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## **Assessing the impossible trinity principle in BRICS grouping**

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### **Abstract**

This paper makes a significant contribution to the literature on the policy trilemma by evaluating potential policy combinations that are relevant for the BRICS grouping within the context of the Impossible Trinity. Additionally, the paper introduces a new modeling approach for assessing the policy trilemma, based on establishing a boundary for the linear combination of variables related to the trilemma. The findings reveal that adopting a fixed exchange rate system presents considerable challenges for BRICS countries within the framework of the Impossible Trinity. Specifically, the results suggest that if BRICS countries opt for a fixed exchange rate system, they would likely have to forgo free capital flow. This loss of flexibility could be particularly detrimental, given their significant international influence and their role as major recipients of capital flows for trade and financial transactions.

## 1. INTRODUCTION

The Impossible Trinity, also known as the Policy Trilemma or Mundell-Fleming Trilemma, is a concept in international economics that states that a country cannot simultaneously achieve all three of the following policy goals- A fixed foreign exchange rate, Free capital movement (absence of capital controls) and an independent monetary policy (Padhan et al., 2021; Aizenman, 2019; Beckmann, 2017; Benazic et al.; 2016; Ihnatov and Căpraru, 2014; Aizenman and Ito, 2013; Goh, 2009).

In the context of impossible trinity a country can only pursue two of these three objectives at the same time, with the possibility of the different combinations such as :

- Fixed exchange rate and Free capital movement: implying that country cannot have an independent monetary policy. The central bank must align its interest rates with the global market to maintain the fixed exchange rate.
- Free capital movement and Independent monetary policy: refereeing to the situation that a country cannot maintain a fixed exchange rate. The exchange rate will fluctuate based on market force, especially informed by constant change in interest rate by the monetary authority and the regime of free capital movement.
- Fixed exchange rate and Independent monetary policy: This means the country must impose capital controls to prevent free movement of capital, which could destabilize the fixed exchange rate.

Several studies have analyzed the phenomenon of the policy trilemma, or the impossible trinity, both at the country level and globally. For instance, Pantelopoulos (2021) demonstrates that Central Bank operational frameworks can be severely tested during periods of financial stress. However, the study also reveals that Central Banks in economies with a balance of payments surplus can navigate the constraints imposed by the trilemma within their operational frameworks.

Basri and Sumartono (2023) explore the policy trilemma in the context of Indonesia's experience during the 2009 quantitative easing (QE) and the 2013 taper tantrum, examining why Indonesian policymakers struggled to apply the trilemma's principles and the implications of these challenges. They identify three main reasons for Indonesia's difficulty in implementing the trilemma policy: differing monetary policy objectives, volatile floating exchange rates, and balance sheet effects. The

authors argue that monetary policy alone is insufficient to manage the Indonesian economy effectively. Instead, they emphasize the importance of complementary measures, such as macroprudential policy, fiscal policy, capital flow management, and institutional quality, in enhancing the effectiveness of policy choices.

Ho and Ho (2018) analyze the shifts in the administration of the impossible trinity in Vietnam before and after the 2007-2008 global financial crisis. Using indices representing the trilemma—monetary policy independence (MI), exchange rate stability (ERS), and financial openness (FO)—and regression models based on the ARDL method, the study finds that the Vietnamese government prioritized exchange rate stability during the study period. However, the combination of goals within the trilemma changed across two phases: financial integration was a greater focus before the crisis, while monetary independence became more prominent afterward.

Aizenman and Ito (2013) show that since 1990, trilemma variables in emerging markets have converged toward intermediate levels, characterized by managed flexibility, the use of sizable international reserves as a buffer, and retention of some degree of monetary autonomy. They also find that the weighted sum of the three trilemma variables remains constant, indicating that an increase in one variable must be offset by a decrease in the weighted sum of the other two.

Majumder and Nag(2017) examine the policy trilemma in India and conclude that while the trilemma constraint is binding in the long run, there is evidence of short-run deviations from the constraint. The efficiency of the trilemma depends on factors such as financial stress, financial development, central bank intervention, and liquidity in the economy. The Indian Reserve Bank's interventions in the foreign exchange market have successfully mitigated the trilemma constraint.

Hyeon-seung et al.(2016) examined how the use of the trilemma policy variables in Fiji were applied to address policy trade-offs among the three goals. Using the vector autoregressive as an alternative to the SUR model, they found out that the trilemma constraint is binding for Fiji and policy priority is given to exchange rate stability and independence of monetary policy. They also found out that there is no evidence to suggest that exchange rate stability and monetary policy independence make significant contributions to output growth; nevertheless, monetary policy independence contributes significantly in inflation control, and capital account openness would promote output growth.

In their study of the impossible trinity on Asian emerging market economies, Aizenman et al. (2011) examined the trilemma's powerful hypothesis. The result that came up after using a couple of

econometrics methods—fixed effects, system GMM, pooled OLS—was the three factors of trilemma structures are going to converge towards a middle ground among those countries with managed exchange rate flexibility regime, strengthened by substantial assets of international reserves and intermediate levels of monetary independence and financial integration.

Hyeon-seung et al. (2016) investigated the application of trilemma policy variables in Fiji, focusing on how these were employed to manage trade-offs among the three goals. Using vector autoregressive (VAR) analysis as an alternative to the Seemingly Unrelated Regression (SUR) model, they found that the trilemma constraint is binding in Fiji, with policy priorities given to exchange rate stability and monetary policy independence. However, they observed that neither exchange rate stability nor monetary policy independence significantly contributes to output growth. Nevertheless, monetary policy independence plays a crucial role in controlling inflation, while capital account openness is identified as a key factor in promoting output growth.

Aizenman et al. (2011), in their study of the impossible trinity in Asian emerging market economies, examined the robustness of the trilemma hypothesis. Using various econometric methods—fixed effects, system GMM, and pooled OLS—their findings indicate that the trilemma variables in these economies tend to converge toward a middle ground. This convergence is characterized by a managed exchange rate flexibility regime, supported by substantial international reserves, and intermediate levels of monetary independence and financial integration.

While the majority of the aforementioned studies on the policy trilemma have been conducted at the individual country level, there is a notable lack of research focusing on groupings of regionally integrated countries. This paper aims to fill that gap by exploring the possibility of the policy trilemma within the BRICS grouping. Additionally, this study introduces a methodological departure from previous research, which often relies on a constant as the dependent variable in various econometric models. Such an approach may lead to inconsistent estimations due to the lack of variability in the dependent variable. To address this issue, the paper advocates for the use of bounded dependent variables, which can enhance the effectiveness and reliability of the estimators employed in the analysis.

The BRICS grouping, consisting of Brazil, Russia, India, China, and South Africa, holds significant influence on the global stage, primarily due to its economic power and political coordination. Economically, the BRICS countries collectively represent a substantial portion of the world's population (approximately 41%), GDP (around 24%), and trade (over 16%) (Duggan et al., 2022).

This economic strength enables them to shape global economic policies and trends. Politically, BRICS serves as a platform for these emerging economies to coordinate their strategies and present a united front on various international issues, helping to balance the influence of traditional Western powers in global governance (Trivedy and Khatun, 2023).

Exploring the policy trilemma provides crucial insights for the BRICS grouping, especially as they consider the possibility of unifying their economic policies and advancing toward a deeper economic union within their regional integration efforts. Understanding the dynamics of the trilemma—namely, the trade-offs between monetary independence, exchange rate stability, and financial openness—can guide BRICS countries in harmonizing their policies. This knowledge is essential for addressing the challenges that arise when attempting to synchronize monetary policies, stabilize exchange rates, and manage capital flows across diverse economies. Such insights could help BRICS navigate the complexities of regional integration and lay the groundwork for a more cohesive and resilient economic bloc.

The contribution of this paper is threefold: First, it investigates the applicability of the impossible trinity in the context of BRICS countries. Second, it proposes a new methodology for measuring and evaluating the policy trilemma. Finally, the paper assesses whether an increase in foreign reserves could potentially mitigate the constraints imposed by the policy trilemma within the BRICS grouping

The rest of the paper is structured as follows; section 2 presents the data and the methodology used. Section 3 presents the results of the estimation and discussion of the results. Section 5 concludes the paper.

## **2. DATA AND METHODOLOGY**

We follow Aizenman and Ito (2013) to construct trilemma measures. The formula used for computing FOI index is as follows:

$$FOI = (CAPITAL\ INFLOW + CAPITAL\ OUTFLOW) / GDP \tag{1}$$

Where capital inflow and outflow contains foreign direct and portfolio investment in the balance of payments of BRICS countries. The construction of exchange rate stability index (ERSI) follows the expression:

$$ERSI = \frac{0.01}{0.01 + Sd(\Delta(\log(EXCH)))} \quad (2)$$

Monetary policy independence index (MPII) is constructed using the expression:

$$MPII = 1 - \frac{Corr(i_h, i_f) + 1}{2} \quad (3)$$

Where  $Corr(i_h, i_f)$  is the linear correlation coefficient between the domestic interest rate ( $i_h$ ) and the foreign interest rate ( $i_f$ ). Here the USA interest rate is chosen as the base country because of its strategic position in the international transactions. quarterly interest rate data were used in the calculation of the correlation. The data for the construction of the above indices are collected from the World Economic Indicator, the world Bank database and DataStream from Reuters. The sample data is from 2001 to 2018 for all the five BRICS countries.

We follow Huh et al.(2016) and Ito and Kawai (2012) who suggested that the weighted sum of the linear combination of the three policy formulations must be constant, such as :

$$2 = \alpha ERSIt + \beta FOIt + \gamma MIIt + \varepsilon t \quad (4)$$

According to the authors, Equation 4 can be estimated by the least square method. We follow the same estimation using the pool panel estimation but allowing variation of the dependent variable for efficient estimation of Equation 2. It is worth noting that without variability of the dependent variable, like in previous studies ,the pool regression estimation may be inefficient.

Thus, the estimated equation becomes:

$$2 \mp 95\% CI = \alpha ERSIt + \beta FOIt + \gamma MIIt + \varepsilon t \quad (5)$$

This equation support the impossibility trinity in that the three policies may not coexist as the increase or adoption one of them may lead to decrease of others, as their linear combination cannot go beyond a given interval.

### 3. EMPIRICAL RESULTS AND DISCUSSION

The estimation results from the econometrics model represented by the equation (5) are shown in table 1.

*Table 1. Regression of the trilemma*

Variable	Coefficient	P-value
MII	0.59797	0.6019
ERSI	1.490375***	0.0000
FOI	1.1368476***	0.0000

\*\*\* denotes 1% level of significance.

**Table 1** reveals that none of the estimated coefficients are negative; all are positive. This indicates that monetary policy independence is not statistically significant in the context of BRICS countries. These results suggest that BRICS nations cannot simultaneously maintain a combination of free capital flow and a fixed exchange rate system.

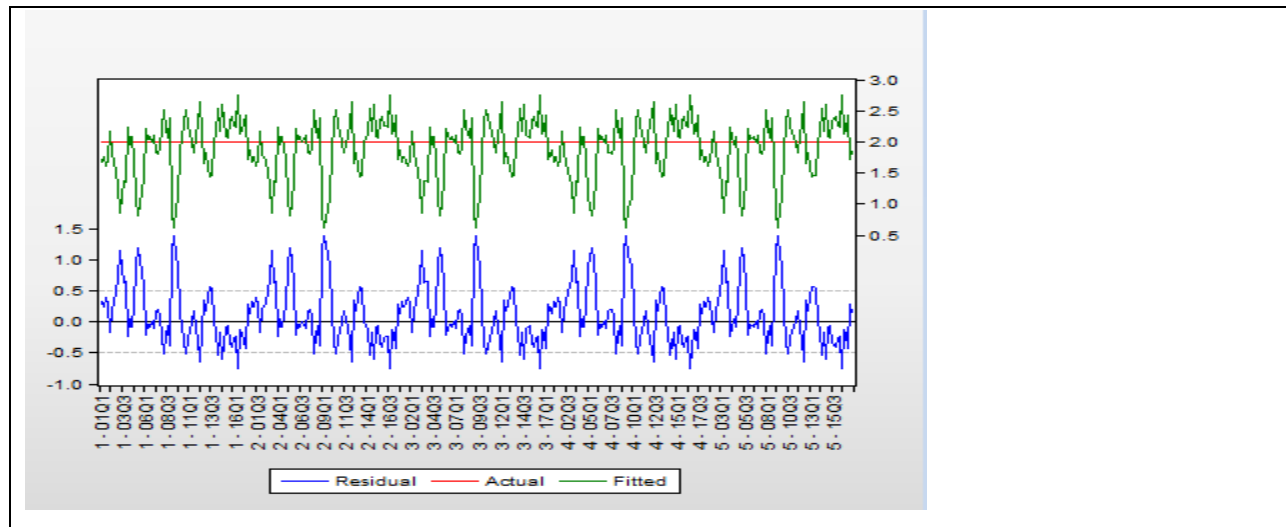
Given this, it is evident that BRICS countries must choose between two potential policy combinations: either monetary policy independence with a fixed exchange rate system, or monetary policy independence with free capital flow. The latter option appears more plausible, considering the nature and influence of the BRICS grouping in attracting capital. Their significant presence in the international economic and financial landscape positions them favorably to benefit from the flexibility of monetary policy independence while allowing free capital flows.

**Figure 1** compares the actual, predicted, and residual values of the linear combination of the three policies. The results indicate that the linear combination stabilizes around a value of 2, which suggests that the model provides a reliable prediction of the interaction between the three policy variables. The closeness of the predicted values to the actual values, coupled with relatively small residuals, underscores the model's effectiveness in capturing the dynamics of these policies. This



alignment reflects a strong fit, demonstrating the accuracy of the model in forecasting the outcomes when these three policy elements are combined.

Figure 1 predicted values of the policy combination



The literature postulate that the presence of reserves may mitigate the policy trilemma in that the selling of an abundant reserves may sustain the fixed exchange rate system in the presence of abundant reserves (Steiner, 2017; Cheng and Rajan, 2020; Aizenman and Ito, 2012). This hypothesis is tested with the results represented in Table 2, with RESERVE, representing the amount of reserves by BRICS countries.

Table 2 impact of reserve stocks in policy dilemma

Variable	Coefficient	t-Statistic	P-value
MII	0.031061	0.263622	0.7922
FOI	1.437577***	13.75257	0.0000
ERSI	1.415002***	4.889557	0.0000
RESERVE	0.012882**	2.096686	0.0368

\*\*\* denotes 1% level of significance.

The positive coefficients of the variables in **Table 2**, combined with the lack of statistical significance for the Monetary Independence Index (MII), indicate that the trilemma remains unresolved, even for BRICS countries that have accumulated substantial foreign reserves. This finding underscores that, despite their large reserves, BRICS nations are still unable to simultaneously achieve all three policy objectives: monetary policy independence, exchange rate stability, and free capital flow. Consequently, the results suggest that these countries cannot confidently adopt a fixed exchange rate system without compromising one of the other crucial policy areas. The accumulation of foreign reserves alone does not provide sufficient leverage to overcome the inherent constraints of the trilemma.

These results show that adopting a fixed exchange rate system poses significant challenges for BRICS countries within the framework of the Impossible Trinity, which posits that it is impossible to simultaneously achieve monetary policy independence, exchange rate stability, and free capital flow. If BRICS countries choose a fixed exchange rate, they would have to forgo monetary policy independence, meaning they could no longer adjust interest rates in response to domestic economic conditions such as inflation, unemployment, or economic growth. This loss of flexibility is particularly harmful during economic shocks or crises, as it leaves these countries unable to use monetary tools to stabilize their economies. Additionally, BRICS countries are often vulnerable to external shocks due to their diverse economic structures and exposure to global economic shifts. A fixed exchange rate system makes them more susceptible to these shocks, as maintaining the peg may require depleting foreign reserves, which is unsustainable in the long term. Moreover, fixed exchange rate regimes are frequently targets for speculative attacks; if investors believe a currency is overvalued or doubt the central bank's ability to maintain the fixed rate, they may engage in speculative activities that force the country to abandon the peg, leading to rapid capital flight and potential currency crises. Given these risks, BRICS countries might be better served by opting for other combinations within the Impossible Trinity framework, such as retaining monetary policy independence with a floating exchange rate, which allows the currency value to adjust to changing economic conditions, or maintaining a fixed exchange rate while implementing capital controls to restrict the free movement of capital. These alternatives offer more flexibility and resilience in managing economic challenges compared to a fixed exchange rate system.

#### **4. CONCLUSION**

This paper examines the Impossible Trinity, or policy trilemma, within the context of BRICS countries to explore whether this group can effectively combine monetary policy independence, exchange rate

stability, and free capital flow. Departing from the conventional literature, this study introduces a novel approach by proposing that the measure of the Impossible Trinity should be based on a linear combination of these policies that fluctuates within a specific interval, rather than being a constant value. This approach enhances the efficiency of estimation using least squares or other econometric methods.

The results from the pooled regression analysis reveal that adopting a fixed exchange rate system presents substantial challenges for BRICS countries under the framework of the Impossible Trinity. Specifically, if BRICS nations opt for a fixed exchange rate, they would likely have to sacrifice monetary policy independence, which would prevent them from adjusting interest rates in response to domestic economic variables such as inflation, unemployment, or economic growth.

These findings are particularly significant for BRICS policymakers as they seek to achieve varying levels of economic integration, which will necessitate the adoption of informed and strategic policy recommendations. The study underscores the importance of carefully considering the trade-offs inherent in the Impossible Trinity when formulating economic policies within the BRICS framework.

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