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Effect of Impossible Trinity on Investment in Developing Countries: Evidence from Africa

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ABSTRACT

We are concerned about which selections from the Trilemma Index will affect investments in developing countries. We use the empirical method to examine Africa's Trilemma Index and investment. Using ordinary least squares and two-level least squares estimators with a dataset covering 39 African countries over an extended period of 30 years, we suggest that the impact of the Trilemma Index on investments in Africa is still a major challenge is to control. The main reason is that most African countries do not have well-developed monetary policies and autonomy and rely on foreign direct investment (FDI). On the other hand, they do not have enough capacity to control exchange rate stability. The endogeneity tests support our results.

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1. Introduction

The trilemma indices quantify the degree of fulfillment along the three dimensions of the trilemma hypothesis, which focuses on monetary independence, exchange rate stability, and financial openness. The links between international reserves, exchange rates, and monetary policy can be understood through the lens of a modern incarnation of the impossible trinity, also known as the trilemma, based on

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the Mundell-Flemings hypothesis that a country can choose any two, but not all, of the simultaneously following three political goals: monetary independence, exchange rate stability and financial integration. The original economic trilemma was formulated in the 1960s during the Bretton Woods regime as a binary choice of two out of three possible policy goals. However, in the 1990s and 2000s, emerging and developing economies found that deeper financial integration was accompanied by increasing vulnerabilities to financial instability and increased risks of capital inflows stalling and capital flight crises. These crises have been characterized by exchange rate instability triggered by countries' balance sheet exposure to external hard currency debt that propagate banking instabilities and crises. Such events have often turned into deep internal and external debt crises that have ended in bailouts for systemically important banks and powerful macro players.

Concerns related to exposure to financial instability have been addressed through different configurations of managing public butter, as well as through the increasing use of macroprudential policies aimed at inducing systemic actors to internalize the impact of their balance sheet exposure on a country's financial stability. Consequently, the original trilemma has morphed into a quadrilemma in which financial stability has been added to the trilemma's original political goals. Size does matter, and smaller countries have no way of fully protecting themselves from global cycles and shocks. However, successfully navigating the open economy quadrillemma helps reduce the transmission of external shocks to the domestic economy and the costs of domestic shocks. These observations explain the relative resilience of emerging markets, particularly in countries with more mature institutions, as they have been cushioned by more prudent reserve management and greater fiscal and monetary space.

A small open economy wishing to maintain financial integration can regain its monetary autonomy by abandoning the fixed exchange rate. Under a flexible exchange rate regime, the expansion of the domestic money supply lowers the interest rate, leading to capital outflows in search of higher foreign returns. The beginning excess demand for foreign exchange devalues the exchange rate. Therefore, monetary policy operates in a flexible exchange rate regime with financial integration. A higher money supply lowers the interest rate, increasing domestic investment and weakening the domestic currency, which in turn expands the economy through increased net exports. Consequently, achieving monetary independence requires the small open economy to give up exchange rate stability.

An alternative way for the small open economy to regain monetary independence is to abandon financial integration and opt for exchange rate stability. The abandonment of financial integration prevents arbitrage between domestic and foreign borrowing, thereby decoupling the domestic interest rate from the foreign interest rate. Monetary policy works much like the closed economy, where the central bank controls the money supply in the short term and monetary expansion lowers the domestic interest rate. Test key predictions of the trilemma in a series of insightful articles (Jeffrey A. Frankel & Saravelos, 2010; Obstfeld et al., 2004, 2008, 2009). In particular, they assess the transmission of interest rate shocks in different regimes and contrast different regimes that have been close to the three trilemma vertices over time. Overall, the results agree with the trilemma prediction. During the periods of fixed exchange rates in the classic gold standard period, there is a pronounced and rapid pass-through of interest rate shocks (corresponding to the right-hand corner of the trilemma). This is consistent with the prediction that the fixed exchange rate combined with capital mobility will destroy monetary independence. By contrast, during the Bretton Woods era, fixed exchange rates did not represent a major constraint on domestic interest rates, a by-product of widespread capital controls (corresponding to the topmost vertex of the trilemma). In the post-Bretton Woods era, the return to a more globalized pattern is manifested in increased transmission of interest rates between fixed income countries.

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2. Problem Statement and the Research Question

There has been a concerted debate about the sensitivity of the Trilemma Index to economic and financial activity. A strand of the literature by Aizenman, Chinn, and Ito (2008) suggests that when it comes to macroeconomic management, policymakers must compromise by choosing two, not all, of the three policy options: monetary independence, exchange rate stability, and financial openness. This is the famous hypothesis in international finance called the trilemma or the impossible trinity. History has shown that different international financial systems have attempted to achieve combinations of two of the three policy goals (Aizenman, 1987, 2019; Aizenman et al., 2008). They also point out that monetary policy, exchange rates and interest rates must be sensitive to global financial shocks. (Jebeniani & Trabelsi, 2022) show that an accommodative monetary policy in the context of fixed and intermediate exchange rate systems is an effective tool to stabilize exchange rate fluctuations and mitigate overvaluations in developing countries. (Deng & Fang, 2022) point out that firms are less responsive to expansionary monetary shocks in terms of investment, and the impact of monetary policy on overall investment depends on the distribution of debt maturity. While there are some studies on exchange rates, surveillance policies and financial openness in Africa, we need more studies that could identify the best indices that should be used to promote investment opportunities in Africa. However, our particular interest in this study is to show how the Trilemma Index influences both private and government investment decisions.

3. Literature Review

This chapter presents the relevant theoretical and empirical literature on the effect of the Trilemma Index on investments. The first section addresses the theoretical underpinning of the study, the second section examines the empirical literature of interest to the topic, and the last section draws conclusions from both the theoretical and empirical literature.

3.1 Theories on Investment

The Fisher equation explains that the nominal riskless interest rate (krf) is composed of the real riskless rate of interest (k*) plus expected inflate rate (EI). This equation can mathematically be expressed as: (krf) =k*+EI……. (1) Equation (1) was developed in terms of the expectations of financial markets participants (Kudryashov & Zakharchenko, 2014; Yokus & Yavuz, 2021). This means investors determine their desired risk-free rate of return before investing their money. That's because; The nominal risk-free rate is the base on which all other returns are built. From the Fisher equation; When inflation is low, the nominal interest rate also falls. This implies that the expected return on investment will be high. In addition, the cost of capital would also be low and thus the financial cost of new investments would be low. As foreign investors seek to lower their financial costs to maintain price competitiveness, the availability of capital at low lending rates will allow foreign investors not only to find better partners in the host country with sufficient domestic investment to complement, but also to increase returns maximize their investment. Therefore, the ready availability of capital at a lower nominal interest rate in the host country would attract foreign investors. So Fisher's equation shows that when inflation is low, the nominal interest rate is also low. Therefore, the financial cost of foreign direct investment (FDI) is low and the return on investment is high. Therefore, inflation has a negative impact on foreign direct investment.

(Megasari & Saleh, 2021) define an exchange rate as the price of a monetary unit expressed in relation to another currency rate. These theories differ according to long-term and short-term. If two countries produce an identical good and all factors, including transportation and legal costs, remain constant, the

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price of that good should be constant worldwide in the long run, no matter which country produces it (Kiat, 2008; Omankhanlen, 2011). This is called the law of one price, which is only relevant in the long term.

The Keynesian model is based on analysis of aggregate demand (AD) and aggregate supply (AS). The main feature of this theory is that the AS curve slopes up in the short term instead of being vertical (Annicchiarico & di Dio, 2015). When the AS curve is vertical, shocks on the demand side of the economy only affect prices. (da Silva, 2001; Ojapinwa & Nwokoma, 2018) point out, however, that due to this ascending nature of the AS curve and changes in demand, prices and production can change. The short-term dynamic equilibria of the AD and AS curves form an adjustment path that initially shows a positive relationship between inflation and growth, but later becomes negative towards the last part of the adjustment path (Annicchiarico & di Dio, 2015; Calvert Jump et al., 2019; Clerc, 2021; Kiley, 2016). In this model, there is a short-run trade-off between output and change in inflation, but no lasting trade-off between output and inflation. In order for inflation to be kept constant at any level, production must match the natural rate. Any level of inflation is sustainable; However, for inflation to fall, there must be a period when production is below the natural rate.

Neo-classical Theory consists of several other models that attempt to explain countries' investment and economic growth (Connor, 1973; Desai & Potter, 2021). However, the dynamic relationship between the Trilemma Index and investment can be deduced. The model showed diminishing returns for labor and capital separately and constant returns for both factors together. According to Mundell's model, an increase in inflation or inflation expectations directly reduces the wealth of people and firms (Bar-Eli et al., 2020; Eisner & Nadiri, 1968; Kashyap Heena, 2015; Keane, 2019; North, 1993; Waldén et al., 1961).

3.2 Empirical Studies

The international financial trilemma is a challenge to reconcile government policies and ensure a healthy financial sector to facilitate a country's economic development. (Arefjevs & Bogdanova, 2020) have developed a model of the international financial trilemma that defines the three main pillars of the international financial trilemma and the corresponding relevant economic indicators, they propose to determine the financial trilemma index based on the following pillars: financial stability, financial inclusion and transparency. The authors analyze FinTech services as a disruptive element affecting the International Financial Trilemma Index. As the statistical basis of the financial trilemma and its building blocks, the data set is determined from publicly available databases such as the Global Competitiveness Index, the Financial Development Index, Global Findex and Doing Business.

(Aizenman & Ito, 2014) examine the potential implications of the degree of divergence of open macroeconomic policies in the context of the trilemma hypothesis. Using an index that measures the extent of policy divergence between the three policy trilemma choices: monetary independence, exchange rate stability, and financial openness, they find that emerging economies have adopted combinations of trilemma strategies with the lowest degree of policy divergence. They then examine whether and to what extent the degree of open macropolitical convergence affects the likelihood of a crisis, finding that a developing or emerging economy with a higher degree of policy divergence is more likely to experience a currency or debt crisis. They also compare the development of trilemma policies around the time of the crisis for the groups of Latin American crisis countries in the 1980s and the Asian crisis countries in the 1990s. They find that Latin American crisis countries tend to close their capital accounts after a crisis, while this is not the case in Asian crisis countries. Crisis Asian countries tended to reduce the degree of policy divergence in the post-crisis period, possibly meaning they opted

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for open macro policies that made their economies less vulnerable to crises.

(Aizenman et al., 2011) examine how policy configurations affect macroeconomic performance, with a focus on Asian economies. They find that the three policy choices matter for output volatility and the medium-term level of inflation. Greater monetary independence is associated with lower output volatility, while greater exchange rate stability implies greater output volatility, which can be mitigated if a country holds international reserves (IR) at levels above a threshold (about 20% of GDP). Greater monetary autonomy is associated with higher levels of inflation, while greater exchange rate stability and greater financial openness could lower the rate of inflation. They find that trilemma policy configurations affect output volatility through the investment or trade channel depending on the openness of economies. They point out that in a more open economy, policymakers would prefer to seek greater exchange rate stability while holding vast amounts of international reserves. Emerging Asian economies are equipped with macroeconomic policy configurations that help economies dampen real exchange rate volatility.

4. Expected Benefits of the Research

This research analysis makes a significant contribution to policy making related to monetary policy, financial openness and exchange rate stability and their economic and financial implications for the development of financial institutions and markets. In this study, we anticipate that effective management of the Trilemma Index can have a positive impact on private and public investment, and this can lead to efficient and effective management of interest payments and debt servicing on external debt. This argument has not been thoroughly explored by either developing country. As we have an interesting topic and this is the first to use all of the Trilemma Index data, we expect that our research may make a notable contribution to the academic literature and be of use to policy makers worldwide, particularly in sub-Saharan Africa and in the context. Interested in investment and a balance between the country's economic growth and prosperity, the government can determine whether measures are being taken to encourage foreign direct investment. It isolates the country-specific factors that explain variability investment. The current study is useful in determining exchange rates to achieve a balance between domestic and foreign investment in order to attract foreign direct investment and stimulate growth. It will be useful for major Forex market players as the ratio between the Trilemma Index and the FDI will determine the trading level at any point in time.

5. Research data and methods

We collect data from 39 African countries. The main sources of our data are the trilemma dataset[1], the IMF and the World Bank. The World Economic Outlook (WEO) is also a key to the country-specific variables. The dependent variable are the trilemma indices, which quantify the degree of fulfillment along the three dimensions of the trilemma hypothesis: monetary independence, exchange rate stability, and financial openness. These indices are first introduced by (Aizenman, Chinn and Ito, 2008). The political trilemma refers to the trade-offs faced by a government when deciding international monetary policy. The impossible trinity (also known as the trilemma) is a trilemma in international economics that states that it is impossible to have all three of the following at the same time: - a stable exchange rate; free movement of capital (lack of capital controls); and an independent monetary policy. When the government sets a fixed exchange rate and allows capital to move freely, they have to change interest rates according to outside pressures. This implies that in a recession the country could not lower interest rates, otherwise the currency would depreciate. If the government wanted to seek monetary autonomy

[1] The Trilemma Indexes (pdx.edu)

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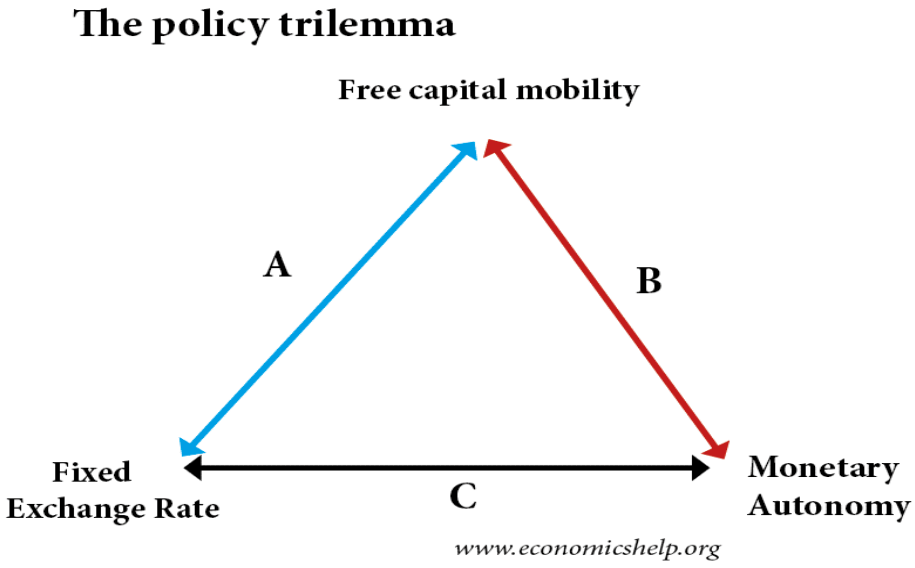
and allow capital to move freely, it would have to allow a flexible exchange rate. For example, if the government is worried about inflation, it could raise interest rates. These higher interest rates would cause the currency to appreciate. Countries looking to boost growth would lower interest rates, but lower interest rates would drain hot money from the economy and cause the exchange rate to fall. If the government wants to have a fixed exchange rate, but also wants to change interest rates according to its own preferences, it needs to control the outflow of money. Suppose a country wants to keep its exchange rate stable but lower interest rates to stimulate growth, and then downward pressure on the currency is created. Investors want to sell this country's currency and buy dollars. However, if the country prevents investors from buying dollars and taking currency out of the country, then it can keep the value of the currency artificially high (Mundell, 1963).

The degree *of monetary independence* is measured as the reciprocal of the annual correlation between the monthly interest rates in the home country and the base country. The base country is defined as the country with which a home country's monetary policy is most closely linked, as in Shambaugh (2004). By design, the maximum value is 1 and the minimum value is 0. Higher values of the index mean more monetary policy independence. To measure *exchange rate stability*, annual standard deviations of the monthly exchange rate between the home country and the base country are calculated and the index normalized between 0 and 1. As a measure of *financial openness*, we use the Capital Account Openness Index, or KAOPEN, by Chinn and Ito (2006, 2008). KAOPEN is based on information on restrictions in the International Monetary Funds Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). In particular, KAOPEN is the first standardized principal component of variables indicating the presence of multiple exchange rates, restrictions on current account transactions, capital account transactions, and the requirement to release export earnings. The Chinn-Ito Index is normalized between zero and one. Higher scores on this index indicate that a country is more open to cross-border capital transactions (Aizenman, Chinn, and Ito, 2008; Aizenman, Chinn, and Ito, 2017).



This simple diagram suggests that a government must choose either: A = Fixed exchange rate + free capital mobility; B = Free capital mobility + monetary autonomy; C = Fixed Exchange rate + monetary autonomy.

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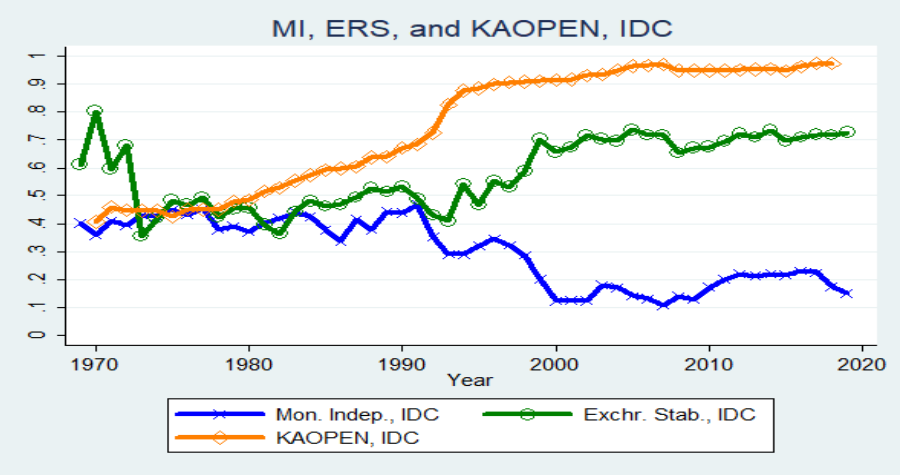
Figur 1:Trilemma index globally



Source: The Trilemma Indexes (pdx.edu), (Aizenman, 2019)

The independent variables are foreign direct investment, private investment, and public investment. We employ both Ordinary Least Square (OLS) and Two Stages Least Squares(2SLS) estimators' country-year panel data set of 39 African countries over the period 1990–2019. The OLS model is given below:

$$Foreign\ Direct\ Investment = \alpha + \beta Trilemma\ index + \theta Y_{i,t} + u_{it} + Country\ FE + Year\ FE \quad (1)$$

$$Public\ Investment = \alpha + \beta Trilemma\ index + \theta Y_{i,t} + u_{it} + Country\ FE + Year\ FE \quad (2)$$

$$Private\ Investment = \alpha + \beta Trilemma\ index + \theta Y_{i,t} + u_{it} + Country\ FE + Year\ FE \quad (3)$$

Where α is intercept and β is a slope. Y_{it} is a vector of macroeconomic control variables for ith country at year t, and u_{it} is an error term, country FE is country fixed effect and Year FE is year fixed effect.

6. Description and Distribution of Data

In this section we present data using tables and figures. We show and explain the most important variables that we used in this paper. We also describe the most important variables by country.

Figure 2: The main Variables and data distribution

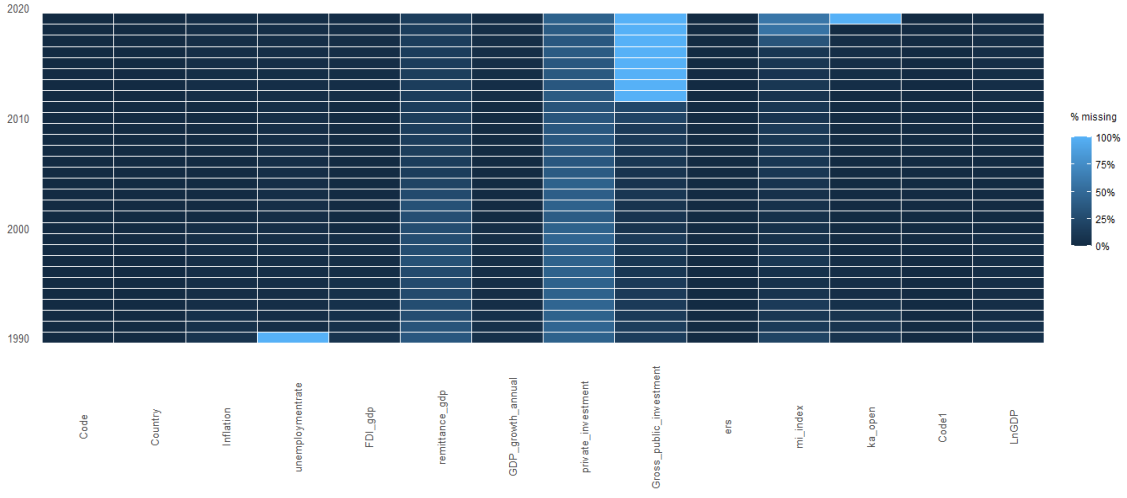


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Figure 3:Exchange Rate Stabilty by Countries

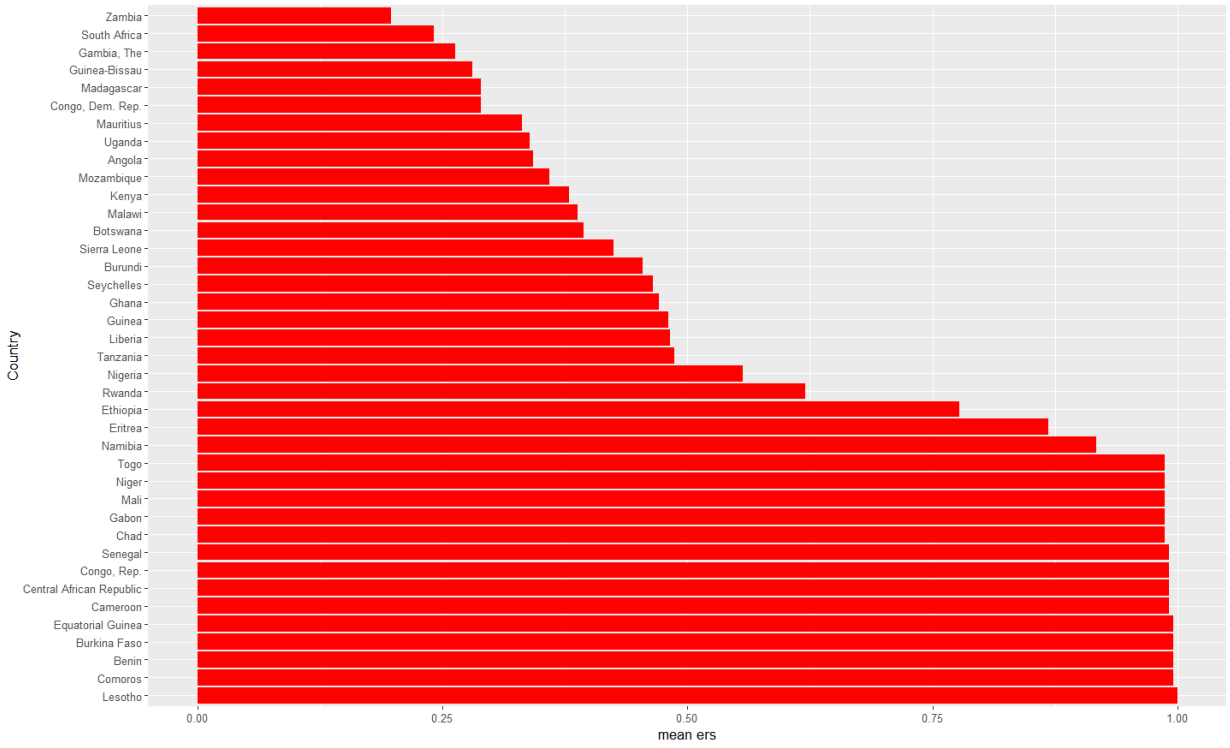

Figure 4: Monitory Policy Independence by Country

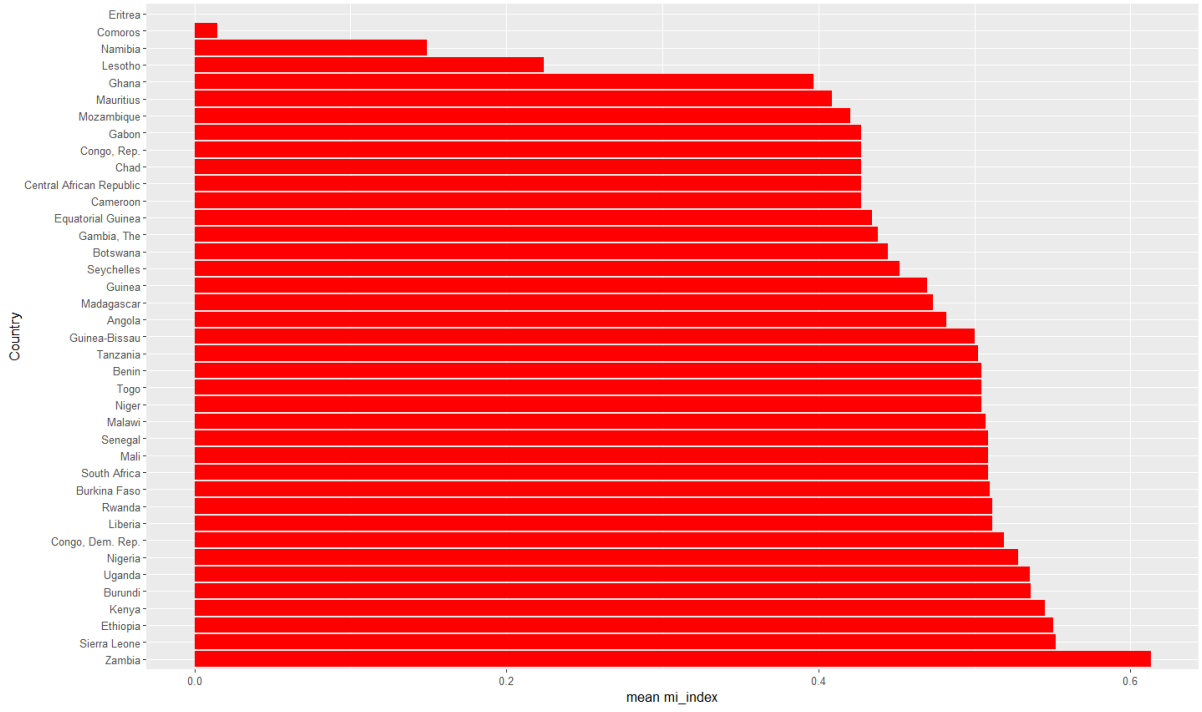

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Figure 5: Country Financial Openness by Country

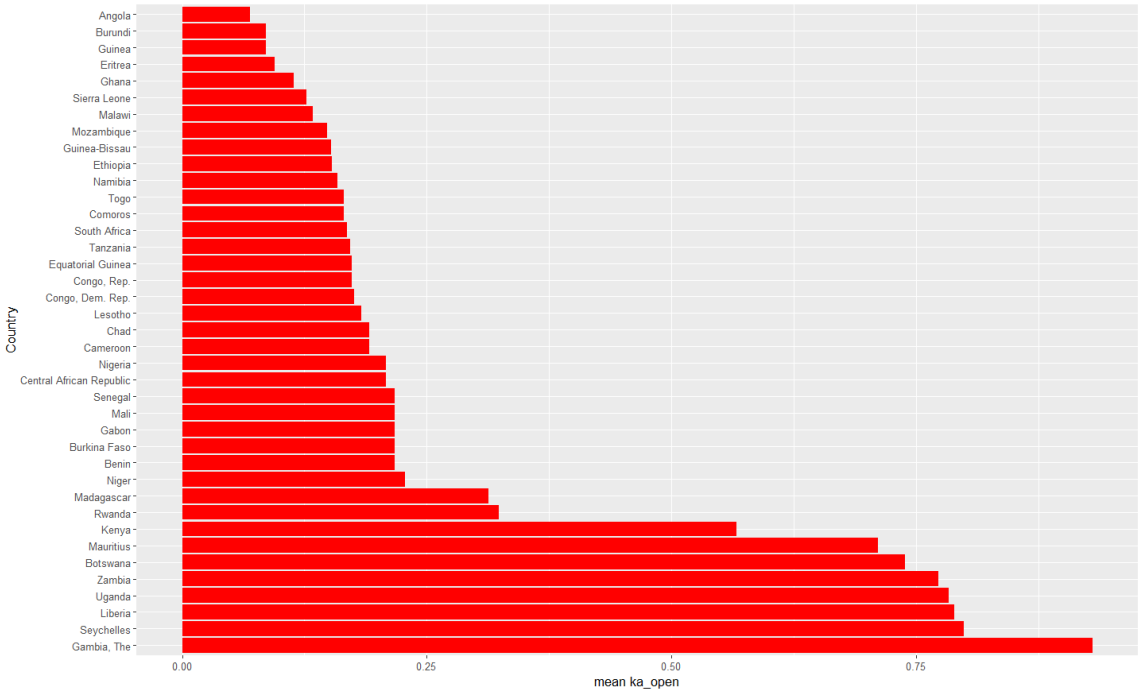

Table 1: List of countries' codes and years

Code	min	max
AGO	1990	2019
BDI	1990	2019
BEN	1990	2019
BFA	1990	2019
BWA	1990	2019
CAF	1990	2019
CMR	1990	2019
COD	1990	2019
COG	1990	2019
COM	1990	2019
ERI	1990	2019
ETH	1990	2019
GAB	1990	2019
GHA	1990	2019
GIN	1990	2019
GMB	1990	2019
GNB	1990	2019
GNQ	1990	2019
KEN	1990	2019
LBR	1990	2019
LSO	1990	2019
MDG	1990	2019
MLI	1990	2019
MOZ	1990	2019
MUS	1990	2019
MWI	1990	2019

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NAM	1990	2019
NER	1990	2019
NGA	1990	2019
RWA	1990	2019
SEN	1990	2019
SLE	1990	2019
SYC	1990	2019
TCD	1990	2019
TGO	1990	2019
TZA	1990	2019
UGA	1990	2019
ZAF	1990	2019
ZMB	1990	2019

Table 2: Summary Statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	mean	Sd	p25	p50	p75	min	max	N
Inflation	16.7347	52.8003	2.09607	6.51484	13.3252	-15.4237	466.407	1,258
Unemploymentrate	7.81875	7.50236	2.92000	4.52000	9.43000	0.56000	33.2900	1,201
FDI_gdp	3.60560	5.99062	0.54000	1.97000	4.36000	-3.75000	39.4600	1,242
remittance_gdp	3.68108	7.54540	0.29000	1.27000	3.36000	0	53.8300	1,011
gvtspend_gdp	14.8659	6.67599	10.5100	14.0850	17.7400	2.05000	39.6300	1,102
GDP_growth_annual	4.08236	4.74975	1.92121	4.22793	6.33369	-10.7934	20.7158	1,252
Tax_revenue_GDP	16.7240	7.41635	11.1276	14.9486	22.4202	5.68812	35.9075	511
Gross_nat_expend_gdp	108.825	16.8165	101.402	108.325	115.370	67.0096	174.421	1,110
private_investment	14.9650	6.86809	9.87621	14.3884	18.7282	2.01625	39.9840	765
Gross_capital_formation	21.2090	9.53404	15.1566	20.4861	26.1430	0	52.1218	1,133
Gross_public_investment	7.55630	4.35935	4.49472	6.75884	9.73434	0.75992	26.1894	777
Ers	0.64095	0.35033	0.30699	0.67876	1	0.031324	1	1,166
mi_index	0.45887	0.17994	0.35261	0.48263	0.58523	1.4130e-03	0.86328	1,014
ka_open	0.29867	0.29032	0.16496	0.16496	0.41654	0	1	1,111
LnGDP	22.4150	1.50164	21.3051	22.4002	23.2871	19.2642	26.6321	1,255

7. Empirical Results and Discussion

This section focuses on the empirical results and discussion. We present our regression analysis results in tables. We also report in this section the endogeneity tests using the two-stage least squares method.

Table 3: The effect of Exchange Rate stability on investment

	(1)	(2)	(3)
VARIABLES	FDI percent of GDP	private_investment	Gross_public_investment
Exchange Rate Stability	-0.453	3.097**	-1.692**
	(-0.499)	(2.157)	(-2.220)
Unemployment rate	-0.335***	-0.209*	-0.0524
	(-3.411)	(-1.752)	(-0.608)
LnGDP	-0.168	0.510	-1.532**
	(-0.225)	(0.435)	(-2.248)
GDP_growth_annual	0.00400	-0.00143	0.114***
	(0.0972)	(-0.0265)	(3.847)
Inflation	0.000455	-0.0226	0.000868
	(0.0562)	(-1.219)	(0.162)

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Remittances as percent of GDP	0.122**	-0.121	0.214***
	(2.484)	(-1.146)	(4.545)
Constant	2.081	1.894	47.06***
	(0.116)	(0.0669)	(2.890)
Observations	854	546	557
R-squared	0.463	0.613	0.651
Country FE	YES	YES	YES
Year FE	YES	YES	YES

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Exchange rate movements affect FDI values because they strongly affect not only the amount of cash inflows received from investments, but also the amount of cash outflows required to continue operating those investments. Currencies appreciate and depreciate according to prevailing market conditions (Zhang, 2022). These exchange rate movements affect inflation and interest rates, which can significantly affect the economic growth of developing countries and also lead to a decrease in foreign direct investment. The economic difficulties of developing countries do not stem from their perceived isolation from developed countries, but rather from the way they are imposed on the international system. (Husain et al., 2005) argues that economic policies that create a favorable business environment are always desirable. Inflation, which refers to a general increase in the price level, hampers foreign direct investment particularly when the general price level is high (high inflation), but when general prices are stable (low inflation) then foreign direct investment becomes attractive. Low inflation leads to low nominal interest rates and low costs of capital.

Table 4: The effect on monitory policy on investment

	(1)	(2)	(3)
VARIABLES	FDI percent of GDP	private_investment	Gross_public_investment
Monitory policy independency	2.387**	-0.258	1.578*
	(2.078)	(-0.168)	(1.735)
Unemployment rate	-0.253**	-0.293**	-0.00388
	(-2.452)	(-2.396)	(-0.0459)
LnGDP	-0.582	0.188	-1.459**
	(-0.710)	(0.160)	(-2.142)
GDP_growth_annual	0.00444	0.00229	0.0900***
	(0.102)	(0.0426)	(2.975)
Inflation	0.00573	-0.0224	0.00146
	(0.696)	(-1.247)	(0.280)
Remittances as percent of GDP	0.147***	-0.127	0.195***
	(2.860)	(-1.178)	(4.190)
Constant	9.736	11.15	43.89***
	(0.493)	(0.392)	(2.694)
Observations	768	502	516
R-squared	0.494	0.633	0.631
Country FE	YES	YES	YES
Year FE	YES	YES	YES

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Monetary policy affects corporate investment through both an interest rate channel and a balance sheet channel. First, monetary policy can influence firms' demand for capital as an input to the production

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process via the interest rate channel. This is because interest rates influence decisions to save or invest and can stimulate aggregate demand. Second, through the balance sheet channel, monetary policy can make external borrowing cheaper for firms and lower firm-specific user costs of capital, allowing them to invest more. The debt financing premium is the difference between the cost of debt financing and equity financing (Francis et al., 2011; Mundell, 1963). Lower interest rates can reduce this premium as they increase asset value, increasing the value of companies' balance sheets and therefore their net worth. Monetary policy affects companies in different ways. Not all spending is equally sensitive to interest rates. Therefore, the fluctuations in demand generated by monetary policy will differ from company to company. Expenditure on durable goods such as cars or household furniture is often funded by loans and provides a range of services over time; such spending is therefore more interest rate sensitive than prudent policy (Francis et al., 2011; Razin et al., 2004). There is ample evidence that output from industries producing durable goods is more sensitive to monetary policy shocks.

Table 5: The effect of country financial openness policy on investment

	(1)	(2)	(3)
VARIABLES	FDI percent of GDP	private_investment	Gross_public_investment
Country Financial Openness	-0.927	-2.650	-3.328***
	(-0.751)	(-1.518)	(-3.618)
Unemployment rate	-0.339***	-0.221*	-0.0940
	(-3.410)	(-1.841)	(-1.074)
LnGDP	-0.0942	0.667	-1.682**
	(-0.126)	(0.572)	(-2.495)
GDP_growth_annual	0.00242	0.00557	0.110***
	(0.0582)	(0.103)	(3.717)
Inflation	0.00138	-0.0345*	0.00255
	(0.172)	(-1.867)	(0.483)
Remittances as percent of GDP	0.124**	-0.127	0.224***
	(2.498)	(-1.196)	(4.768)
Constant	0.0327	0.273	50.15***
	(0.00182)	(0.00963)	(3.103)
Observations	844	541	552
R-squared	0.465	0.613	0.644
Country FE	YES	YES	YES
Year FE	YES	YES	YES

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

FDI is an important part of the capital flow for developing countries, and its contribution to economic growth is widely disputed, although most researchers agree that the benefits far outweigh the costs to the economy. (Megasari & Saleh, 2021) note that foreign direct investment includes a package of potential growth-enhancing attributes such as technology and access to the international market. FDI is a component of international capital flows and is the largest source of external financing for developing countries, as it is widely believed that economic growth depends critically on domestic and foreign investment, just as the rate of foreign investment inflows depends on the rate of economic growth.

Table 6: TWO STAGES LEAST SQUARES: Exchange rate Stability

	(1)	(2)	(3)

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VARIABLES	IV-2SLS	IV-2SLS	IV-2SLS
Exchange Rate Stability	-1.276*	4.410***	-1.393**
	(-1.772)	(4.842)	(-2.251)
Unemployment rate	0.00330	0.0656*	0.00567
	(0.118)	(1.674)	(0.230)
LnGDP	-0.113	1.709***	-0.347**
	(-0.806)	(8.308)	(-2.344)
GDP_growth_annual	0.190***	-0.0135	0.135***
	(3.997)	(-0.207)	(3.571)
Inflation	-0.0190**	-0.0408*	0.0131*
	(-1.968)	(-1.737)	(1.846)
Remittances as percent of GDP	0.0421	-0.227***	0.105***
	(1.422)	(-2.877)	(4.365)
Constant	5.876*	-25.98***	15.21***
	(1.802)	(-5.556)	(4.549)
Observations	826	529	532
R-squared	0.028	0.238	0.108
Cragg-Donald Wald	208.8	208.8	208.8
Stock-Yogo10%	16.38	16.38	16.38
Control variables	YES	YES	YES
Country FE	YES	YES	YES
Year FE	YES	YES	YES
Adj R2	0.0212	0.229	0.0979

z-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A weak national currency can push up inflation in a country that is a large importer due to higher prices for foreign products. This could prompt the central bank to raise interest rates to counter inflation, as well as support the currency and prevent a sharp drop. Conversely, a strong currency depresses inflation and puts a brake on the economy, which is tantamount to tight monetary policy *(Baxter & Stockman, 1989; da Silva, 2001)*. In response, a country's central bank may move to keep interest rates low or cut them further to prevent the local currency from becoming too strong. The exchange rate thus indirectly affects the interest rate you pay on your mortgage or car loan, or the interest you receive on the money in your savings or money market account. A weak national currency boosts economic growth by boosting exports and making imports more expensive (thereby forcing consumers to buy domestic goods). Faster economic growth usually leads to better employment prospects. A strong national currency can have the opposite effect, slowing economic growth and reducing job prospects. Exchange rate fluctuations can have a significant impact on your investment portfolio, even if you only hold domestic investments. For example, the strong dollar generally dampens global demand for commodities as they are priced in dollars *(Atish, 2003; Jebeniani & Trabelsi, 2022)*. This weak demand may impact domestic commodity producers' earnings and valuations, although some of the negative impact would be mitigated by the weaker local currency. A strong currency can also have an impact on sales and profits generated abroad in recent years. Of course, the impact of exchange rates on portfolio returns is well known. Investing in securities denominated in an appreciating currency may increase total returns, while investing in securities denominated in a depreciating currency may decrease total returns.

Table 7: TWO STAGES LEAST SQUARES: Monetary Policy

	(1)	(2)	(3)

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VARIABLES	IV-2SLS	IV-2SLS	IV-2SLS
Monitory Policy Independency	3.755**	1.799	3.858***
	(2.161)	(0.788)	(2.577)
Unemployment rate	-0.258**	-0.275**	0.00696
	(-2.567)	(-2.379)	(0.0843)
LnGDP	-0.418	0.252	-1.491**
	(-0.528)	(0.231)	(-2.243)
GDP_growth_annual	-0.0173	-0.0185	0.0790***
	(-0.406)	(-0.376)	(2.702)
Inflation	0.00382	-0.0292	-0.00239
	(0.291)	(-1.601)	(-0.278)
Remittances as percent of GDP	0.153***	-0.146	0.173***
	(3.107)	(-1.465)	(3.850)
Constant	8.208	12.64	46.79***
	(0.406)	(0.454)	(2.809)
Observations	737	483	489
R-squared	0.509	0.661	0.620
Cragg-Donald Wald	208.8	208.8	208.8
Stock-Yogo10%	16.38	16.38	16.38
Control variables	YES	YES	YES
Country FE	YES	YES	YES
Year FE	YES	YES	YES
Adj R2	0.460	0.615	0.568

z-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Consequently, if the impact of monetary policy on demand for durable goods is relatively strong, the investment demand of manufacturing companies should also react more strongly to monetary policy shocks. Another reason for the different impacts on business investment is the size of the external financing premium they face. Firms with less access to finance should face higher and more volatile external financing premiums. Unfortunately, we cannot measure companies' external financing premiums. However, a good indicator of access to finance is the age of the company. Younger companies generally have less access to credit, are smaller and have lower revenues. Recent evidence from the US and UK has already shown that younger firms are more responsive to monetary policy shocks (Hamiani et al., 2020; Mishkin, 2009; Zhang, 2022) the amount of money circulating in the economy and its value. The main goal of monetary policy is long-term economic growth, but the central bank can set other goals for this purpose. Therefore, the Fed's monetary policy goal is to support employment, stable prices and moderate long-term interest rates.

Table 8: TWO STAGES LEAST SQUARES: Country Financial Openness

	(1)	(2)	(3)
VARIABLES	IV-2SLS	IV-2SLS	IV-2SLS
Country Financial openness	-1.751	-0.584	-4.194***
	(-1.204)	(-0.293)	(-3.837)
Unemployment rate	-0.347***	-0.198*	-0.131
	(-3.533)	(-1.727)	(-1.571)
LnGDP	-0.122	0.976	-1.497**
	(-0.163)	(0.877)	(-2.327)
GDP_growth_annual	0.00617	0.00566	0.0866***
	(0.149)	(0.110)	(3.049)

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Inflation	0.00239	-0.0398**	0.000927
	(0.296)	(-2.059)	(0.184)
Remittances as percent of GDP	0.133***	-0.119	0.223***
	(2.704)	(-1.181)	(5.020)
Constant	3.817	-4.757	50.12***
	(0.199)	(-0.167)	(3.087)
Observations	814	522	526
R-squared	0.466	0.616	0.632
Cragg-Donald Wald	208.8	208.8	208.8
Stock-Yogo10%	16.38	16.38	16.38
Control variables	YES	YES	YES
Country FE	YES	YES	YES
Year FE	YES	YES	YES
Adj R2	0.417	0.567	0.585

z-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The stronger the openness effect, the lower the optimal tax on leverage; and when this effect is dominant, the optimal policy is in the form of an investment subsidy (Aizenman, 1987; Caglayan & Demir, 2014; Fagiolo et al., 2020; Manova, 2008; Yu & Qayyum, 2021). However, financial factors are critical to improving corporate export performance and innovation, as financial openness can ease corporate financial constraints through international capital inflows to stimulate corporate innovation. However, given the increase in cross-border capital flows globally, countries' financial openness does not promise to attract more international direct investment in our sample.

8. Conclusion

We note that the trilemma index control is still a major challenge for investors on the African continent. With some of the fastest growing economies in the world, African nations are playing an increasingly important role in the global economy. The population is young and growing rapidly, and household incomes and consumption are expected to increase. Digital and mobile access is increasing rapidly, the infrastructure gap is closing and Africa is poised for mass industrialization. In addition, all governments have taken unprecedented steps to support investors. And as business environment reforms are enacted across the continent, the prospects for investing in Africa's numerous and diverse countries are very different than they have been for decades. Despite the abundance of opportunities, doing business in Africa continues to come with real and perceived risks. Institutional and economic barriers, risk and reward imbalances, and high transaction costs can make it difficult for investors to find opportunities and close deals. However, understanding the conditions of the Trilemma Index or the impossible trinity can increase the effectiveness of macroprudential and capital control policies, their impact on the investment cycle and patterns of capital flows, while the demand for international reserves remains a challenge for key countries as more experience required in administering these policies.

9. References

1. Aizenman, J. (1987). Investment, Openness, and Country Risk. *NBER WORKING PAPER SERIES*. https://doi.org/10.3386/W2410
2. Aizenman, J. (2019). International Reserves, Exchange Rates, and Monetary Policy: From the Trilemma to the Quadrilemma. In *Oxford Research Encyclopedia of Economics and Finance*. https://doi.org/10.1093/acrefore/9780190625979.013.313

3. Aizenman, J., Chinn, M. D., & Ito, H. (2008). *Assessing the Emerging Global Financial Architecture: Measuring the Trilemma's Configurations over Time*. Place:Publisher
4. Aizenman, J., Chinn, M. D., & Ito, H. (2011). Surfing the waves of globalization: Asia and financial globalization in the context of the trilemma. *Journal of the Japanese and International Economies*, *25*(3). https://doi.org/10.1016/j.jjie.2011.06.003
5. Aizenman, J., & Ito, H. (2014). The more divergent, the better? Lessons on trilemma policies and crises for Asia. *Asian Development Review*, *31*(2). https://doi.org/10.1162/ADEV_a_00030
6. Annicchiarico, B., & di Dio, F. (2015). Environmental policy and macroeconomic dynamics in a new Keynesian model. *Journal of Environmental Economics and Management*, *69*(1). https://doi.org/10.1016/j.jeem.2014.10.002
7. Arefjevs, I., & Bogdanova, O. (2020). International Finance Trilemma as a Tool for Balanced Development of an Economy. *European Integration Studies*, *1*(14). https://doi.org/10.5755/j01.eis.1.14.26318
8. Atish, G. (2003). Exchange rate regimes: choices and consequences. *Choice Reviews Online*, *40*(11). https://doi.org/10.5860/choice.40-6524
9. Bar-Eli, M., Krumer, A., & Morgulev, E. (2020). Ask not what economics can do for sports - Ask what sports can do for economics. In *Journal of Behavioral and Experimental Economics* (Vol. 89). https://doi.org/10.1016/j.socec.2020.101597
10. Baxter, M., & Stockman, A. C. (1989). Business cycles and the exchange-rate regime. Some international evidence. *Journal of Monetary Economics*, *23*(3). https://doi.org/10.1016/0304-3932(89)90039-1
11. Caglayan, M., & Demir, F. (2014). Firm Productivity, Exchange Rate Movements, Sources of Finance, and Export Orientation. *World Development*, *54*. https://doi.org/10.1016/j.worlddev.2013.08.012
12. Calvert Jump, R., Hommes, C., & Levine, P. (2019). Learning, heterogeneity, and complexity in the New Keynesian model. *Journal of Economic Behavior and Organization*, *166*. https://doi.org/10.1016/j.jebo.2019.07.014
13. Clerc, P. (2021). The Dynamics of Unemployment and Inflation in New Keynesian Models with Two Labor Margins. *Journal of Money, Credit and Banking*, *53*(2–3). https://doi.org/10.1111/jmcb.12768
14. Connor, J. W. (1973). The neo-classical transport theory of a plasma with multiple ion species. *Plasma Physics*, *15*(8). https://doi.org/10.1088/0032-1028/15/8/003
15. da Silva, S. (2001). Chaotic exchange rate dynamics redux. *Open Economies Review*, *12*(3). https://doi.org/10.1023/A:1011181423098
16. Deng, M., & Fang, M. (2022). Debt maturity heterogeneity and investment responses to monetary policy. *European Economic Review*, *144*, 104095. https://doi.org/10.1016/J.EUROECOREV.2022.104095
17. Desai, V., & Potter, R. B. (2021). 5 New institutional economics and development. In *The Companion to Development Studies*. https://doi.org/10.4324/9780203773420-10

E-mail address: info@researchparks.org
Peer review under responsibility of Emil Kaburuan.

18. Eisner, R., & Nadiri, M. I. (1968). Investment Behavior and Neo-Classical Theory. *The Review of Economics and Statistics*, *50*(3). https://doi.org/10.2307/1937931
19. Fagiolo, G., Giachini, D., & Roventini, A. (2020). Innovation, finance, and economic growth: an agent-based approach. *Journal of Economic Interaction and Coordination*, *15*(3). https://doi.org/10.1007/s11403-019-00258-1
20. Francis, B. B., Hunter, D. M., & Kelly, P. J. (2011). Financial Market Openness and Monetary Policy Independence: Does the Impact of Monetary Policy Differ between Investable and Non-Investable Firms? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1362328
21. Hamiani, K. M., Buessings-Loercks, M., & Fleuriet, V. (2020). Monetary Policy Under an Exchange Rate Anchor. *IMF Working Papers*, *20*(180). https://doi.org/10.5089/9781513556383.001
22. Husain, A. M., Mody, A., & Rogoff, K. S. (2005). Exchange rate regime durability and performance in developing versus advanced economies. *Journal of Monetary Economics*, *52*(1). https://doi.org/10.1016/j.jmoneco.2004.07.001
23. Jebeniani, J., & Trabelsi, J. (2022). Effects of the business cycle on real exchange rate misalignments with respect to exchange rate regimes. *International Economics*, *170*, 92–102. https://doi.org/10.1016/J.INTECO.2022.02.009
24. Jeffrey A. Frankel, & Saravelos, G. (2010). Are Leading Indicators of Financial Crises Useful for Assessing Country Vulnerability? Evidence from the 2008-09 Global Crisis. In *NBER Working Paper No. 16047*.
25. Kashyap Heena. (2015). Relevance of classicaland neo-classical theories in present world. *Indian Streams Research Journal*, *5*(1).
26. Keane, W. (2019). How everyday ethics becomes a moral economy, and vice versa. *Economics*, *13*. https://doi.org/10.5018/economics-ejournal.ja.2019-46
27. Kiat, J. (2008). The effect of exchange rate and inflation on foreign direct investment and its relationship with economic growth in South Africa. *Economics and Applied Informatics*, *17*(1).
28. Kiley, M. T. (2016). Policy paradoxes in the New Keynesian model. *Review of Economic Dynamics*, *21*. https://doi.org/10.1016/j.red.2016.03.002
29. Kudryashov, N. A., & Zakharchenko, A. S. (2014). A note on solutions of the generalized Fisher equation. *Applied Mathematics Letters*, *32*(1). https://doi.org/10.1016/j.aml.2014.02.009
30. Manova, K. (2008). Credit constraints, equity market liberalizations and international trade. *Journal of International Economics*, *76*(1). https://doi.org/10.1016/j.jinteco.2008.03.008
31. Megasari, T., & Saleh, S. (2021). Determinant of FDI Inflows in OIC Countries. *International Journal of Islamic Economics and Finance (IJIEF)*, *4*(1). https://doi.org/10.18196/ijief.v4i1.9473
32. Mishkin, F. S. (2009). Globalization, macroeconomic performance, and monetary policy. *Journal of Money, Credit and Banking*, *41*(SUPPL. 1). https://doi.org/10.1111/j.1538-4616.2008.00204.x
33. Mundell, R. A. (1963). Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates. In *Science politique* (Vol. 29, Issue 4).
34. North, D. (1993). The New Institutional Economics and Development. *EconWPA Economic History*, *January*.

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Peer review under responsibility of Emil Kaburuan.

35. Obstfeld, M., Shambaugh, J. C., & Taylor, A. M. (2004). Monetary sovereignty, exchange rates, and capital controls: The Trilemma in the interwar period. *IMF Staff Papers*, *51*(SPEC. ISS.).

36. Obstfeld, M., Shambaugh, J. C., & Taylor, A. M. (2008). Financial Stability, the Trilemma, and International Reserves Maurice. *NBER Working Paper*, *14217*(April).

37. Obstfeld, M., Shambaugh, J. C., & Taylor, A. M. (2009). Financial instability, reserves, and central bank swap lines in the panic of 2008. *American Economic Review*, *99*(2). https://doi.org/10.1257/aer.99.2.480

38. Ojapinwa, T. v., & Nwokoma, N. I. (2018). Workers' Remittances and the Dutch-Disease Argument: Investigating the Relationship in Sub-Saharan Africa. *African Development Review*, *30*(3). https://doi.org/10.1111/1467-8268.12339

39. Omankhanlen, A. E. (2011). The Effect of Exchange Rate and Inflation on Foreign Direct Investment and Its Relationship with Economic Growth in Nigeria. *Economics and Applied Informatics*, *17*(1).

40. Razin, A., Rubinstein, Y., & Berglas, E. (2004). *NBER WORKING PAPER SERIES GROWTH EFFECTS OF THE EXCHANGE-RATE REGIME AND THE CAPITAL-ACCOUNT OPENNESS IN A CRISIS-PRONE WORLD MARKET: A NUANCED VIEW Growth Effects of the Exchange-Rate Regime and the Capital-Account Openness in A Crisis-Prone World Market: A Nuanced View*. http://www.nber.org/papers/w10555

41. Waldén, L. J., Meade, J. E., & Walden, L. J. (1961). A Neo-Classical Theory of Economic Growth. *Ekonomisk Tidskrift*, *63*(3). https://doi.org/10.2307/3438723

42. Yokus, A., & Yavuz, M. (2021). Novel comparison of numerical and analytical methods for fractional burger⇓fisher equation. *Discrete and Continuous Dynamical Systems - Series S*, *14*(7). https://doi.org/10.3934/DCDSS.2020258

43. Yu, Y., & Qayyum, | Muhammad. (2021). *Impacts of financial openness on economic complexity: Cross-country evidence*. https://doi.org/10.1002/ijfe.2491

44. Zhang, T. (2022). Monetary Policy Spillovers through Invoicing Currencies. *Journal of Finance*, *77*(1). https://doi.org/10.1111/jofi.13071