EXCHANGE RATES AND BANKING SECTOR RISK IN EMERGING ECONOMIES: THE ROLE OF VULNERABILITIES AND POLICY BUFFERS

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Abstract: *The paper studies the relationship between exchange rates and local banking sector risk in emerging economies between 2000 and 2024, while accounting for the role of general economic vulnerability and the intensity of macroeconomic policy. The study approach consists of two steps, first we estimate both average and country-specific coefficients of the effect of banking sector risk on exchange rate. In the second step, we estimate interactions with several vulnerability and macroeconomic policy variables using the robust correlated interaction term effects approach. Results suggest that local banking instability has a positive and significant effect on exchange rate dynamics and, while economic vulnerability strengthens the effect, macroeconomic policies consisting of macroprudential policies, capital controls, and foreign exchange interventions, may act as a buffer, potentially reducing exchange rate volatility during periods of macrofinancial stress.*

Keywords**:** *Exchange rates, macrofinancial stability, emerging economies, macroeconomic policies*

INTRODUCTION

There is growing evidence that the exchange rate disconnect from macro fundamentals may be rationalized by financial shocks and frictions. It is often argued that balance sheets of financial intermediaries and shocks to their leverage are an important missing link in explaining various asset prices and time-varying risk premia, including those in foreign-exchange markets (Gabaix & Maggiori, 2015; Maggiori, 2022; Janus, 2025). In an important contribution, Akinci and Queralto (2024) study the relationship between local risk and exchange-rate returns, which constitutes "financial accelerator" and they argue that the relationship is influenced by countries' vulnerabilities. Additionally, Basu et al. (2025) show that a traditionally recommended macroeconomic policy of open emerging economies must be supplemented by additional tools, specifically foreign exchange interventions, capital controls, and macroprudential policies when various market frictions amplify financial shocks and trigger macroeconomic destabilization. Our study builds upon these threads while expanding the existing evidence and incorporates the methodological approach presented by Muris and Wacker (2026).

The main objective of this paper is to investigate the relationship between exchange rate and domestic macrofinancial stability and factors that may influence this relationship. Specifically, in the first step, we investigate the relationship between the probability of default (PD) in the local banking sector (local credit risk) and the exchange rates in emerging market economies (EMEs). In the second step, we test whether local economic vulnerability conditions and policies (macroprudential, capital controls, foreign exchange interventions) intensify, in the case of vulnerability, the baseline relationship or, in the case of policies, act as a buffer potentially stabilizing the consequences of local credit risk volatility. While baseline results were estimated using fixed-effects panel model (country, time, and two-ways effects), the main specification uses Correlated Interaction Terms Effects (CITE) to estimate heterogenous PD coefficients and incorporate interactions with vulnerability and policy control variables.

We report a strong and heterogeneous between banking sector risk and exchange rate dynamics, consistent with a financial accelerator in which deteriorating local balance sheets widen the currency risk premium and the resulting depreciation feeds back into further balance-sheet weakening. Moderating effects, obtained across various specifications including the correlated interaction terms approach, suggest that both economic vulnerability and macrofinancial policy shape the relationship between banking sector risk and exchange rate dynamics. Vulnerability exerts the stronger influence, yet the two effects operate additively rather than overlapping, indicating that vulnerability and policy work through separate margins of the same underlying channel.

METHODOLOGY AND DATA

The first step of our research method involves the estimation of the simple, unconditional relationship between the log returns of the country's exchange rate return vis-à-vis the US dollar (Δs_t) and the banking sector risk (Δpd_{it}):

$$\Delta s_{it} = \mu_i + \eta_t + \beta \Delta pd_{it} + Z_{it}'\gamma + \varepsilon_{it}, \tag{1}$$

where Z_{it}' contain potential control variables, ε_t is the error term, while $\mu_i + \eta_t$ denote country- and time-fixed effects, respectively. Our main object of interest is β which approximates the financial acceleration mechanism between the probability of default of the local banking sector and the currency depreciation.

Since our main objective is to investigate the role of country-level vulnerabilities (H_{1i}) and macrofinancial policies (H_{2i}) as moderating variables in the relationship captured in Eq. (1), a natural way to extend the initial panel-data regression is to incorporate both country-level indices as interaction terms effects (ITE):

$$\Delta s_{it} = \mu_i + \eta_t + \beta \Delta pd_{it} + \kappa_1 (H_{1i} \times \Delta pd_{it}) + \kappa_2 (H_{2i} \times \Delta pd_{it}) + Z_{it}'\gamma + \varepsilon_{it}, \tag{2}$$

where κ_1 and κ_2 describe the moderating effects captured in the model. However, a recent contribution by Muris and Wacker (2026) finds that there are at least two problems with the standard ITE approach, which may breach the exogeneity assumptions for consistent estimation of the interaction term coefficients. The first one stems from the presence of omitted interaction variables. In our case, cross-country differences in vulnerabilities (H_{1i}) are expected to be correlated with macrofinancial policy buffers that a country employs (H_{2i}), as more vulnerable economies often adopt more active policies precisely because they are less resistant. This, in turn, may introduce bias in $\hat{\kappa}$ if one of them is omitted. The second problem is related to the fact that ITE specifications may neglect the unobservable effect heterogeneity across countries. For example, the strength of a country's financial-sector institutions and the depth of its local-currency debt markets are not fully captured by our vulnerability and policy indices, yet plausibly shape how forcefully a shock to banking-sector PD passes through to the exchange rate — deeper, more credible local-currency markets should absorb credit-risk shocks with less currency depreciation, all else equal. This "institutional depth", which is not directly observable, will hence enter the error term in the standard ITE regression.

As an alternative, Muris and Wacker (2026) propose the correlated interaction term effects (CITE) estimator, which confronts both problems by promoting the country-specific slopes from an implicit, restricted object to a parameter estimated directly. The first step consists of estimating country-specific parameters β_i:

$$\Delta s_{it} = \mu_i + \eta_t + \beta_i \Delta pd_{it} + Z_{it}'\gamma + \varepsilon_{it}. \tag{3}$$

In the second step, CITE investigates the relationship between β_i and country-specific, observed moderators of the baseline relationship by running a cross-sectional heterogeneity regression:

$$\widehat{\beta_i} = \kappa_0 + \kappa_1 H_{1i} + \kappa_2 H_{2i} + u_i. \tag{4}$$

Because the moderators enter at the level at which they vary — across countries — and are regressed on slopes that already embody the unobserved heterogeneity, the two problems separate cleanly: including both indices guards against omitted-interaction bias, while the unobserved component is relegated to the cross-sectional residual u_i. Consistent estimation of κ then requires only that u_i be uncorrelated with H_{1i} and H_{2i}, which is a weaker and more defensible condition than the ITE requirement that this heterogeneity also be uncorrelated with Δpd_{it} and the controls (Muris and Wacker, 2026). Equation (4) is a cross-sectional OLS regression estimated with heteroskedasticity-robust standard errors. We later perform several sensitivity checks on it, including the identification of influential countries via Cook's distance.

Our main specifications cover 25 emerging and frontier market economies between 2000 and 2024, with the sample shaped primarily by the availability of banking-sector data on the probability of default. The data on dollar exchange rates (domestic currency per US Dollar, end-of-period, monthly) was sourced from the IMF (2026). One-year probability of default of local banking sectors was collected from National University of Singapore's Credit Research Initiative database (NUS-CRI, 2026).

Control variables include interest rate spreads, VIX index, and excess bond premiums. The data on interest rate spreads relative to US rates was constructed using a hierarchical procedure, following a similar approach to Iacoviello and Navarro (2019): (1) Money Policy-Related Rates (IMF, 2026); (2) Money Market Rates (IMF, 2026); (3) Treasury Bills Rates (IMF, 2026); (4) Short-term rates (OECD, 2026). For each country, we calculate interest rate spreads using the first measure. If data for a specific measure is not available, we move to the subsequent measure. VIX data was sourced from Federal Reserve Bank of St. Louis (2026). Data on excess bond premiums was collected from Favara et al. (2016).

To account for cross-country differences in economic vulnerabilities and the stringency of their macrofinancial policies, we build country rankings of structural characteristics in the spirit of Iacoviello and Navarro (2019) and construct variables H_{1i} (vulnerability index) and H_{2i} (macrofinancial policy index). Rankings for each country and measure are reported in Table A1 in the appendix. Our basic vulnerability index consists of measures of the current account balance, external debt, foreign-exchange reserves, and inflation rates. Inflation data was sourced from the World Bank (2026). Remaining variables for vulnerability index were collected from the External Wealth of Nations database (Milesi-Ferretti, 2026).

When building the macrofinancial policy index, we take into account macroprudential policy, capital control measures, and foreign exchange interventions. Data on macroprudential policy was collected from the IMF's integrated Macroprudential Policy (iMaPP) Database (Alam et al., 2019). For capital controls, we use cumulative net tightenings of cross-border flow restritions (Bergant et al., 2025). Data on foreign exchange interventions was collected from Adler et al. (2024).

FINDINGS

As the benchmark results our empirical analysis, we estimate a series of standard panel-data regression models to investigate the relationship between exchange rates and banking sector risk. Shown in Table 1, these models point to a positive relationship between the banking risk, as approximated by the local banking sector probability of default and the dollar exchange rates in 25 EMEs. The fact that currency depreciation is linked to higher banking sector risk is robust to the UIP interest rate spread (in column 2), widely used measures of global financial risk (in columns 3 and 4), as well as two-way fixed effects.

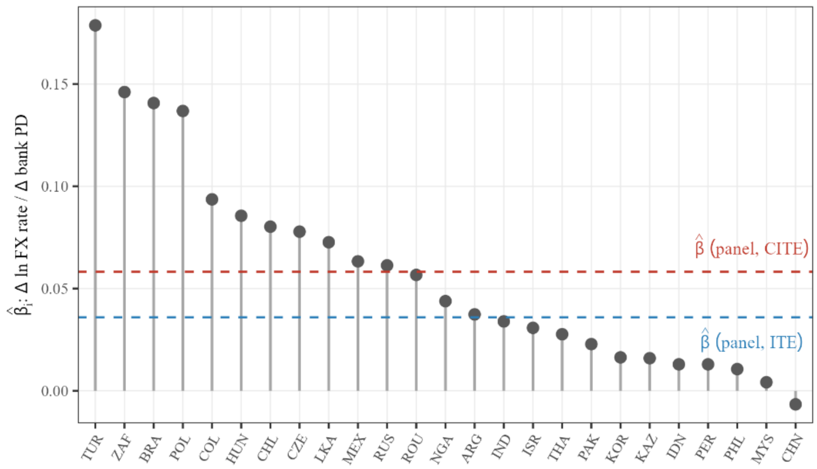
Having established a tight relationship between our two main variables of interest, we now turn the investigation of the role of country-level factors in shaping the scale of influence local credit risk may have on exchange rates. The cross-country heterogeneity of estimates is presented in Figure 1. Both the average and country-specific β coefficients were sourced from estimations presented in Table 1. It is apparent that β estimates diverge across countries indicating that the underlying relationship is affected by specific characteristics of emerging economies. We assume that heterogeneity between countries not only comes from susceptibility to be affected by instability, but also by the ability to employ valid macroeconomic policy.

Table 1. Initial panel models estimation results for log returns of the exchange rate, Δs_t

	(1)	(2)	(3)	(4)	(5)	(6)
Banking sector risk, Δpd_t	0.0500*** (0.0030)	0.0619*** (0.0033)	0.0506*** (0.0030)	0.0547*** (0.0031)	0.0359*** (0.0028)	0.0380*** (0.0023)
Interest spread, Δi_t^{diff}		0.0018*** (0.0006)	0.0014** (0.0006)	0.0016** (0.0006)		0.0012* (0.0006)
CBOE VIX, ΔVIX_t			0.0016*** (0.0002)			
Excess bond premium, ΔEBP_t				0.0191*** (0.0037)		
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	No	No	No	No	Yes	Yes
R^2	0.094	0.105	0.149	0.129	0.295	0.390
R^2 (within)	0.076	0.091	0.135	0.115	0.045	0.043
N	7223	6046	6046	6046	7223	6046

Notes: panel-corrected standard errors are reported in parentheses; significance levels are denoted as: *** p<0.01, ** p<0.05, * p<0.10.

Figure 1. First-stage estimates of coefficients in CITE panel-data models



Notes: the figure shows country-specific and general estimates of coefficients

Table 2 presents our baseline results on the moderating role of vulnerability and policy, estimated separately (columns 2 and 3) and jointly (column 4), alongside the specification with no moderator (column 1). Two main findings stand out. First, the interaction term estimates carry the expected signs, positive for vulnerability and negative for policy, and both moderating effects are significant at conventional levels in every specification, both individually and jointly. Second, and consistent with this independence, the explanatory power of the two indices is close to additive rather than overlapping: in the CITE second stage, vulnerability alone accounts for an R^2 of 0.247 and policy alone for 0.158, while the two together (column 4) raise the second-stage R^2 to 0.401, near the sum of the individual contributions. Jointly including both moderators also modestly sharpens statistical precision, tightening the standard error on the vulnerability coefficient from 0.042 to 0.035 and on the policy coefficient from 0.085 to 0.079, again consistent with two moderators capturing complementary rather than competing sources of variation. This suggests that distinct mechanisms are at play: vulnerability captures a country's exposure to the amplification mechanism, while the policy index captures the country's ability to dampen the financial accelerator.

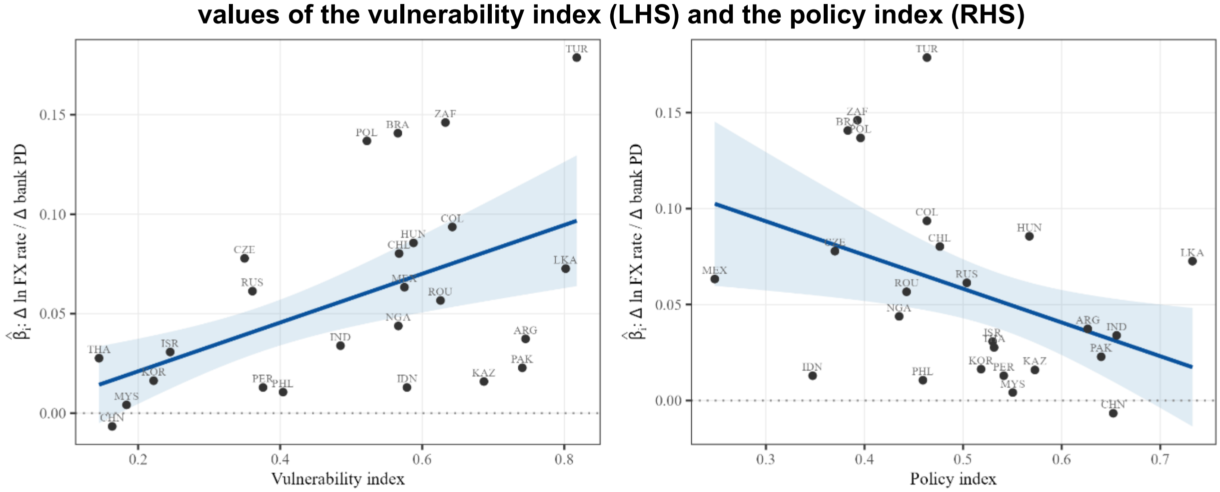
Based on the estimated CITE models, we investigate the marginal effects of vulnerability and policy index. The left panel in Figure 2 shows a clear positive slope of the effects conditional on economic vulnerabilities. For countries marked by lowest vulnerabilities the marginal value of β is not significantly different from zero, while moderate and high vulnerability ranking can be associated with stronger links between the local banking sector risk and exchange rates. On the other hand, as displayed in the right-hand side, illustrates the negative slope of the effects that we capture for the policy indicator. Less stringent macrofinancial policies are generally connected to larger βs, which diminish when more intense macroprudential, capital control, and foreign-exchange policies are employed, showing their dampening role in the financial accelerator mechanism between the exchange rate and the local banking risk.

Table 2. Baseline results for the moderating effects of economic vulnerability and macrofinancial policies for the exchange rate-banking sector risk relationship

	(1)	(2)	(3)	(4)
Panel A: ITE results				
Banking sector risk, Δpd_t	0.0359***	0.0051	0.0570***	0.0298**
	(0.0028)	(0.0058)	(0.0098)	(0.0133)
x Vulnerability, H_1		0.0546***		0.0583***
		(0.0123)		(0.0114)
x Policy index, H_2			-0.0413**	-0.0525***
			(0.0210)	(0.0199)
R^2	0.295	0.298	0.296	0.299
R^2 (within)	0.045	0.050	0.046	0.051
N	7223	7223	7223	7223
Panel B: CITE results				
Banking sector risk, Δpd_t	0.0582***	-0.0035	0.1461***	0.0838*
	(0.0100)	(0.0170)	(0.0463)	(0.0436)
x Vulnerability, H_1		0.1225***		0.1214***
		(0.0420)		(0.0353)
x Policy index, H_2			-0.1758**	-0.1734**
			(0.0846)	(0.0787)
R^2 (2nd stage)	0.000	0.247	0.158	0.401
N (countries)	25	25	25	25

Notes: panel-corrected (ITE) and heteroskedastic-consistent (CITE) standard errors are reported in parentheses; significance levels are denoted as: *** p<0.01, ** p<0.05, * p<0.10.

Figure 2. Marginal effects of the exchange rate – banking sector risk relationship under different values of the vulnerability index (LHS) and the policy index (RHS)



CONCLUSIONS

Our results contribute to the body of literature trying to resolve the divergence between UIP theory and apparent UIP premiums being present under specific conditions. Local credit risk affects exchange rate dynamics in emerging markets – a result consistent under various specifications, which implies that periods of heightened banking sector instability may weaken the domestic currency. This underlying relationship was found to be influenced by country-specific factors, including vulnerability of each economy and the intensity of its macroeconomic policies. Our evidence suggest that these two channels have opposite effect on the underlying relationship: vulnerability strengthens the effect of local credit risk on domestic currency depreciation, while stringent macroeconomic policy acts as a buffer diminishing the changes in exchange rates.

Since exchange rate uncertainty may negatively affects domestic firms and households, our results contribute additional evidence that robust macroeconomic policy may increase the resilience of emerging economies in times of local and global instability, possibly contributing to more stable economic growth. Our results are consistent with predictions made by Basu et al. (2025) that feedback loops between exchange rate and local credit risk do not mean that emerging economies are doomed to be unstable – stringent macroeconomic policy works. In other words, our results imply that exchange rate flexibility is not enough to insulate open economies from financial shocks and policy-makers in vulnerable economies could possibly opt for the level of macroeconomic policy stringency that balances out underlying vulnerability factors.

From the methodological standpoint, our study presents a valid use-case for the novel estimator proposed by Muris and Wacker (2026) and allows for a higher degree of certainty in interpreting results. The main limitation of the study is a relatively low sample size, which was constrained by data availability. Additionally, some of the variables studied were affected by incomplete data for selected countries, which led to decreased sample size in some specifications.

REFERENCES

Adler, G., Chang, K. S., Mano, R. C., & Shao, Y. (2024). Foreign exchange intervention: A dataset of public data and proxies. *Journal of Money, Credit and Banking*. https://doi.org/10.1111/jmcb.13137

Alam, Z., Alter, A., Eiseman, J., Gelos, G., Kang, H., Narita, M., Nier, E., & Wang, N. (2019). *Digging deeper: Evidence on the effects of macroprudential policies from a new database* (IMF Working Paper No. 19/66). International Monetary Fund.

Basu, S. S., Boz, E., Gopinath, G., Roch, F., & Unsal, D. F. (2025). Integrated monetary and financial policies for small open economies. *Econometrica, 93*(6), 2201–2234. https://doi.org/10.3982/ECTA21802

Bergant, K., Fernández, A., Teoh, K., & Uribe, M. (2025). *Expanding the landscape of cross-border flow restrictions: Modern tools and historical perspectives* [Data set]. https://github.com/kteoh37/bftu_cross_border

Favara, G., Gilchrist, S., Lewis, K. F., & Zakrajšek, E. (2016). Updating the recession risk and the excess bond premium. *FEDS Notes*. Washington: Board of Governors of the Federal Reserve System. https://doi.org/10.17016/2380-7172.1836

Federal Reserve Bank of St. Louis. (2026). *CBOE Volatility Index: VIX (VIXCLS)* [Data set]. FRED. https://fred.stlouisfed.org/series/VIXCLS

Gabaix, X., & Maggiori, M. (2015). International liquidity and exchange rate dynamics. *The Quarterly Journal of Economics, 130*(3), 1369–1420. https://doi.org/10.1093/qje/qjv016

Iacoviello, M., & Navarro, G. (2019). Foreign effects of higher U.S. interest rates. *Journal of International Money and Finance, 95*, 232–250. https://doi.org/10.1016/j.jimonfin.2018.06.012

International Monetary Fund. (2026). *Exchange rates (ER)*, *Monetary and Financial Statistics (MFS)* [Data sets]. IMF Data. https://data.imf.org/en/Data-Explorer

Janus, J. (2025). Global financial risk and uncovered interest parity premia in Central and Eastern Europe. *Economic Modelling, 148*, Article 107078. https://doi.org/10.1016/j.econmod.2025.107078

Maggiori, M. (2022). International macroeconomics with imperfect financial markets. In G. Gopinath, E. Helpman, & K. Rogoff (Eds.), *Handbook of international economics: International macroeconomics* (Vol. 6, pp. 199–236). Elsevier. https://doi.org/10.1016/bs.hesint.2022.03.002

Milesi-Ferretti, Gian Maria, 2026, "The External Wealth of Nations Database," The Brookings Institution (based on Lane, Philip R. and Gian Maria Milesi-Ferretti, 2018, "The External Wealth of Nations Revisited: International Financial Integration in the Aftermath of the Global Financial Crisis," IMF Economic Review 66, 189-222).

Muris, C., & Wacker, K. M. (2026). Estimating interaction effects with panel data. *Journal of Applied Econometrics*, 41(4), 360–376. https://doi.org/10.1002/jae.70040

National University of Singapore, Credit Research Initiative. (2026). *Probability of default* [Data set]. NUS-CRI. https://nuscri.org/en/data/companyalldata/

OECD. (2026). *Key short-term economic indicators (KEI)* [Data set]. OECD Data Explorer. https://data-explorer.oecd.org/

World Bank. (2026). *Inflation, consumer prices (annual %)* [Data set]. World Bank Open Data. https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG

APPENDIX

Table A1. Country-level values of the economic vulnerability index (top panel) and macrofinancial policy index (bottom panel)

	C.A. balance	Net ext. debt	Reserves	Inflation	Vuln. index
THA	0.24	0.11	0.04	0.19	0.14
CHN	0.22	0.02	0.20	0.21	0.16
MYS	0.07	0.42	0.07	0.18	0.18
KOR	0.19	0.22	0.26	0.21	0.22
ISR	0.27	0.38	0.20	0.13	0.25
CZE	0.59	0.37	0.17	0.27	0.35
RUS	0.10	0.25	0.31	0.79	0.36
PER	0.60	0.42	0.20	0.28	0.38
PHL	0.38	0.49	0.33	0.41	0.40
IND	0.57	0.22	0.52	0.63	0.48
POL	0.68	0.67	0.45	0.30	0.52
BRA	0.67	0.35	0.62	0.62	0.57
NGA	0.26	0.28	0.83	0.90	0.57
CHL	0.66	0.72	0.53	0.35	0.57
MEX	0.55	0.47	0.76	0.51	0.57
IDN	0.46	0.62	0.69	0.56	0.58
HUN	0.62	0.93	0.31	0.49	0.59
ROU	0.86	0.62	0.43	0.60	0.63
ZAF	0.67	0.49	0.81	0.56	0.63
COL	0.75	0.64	0.64	0.53	0.64
KAZ	0.58	0.68	0.69	0.80	0.69
PAK	0.60	0.64	0.96	0.76	0.74
ARG	0.49	0.70	0.79	1.00	0.75
LKA	0.68	0.93	0.89	0.71	0.80
TUR	0.75	0.84	0.78	0.90	0.82

	Macropru.	Cap. ctrl	FX interv.	Policy index
MEX	0.32	0.26	0.17	0.25
IDN	0.62	0.06	0.36	0.35
CZE	0.32	0.15	0.65	0.37
BRA	0.56	0.21	0.38	0.38
ZAF	0.32	0.74	0.13	0.39
POL	0.32	0.29	0.59	0.40
NGA	0.78	0.01	0.52	0.44
ROU	0.32	0.33	0.69	0.44
PHL	0.64	0.22	0.52	0.46
COL	0.86	0.37	0.15	0.46
TUR	0.61	0.29	0.49	0.46
CHL	0.32	0.75	0.36	0.48
RUS	0.54	0.35	0.62	0.50
KOR	0.24	0.89	0.43	0.52
ISR	0.32	0.66	0.61	0.53
THA	0.32	0.63	0.65	0.53
PER	0.54	0.47	0.61	0.54
MYS	0.12	0.78	0.75	0.55
HUN	0.37	0.56	0.77	0.57
KAZ	0.80	0.28	0.65	0.57
ARG	0.68	0.67	0.54	0.63
PAK	0.60	0.98	0.34	0.64
CHN	0.54	0.88	0.54	0.65
IND	0.54	0.97	0.46	0.66
LKA	0.95	0.72	0.53	0.73