.067	0.055	0.090	0.069	0.073	0.073	0.113
variability (ln)	(0.029)**	(0.033)*	(0.031)***	(0.029)**	(0.030)**	(0.029)**	(0.038)***
Broad money (BM) growth	-0.008	-0.009	-0.010	-0.009	-0.008	-0.003	-0.008
variability (ln, t-1)	(0.027)	(0.028)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
Government expenditure (GE)	0.072	0.071	0.082	0.075	0.066	0.074	0.083
growth variability (ln)	(0.032)**	(0.033)**	(0.036)**	(0.031)**	(0.034)*	(0.031)**	(0.041)**
Government expenditure	0.026	0.025	0.025	0.025	0.026	0.024	0.022
(GE) growth variability (ln, t-1)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.032)	(0.033)
Government expenditure/GDP	0.348	0.378	0.364	0.340	0.360	0.341	0.388
(t-1)	(0.127)***	(0.128)***	(0.130)***	(0.131)***	(0.128)***	(0.132)***	(0.135)***
GDP per capita growth rate	-4 244	-4 419	-4 267	-4 173	-4 229	-4 534	-4 501
(% t-1)	(1 212)***	(1 239)***	(1 211)***	(1 215)***	(1 215)***	(1 227)***	(1 243)***
Gross external debt/GDP (ln_t-	0.252	0.235	0.237	0 245	0 245	0.233	0 207
1)	(0.083)***	(0.084)***	(0.083)***	(0.083)***	(0.085)***	(0.084)***	(0.085)**
	0.139	0.175	0.143	0.130	0.139	0.170	0.170
NEER volatility (ln)	(0.072)*	(0.076)**	(0.072)**	(0.073)*	(0.073)*	(0.076)**	(0.076)**
	-0.139	-0.158	-0.109	-0.126	-0.137	-0.136	-0.108
Trade openness (ln)	(0.097)	(0.098)	(0.097)	(0.102)	(0.097)	(0.102)	(0.103)
	-0.050	0.054	-0.064	-0.023	-0.050	0.195	0.228
Financial openness (ln)	(0.113)	(0.123)	(0.146)	(0.117)	(0.114)	(0.174)	(0.174)
	0.034	0.044	0.038	0.033	0.031	0.039	0.045
TOT volatility (ln)	(0.033)	(0.034)	(0.033)	(0.034)	(0.034)	(0.034)	(0.034)
Institutional development	0.509	0.499	0.493	0.499	0.463	0.521	0.438
(Lack of vulnerability)	(0.410)	(0.411)	(0.409)	(0.412)	(0.413)	(0.411)	(0.416)
	0.321	0.314	0.314	0.317	0.318	0.317	0.305
Financial crisis	(0.164)*	(0.163)*	(0.163)*	(0.164)*	(0.164)*	(0.163)*	(0.160)*
	(01201)	-0.011	(01200)	(0.201)	(012.0.1)	-0.333	-0.325
Flex		(0.344)				(0.141)**	(0.365)
BM growth variability (ln) x		0.059				(01111)	0.004
Flex		(0.058)					(0.061)
GE growth variability (ln) x		0.019					0.009
Flex		(0.086)					(0.090)
		(-0.576			0.093	-0.565
Closed_Fix			(0.334)*			(0.136)	(0.353)
BM growth variability (ln) x			-0.120			. ,	-0.146
Closed Fix			(0.073)				(0.077)*
GE growth variability (ln) x			-0.041				-0.051
Closed_Fix			(0.065)				(0.068)
				-0.652		-0.309	-0.982
Open_Fix				(1.114)		(0.255)	(1.133)
BM growth variability (ln) x				-0.026			-0.071
Open_Fix				(0.154)			(0.157)
GE growth variability (ln) x				-0.108			-0.115
Open_Fix				(0.266)			(0.269)
Mi Jala					0.012	-0.060	-0.267
Wilddie					(0.502)	(0.138)	(0.519)
BM growth variability (ln) x					-0.067		-0.101
Middle					(0.095)		(0.099)
GE growth variability (ln) x					0.042		0.027
Middle					(0.088)		(0.091)
No. of observations	1,044	1,044	1,044	1,044	1,044	1,044	1,044
Adjusted R ²	0.20	0.20	0.20	0.19	0.19	0.20	0.20
No. of countries	54	54	54	54	54	54	54
Sample period	1984-2020	1984-2020	1984-2020	1984-2020	1984-2020	1984-2020	1984-2020

Table 2.C: Estimation results of the (log of) variability of per capita real GDP growth

broad money; Closed_Fix = financially closed fixed rate regime dummy; FDI = foreign direct investment; Flex = flexible exchange rate regime dummy; GDP = gross dor ict; GE = government expenditure; Middle = middle ground regime dummy; NEER = nominal effective exchange rate; Open_Fix = financially open fixed rate regime dummy; of trade.

Output volatility

	Baseline	Model	Model	Model	Model	Model	Model
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Broad money (BM) growth	-0.001	-0.005	0.003	0.004	0.003	0.000	0.014
variability (ln)	(0.018)	(0.020)	(0.021)	(0.019)	(0.019)	(0.018)	(0.026)
Broad money (BM) growth	0.019	0.019	0.020	0.018	0.019	0.019	0.020
variability (ln, t-1)	(0.019)	(0.019)	(0.019)	(0.019)	(0.020)	(0.019)	(0.019)
Government expenditure (GE)	0.036	0.023	0.052	0.043	0.028	0.035	0.040
growth variability (ln)	(0.016)**	(0.017)	(0.018)***	(0.016)***	(0.018)	(0.016)**	(0.022)*
Government expenditure	0.014	0.014	0.015	0.013	0.014	0.013	0.012
(GE) growth variability (ln, t-1)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
	2.482	2.324	2.455	2 395	2.481	2.425	2.272
Output gap variability (t-1)	(1 122)**	(1 159)**	(1 104)**	(1 117)**	(1 123)**	(1 127)**	(1.127)**
Government expenditure/GDP	0.138	0 145	0.154	0.126	0 144	0.112	0.154
(ln t-1)	(0.070)*	(0.070)**	(0.071)**	(0.072)*	(0.071)**	(0.072)	(0.073)**
(, (1)	2.749	2.687	2.723	2.722	2.738	2 717	2.652
CPI inflation rate (t-1)	(0.204)***	(0.217)***	(0.204)***	(0.204)***	(0 205)***	(0.204)***	(0.212)***
Gross external debt/GDP (In t-	0.151	0 149	0 148	0.137	0.156	0 154	0.136
1)	(0.052)***	(0.052)***	(0.052)***	(0.050)***	(0.053)***	(0.053)***	(0.051)***
	-0.016	-0.023	-0.008	0.002	-0.015	0.007	0.002
Trade openness (ln)	(0.065)	(0.065)	(0.067)	(0.066)	(0.065)	(0.066)	(0.066)
	-0.092	-0.099	-0.093	-0.051	-0.087	-0.045	-0.010
Financial openness (ln)	(0.066)	(0.073)	(0.082)	(0.065)	(0.066)	(0.097)	(0.098)
	0.176	0.169	0.175	0.160	0.173	0.167	0.156
NEER volatility (ln)	(0.039)***	(0.040)***	(0.039)***	(0.039)***	(0.039)***	(0.040)***	(0.040)***
	0.024	0.027	0.026	0.024	0.023	0.022	0.028
TOT volatility (ln)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Institutional development	-1.438	-1.439	-1.457	-1.450	-1.467	-1.438	-1.492
(Lack of vulnerability)	(0.254)***	(0.253)***	(0.256)***	(0.250)***	(0.256)***	(0.253)***	(0.254)***
	0.303	0.294	0.297	0.296	0.300	0.297	0.283
Financial crisis	(0.139)**	(0.138)**	(0.139)**	(0.139)**	(0.141)**	(0.140)**	(0.139)**
	(0.00))	0.492	(0.007)	(0.20))	(0.0.12)	-0.015	0.324
Flex		(0.240)**				(0.086)	(0.251)
BM growth variability (ln) x		0.033				(01000)	0.018
Flex		(0.045)					(0.048)
GE growth variability (ln) x		0.093					0.078
Flex		(0.046)**					(0.048)
		(01010)	-0.361			-0.004	-0.333
Closed_Fix			(0.192)*			(0.074)	(0.205)
BM growth variability (ln) x			-0.018			(0101.1)	-0.029
Closed Fix			(0.038)				(0.041)
GE growth variability (ln) x			-0.077				-0.066
Closed Fix			(0.037)**				(0.040)*
				-1.233		-0.264	-1.290
Open_Fix				(0.635)*		(0.135)*	(0.645)**
BM growth variability (ln) x				-0.065			-0.076
Open Fix				(0.079)			(0.081)
GE growth variability (ln) x				-0.210			-0.208
Open Fix				(0.119)*			$(0.122)^*$
					0.029	-0.086	-0.076
Middle					(0.259)	(0.074)	(0.271)
BM growth variability (ln) x					-0.035	. ,	-0.046
Middle					(0.056)		(0.059)
GE growth variability (ln) x					0.047		0.036
Middle					(0.039)		(0.042)
No. of observations	1,017	1,017	1,017	1,017	1,017	1,017	1,017
Adjusted R ²	0.46	0.46	0.46	0.46	0.46	0.46	0.46
No. of countries	53	53	53	53	53	53	53
Sample period	1984-2020	1984-2020	1984-2020	1984-2020	1984-2020	1984-2020	1984-2020

Table 2.D: Estimation results of (the log of) CPI inflation volatility

oad money; Closed_Fix = financially closed fixed rate regime dummy; FDI = foreign direct investment; Flex = flexible exchange rate regime dummy; GDP = gross domestic product; GE = gov ure; Middle = middle ground regime dummy; NEER = nominal effective exchange rate; Open_Fix = financially open fixed rate regime dummy; TOT = terms of trade.) * p<0.1; ** p<0.05; *** p<0.01.

ii) Time fixed effects are included in the estimation, but not reported to conserve space.

Inflation Volatility

	Per capita real GDP growth rate		Inflatio	n rate	Variability of per capita real GDP growth rate		Volatility of inflation rate	
Model	(2)-(5)	(7)	(2)-(5)	(7)	(2)-(5)	(7)	(2)-(5)	(7)
3.A: Monetary p	olicy impact (to	otal)						
Flex	0.047***	0.044***	0.734***	0.734***	0.106**	0.109**	0.046	0.052
Closed_Fix	0.085***	0.084***	0.357***	0.352***	-0.040	-0.041	0.005	0.005
Open_Fix	-0.004	-0.006	0.371***	0.390***	0.033	0.035	-0.043	-0.042
Middle	0.071***	0.067***	0.421***	0.431***	-0.002	0.004	-0.013	-0.012
3.B: Fiscal polic	y impact (total)							
Flex	0.179***	0.176***	-0.291	-0.286	0.115	0.114	0.131***	0.130***
Closed_Fix	0.170***	0.165***	0.004	0.011	0.066	0.054	-0.010	-0.015
Open_Fix	-0.018	-0.027	0.045	0.039	-0.008	-0.010	-0.155	-0.156
Middle	0.156	0.155	0.198*	0.194*	0.134	0.132	0.088**	0.088**
3.C: Trilemma re	egime dummy (total)			•			
Flex	0.000	0.002	0.006	0.004	-0.237**	-0.371***	0.039	-0.035
Closed_Fix	-0.006**	-0.008**	-0.003	-0.003	-0.022	0.086	-0.012	0.014
Open_Fix	0.001	0.000	-0.019***	-0.024**	-0.159	-0.316	-0.228*	-0.244*
Middle	-0.001	-0.000	-0.000	-0.007	0.054	-0.056	-0.055	-0.070

 Table 3: Summary of the estimated coefficients

Impacts of MP and FP on Output Growth conditional on Trilemma Regime

- MP clearly has a significantly positive impact on per capita real GDP growth under the "flexible exchange rate" corner regime.
- MP impact is statistically significant and positive under the "financially closed fixed rate" corner regime. No "leakage"
- MP has no statistically significant impact on per capita real GDP growth under the "financially open fixed rate" corner regime. It is consistent with the Mundell-Fleming predictions.
- FP strong impacts on per capita real GDP growth under the "flexible exchange rate" and "financially closed fixed rate" regimes.
- FP has no statistically significant impact on per capita real GDP growth under the "financially open fixed rate" or "middle ground" regime.
- FP is ineffective under the "financially open fixed rate" corner regime, which is a surprising result in view of the Mundell-Fleming predictions.

	Per capita real GDP growth rate		Inflatio	on rate	Variability of GDP gro	per capita real owth rate	Volatility of i	nflation rate
Model	(2)-(5)	(7)	(2)-(5)	(7)	(2)-(5)	(7)	(2)-(5)	(7)
3.A: Monetary p	policy impact (to	otal)						
Flex	0.047***	0.044***	0.734***	0.734***	0.106**	0.109**	0.046	0.052
Closed_Fix	0.085***	0.084***	0.357***	0.352***	-0.040	-0.041	0.005	0.005
Open_Fix	-0.004	-0.006	0.371***	0.390***	0.033	0.035	-0.043	-0.042
Middle	0.071***	0.067***	0.421***	0.431***	-0.002	0.004	-0.013	-0.012
3.B: Fiscal poli	cy impact (total)							
Flex	0.179***	0.176***	-0.291	-0.286	0.115	0.114	0.131***	0.130***
Closed_Fix	0.170***	0.165***	0.004	0.011	0.066	0.054	-0.010	-0.015
Open_Fix	-0.018	-0.027	0.045	0.039	-0.008	-0.010	-0.155	-0.156
Middle	0.156	0.155	0.198*	0.194*	0.134	0.132	0.088**	0.088**
3.C: Trilemma r	regime dummy (total)						
Flex	0.000	0.002	0.006	0.004	-0.237**	-0.371***	0.039	-0.035
Closed_Fix	-0.006**	-0.008**	-0.003	-0.003	-0.022	0.086	-0.012	0.014
Open_Fix	0.001	0.000	-0.019***	-0.024**	-0.159	-0.316	-0.228*	-0.244*
Middle	-0.001	-0.000	-0.000	-0.007	0.054	-0.056	-0.055	-0.070

Table 3: Summary of the estimated coefficients

Output growth:

- The total coefficients are statistically significant only for the *Closed_Fix* dummy with a negative sign;
- Those on *Flex*, *Open_Fix*, and *Middle* are virtually zero and statistically insignificant.
- The "financially closed fixed rate" regime tends to reduce the growth rate of per capital real GDP, even though MP and FP tend to stimulate growth under the regime.

Impacts of MP and FP on Inflation conditional on Trilemma Regime

- > MP has significantly positive impact on CPI inflation under any trilemma regime.
- MP impact is the largest under the "flexible exchange rate" regime and the smallest under the "financially closed fixed rate" regime measured by the size of the total coefficients.
- Although MP has no impact on per capita real GDP growth under the "financially open fixed rate" corner regime, it has a significantly positive impact on inflation.
- > No economy can escape from the inflationary impact of MP.
- Even taking into account the interactive terms with trilemma regime dummies, FP has no significant impact on inflation except under the "middle ground" regime.
- FP has a positive impact on inflation under the "middle ground" regime, with a weakly statistically significant positive interaction with *Middle*.
- While MP always has a positive impact on inflation under any trilemma regime, FP has a positive impact on inflation only under the "middle ground" regime.

	Per capita real GDP growth rate		Inflatio	on rate	Variability of per capita real GDP growth rate		Volatility of inflation rate	
Model	(2)-(5)	(7)	(2)-(5)	(7)	(2)-(5)	(7)	(2)-(5)	(7)
3.A: Monetary	policy impact (to	otal)						
Flex	0.047***	0.044***	0.734***	0.734***	0.106**	0.109**	0.046	0.052
Closed_Fix	0.085***	0.084***	0.357***	0.352***	-0.040	-0.041	0.005	0.005
Open_Fix	-0.004	-0.006	0.371***	0.390***	0.033	0.035	-0.043	-0.042
Middle	0.071***	0.067***	0.421***	0.431***	-0.002	0.004	-0.013	-0.012
3.B: Fiscal poli	B.B: Fiscal policy impact (total)							
Flex	0.179***	0.176***	-0.291	-0.286	0.115	0.114	0.131***	0.130***
Closed_Fix	0.170***	0.165***	0.004	0.011	0.066	0.054	-0.010	-0.015
Open_Fix	-0.018	-0.027	0.045	0.039	-0.008	-0.010	-0.155	-0.156
Middle	0.156	0.155	0.198*	0.194*	0.134	0.132	0.088**	0.088**
3.C: Trilemma	egime dummy	(total)						
Flex	0.000	0.002	0.006	0.004	-0.237**	-0.371***	0.039	-0.035
Closed_Fix	-0.006**	-0.008**	-0.003	-0.003	-0.022	0.086	-0.012	0.014
Open_Fix	0.001	0.000	-0.019***	-0.024**	-0.159	-0.316	-0.228*	-0.244*
Middle	-0.001	-0.000	-0.000	-0.007	0.054	-0.056	-0.055	-0.070

Table 3: Summary of the estimated coefficients

Inflation:

- Open_Fix dummy has a statistically significant impact on CPI inflation, which is negative.
- "financially open fixed rate" corner regime tends to reduce inflation, while MP and FP tend to increase inflation under the regime.

Impacts of MP and FP on **Output Growth Volatility** conditional on Trilemma Regime

- MP and FP variabilities have very limited impact on the variability of per capita real GDP growth,
- Under the "flexible exchange rate" regime, however, MP variability has a significant positive impact on the variability of per capita real GDP growth.
- FP variability has positive impacts on growth variability under the "flexible exchange rate" and "middle ground" regimes, but the estimated total coefficients are not statistically significant.
- only the Flex dummy has a statistically significant and negative impact on the variability of per capita real GDP growth
- The "flexible exchange rate" regime has a stabilizing effect on the variability in per capita GDP growth, even though MP and FP variabilities can have destabilizing effects under the regime.

Impacts of MP and FP on Inflation Volatility conditional on Trilemma Regime

- MP variability has no impact on inflation volatility under any trilemma regime.
- FP variability has statistically significant positive impacts on inflation volatility under the "flexible exchange rate" regime and the "middle ground" regime.
- ➤ The results on the trilemma regimes show that only the Open_Fix dummy has a statistically significant combine coefficient, which is negative, in the regression for inflation volatility. This means that the "financially open fixed rate" exerts a stabilizing impact on inflation volatility.

Appendix:

Estimated currency zones based on the Frankel-Wei method: 1975 and 1995



Estimated currency zones based on the Kawai-Pontines method: 2007 and 2021

