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DOMESTIC INVESTMENT, EXPORT, IMPORT AND ECONOMIC GROWTH IN BRAZIL: AN APPLICATION OF VECTOR ERROR CORRECTION MODEL

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Abstract: *This paper aims to investigate the nexus between domestic investment, exports, imports, and economic growth for the Brazilian economy during the period 1970-2017, using the VECM methodology. In the short-run, our empirical results pointed out that import, exports, and domestic investment cause economic growth. Also, economic growth causes exports. Exports, imports, and economic growth cause domestic investment. However, in the long-run, our results revealed that domestic investment and exports have a positive effect on economic growth. Also, imports have a negative effect on economic growth. The results recorded a positive impact of economic growth and imports on domestic investment. Exports have a negative effect on domestic investment. Finally, we record the absence of significant impact of economic growth, exports and domestic investment on imports, and economic growth, domestic investment, and imports on exports. Due to the importance of these aspects to the economic performance of Brazil, the policymakers are invited to orient these issues towards the sustainability facets to guarantee a sustained growth path.*

Keywords: Export, Import, Domestic Investment, Economic Growth, VECM, Brazil.

JEL classification: E22, F14, O16, O47, O54.

1. Introduction

The growth of any economy strongly depends on the stock of domestic capital, which constitutes one of the main driving forces of the investment and value-added creation (See. Tiba et al, 2015, Bakari and Tiba, 2019; Tiba and Frikha, 2019). The neoclassical theory considered the capital accumulation process as the driving force behind a strong economic performance. Indeed, the accumulation of the capital is a fundamental element that will finance the investment, and then the economic growth will improve.

Also, the contribution of the movements of exports and imports are recognized in the creation of wealth and national prosperity due to the positive externalities obtained from the dynamism and interactions with the foreign actors under the globalization era.

Furthermore, the impact of the exports and imports on growth is structured around two hypotheses. The first hypothesis assumes that the export is the driving force of the economy that called the export leads-growth (ELG) hypothesis. Also, it supposes that the causality direction is running from exports to growth. While the alternative hypothesis assumes that the economic growth stimulates the export which is called the Growth lead-exports (GLE). The sense of causality is running from economic growth to exports.

Regarding the linkage between the imports and economic growth, where the imports lead-growth hypothesis assumes that the imports are the driving force of the economy (ILG). Moreover, the sense of causality is running from imports to economic growth. However, the alternative one assumes growth lead-imports (GLI), and the causality direction is from growth to imports. Due to the importance of domestic investment, exports, imports, and growth, the understanding of these controversial nexuses seen as a priority, especially, for the Brazilian case, where it is one of the most emerging economic power and member of the G20.

Our current survey attempts to treat the nexus between domestic investment, exports, imports, and growth for the Brazilian economy over the period 1970-2017. For this purpose, we employ the VECM methodology. To the best of our knowledge, none of the previous studies deal with this question in the Brazilian context through the use of the VECM technique.

The rest of the paper is structured as follow: Section 2 presents the empirical literature while Section 3 furnishes data and methodology. Empirical findings sited in Section 4. In the last section, we conclude the study and set up some policy suggestions for policymakers.

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2. Literature Survey

The following Table presents a set of empirical studies that are collected during our exploitation of this research theme to inspire the realization of our empirical analysis.

Table 1 Studies related to the relationship between domestic investment, export, import and economic growth

No	Authors	Countries	Period	Methodology	Results
1	Albiman and Suleiman (2016)	Malaysia	1967-2010	Cointegration Analysis Vector Autoregression Model Granger Causality Tests	Y => DI X => DI X => M
2	Appiah (2018)	Ghana	1960 - 2015	Cointegration Analysis Auto-Regressive Distributive Lags Error Correction Model	DI # Y
3	Bakari (2017a)	Egypt	1965 - 2015	Cointegration Analysis Vector Error Correction Model Wald Tests	DI => Y LR(-) X => Y: LR (-) M => Y: LR M => Y: SR
4	Bakari (2017b)	Gabon	1980 - 2015	Cointegration Analysis Error Correction Model Wald Tests	X => Y: LR (-) DI => Y: LR (-) X => Y: SR DI => Y: SR

5	Bakari (2017c)	Sudan	1976 - 2015	Cointegration Analysis
				Error Correction Model
				Wald Tests
					DI # X # M # Y: LR
					Y => DI : SR
					M => X : SR
					Y => M : SR

6	Bakari (2018)	France	1972 - 2016	Cointegration Analysis Vector Error Correction Model	DI <=> Y: LR (-) DI => Y: SR

				Wald Tests	
7	Bakari et al (2018)	Nigeria	1981 - 2015	Cointegration Analysis Vector Error Correction Model Wald Tests	DI # X # M # Y: LR M <=> Y: SR M => DI: SR
8	Bakari and Mabrouki (2017a)	Panama	1980 - 2015	Cointegration Analysis Vector Autoregression Model Granger Causality Tests	X => Y M => Y
9	Bakari and Mabrouki (2017b)	7 South Eastern Europe Countries	2006 - 2016	Fixed Effect Model Random Effect Model Hausman Test	DI => Y X => Y M => Y: (-)

10	Bakari and Tiba (2019)	24 Asian economies	2002 - 2017	Fixed Effect Model
				Random Effect Model
				Hausman Test
					DI => Y
					M # Y
					X => Y: (-)

11	Bouchoucha and Bakari (2019)	Tunisia	1976 - 2017	Cointegration Analysis Auto-Regressive Distributive Lags Wald Tests	DI => Y: LR (-) M => Y: LR (-) X => Y : LR DI => Y : SR X => Y: SR
12	Mbulawa (2017)	Botswana	1985 - 2015	Ordinary Least Squares Vector Error Correction Model	DI => Y
13	Tang and Tan (2015)	Malaysia	1991- 2010	Cointegration Analysis Auto-Regressive Distributive Lags Vector Autoregression Model	DI <=> Y
14	Tahir & Azid (2015)	50 Developing Countries	1990 - 2009	Fixed Effect Model Random Effect Model Hausman Test	DI => Y
15	Umar-Gingo et Demireli (2018)	Ghana	1980 - 2015	Cointegration Analysis Vector Error Correction Model	DI => Y: LR (-) DI # Y: SR

Note: X means Exports, M means Imports, Y means Economic Growth, LR means Long Run, SR means Short Run, (+) means Positive

Effect and (-) means Negative Effect.

3. Econometric methodology and data source

In this study, we use the following variables: economic growth (Y), domestic investment, (DI), exports (X) and Imports (M) for the case of Brazil. All the variables are taken from the online World Development Indicators data of the World Bank. Y is the variable referring to Gross Domestic Product (Constant US $); DI is the variable referring to Gross Fixed Capital Formation (Constant US $); X is the variable referring to total exports (Constant US $); M is the variable referring to total imports (Constant US $).

Following literature on economic growth {Albiman and Suleiman (2016); Bakari (2017d); Kartikasari (2017); Bakari (2018); Bakari and Ali (2018); Fakraoui and Bakari (2019)}, we can consider the long-run and the short-run relationships between domestic investment, economic growth, exports and imports in linear logarithmic form.

$$\mathbf{Log(Y)_t = \alpha_0 + \alpha_1 Log(DI)_t + \alpha_2 Log(X)_t + \alpha_3 Log(M)_t + \varepsilon_t} \qquad \textbf{(1)}$$

The returns to scale are enclosed with domestic investment, exports and imports which are exposed by α_1, α_2 and α_3 respectively. In addition, ε is error term and t is time index.

We use recent developments in time series econometrics to analyze the short-term and long-run causal relationships between domestic investment, exports, imports, and economic growth. This approach will be done in three steps: unit root tests, Johansen cointegration tests, Granger causality tests as part of an error-correction vector model.

3.1.Unit root tests

Unit root tests identify the presence of a unit root in a series. A time series is stationary if it has neither trend nor seasonality. The enhanced Dickey-Fuller test is used for this purpose. In this test, we try to verify the null hypothesis against the alternative hypothesis.

3.2.Cointegration Analysis

The study of cointegration makes it possible to test the existence of a stable long-term relationship between two non-stationary variables, including delayed variables and exogenous variables. The analysis of cointegration makes it possible to identify the true relationship between two variables, by looking for the existence of a cointegrating vector, and by eliminating its effect if necessary. Two series x and y are cointegrated if the following two conditions are satisfied: they are assigned a stochastic trend of the same order of integration and a linear combination of these series leads to a series of the order of integration more lower. Finally, the Johansen cointegration test uses two statistics: the trace statistic and the maximum Eigenvalue. The asymptotic distributions of these statistics are nonstandard.

3.3.Vector Error Correction Model

The presence of a cointegration relationship between two variables leads to the existence of a causal relation between them in at least one direction. This causal relationship can be analyzed through the Granger causality test (Wald test), which relies on the Vector Error Correction Model. According to Granger's representation theorem, any cointegrated system implies the existence of an error-correcting mechanism that prevents variables from deviating too far from their long-run equilibrium. In addition, one of the important roles of Vector Error Correction Model is exterminating the causal relationship between all variables in the long run and in the short run.

To inspect the existence of a short-term relationship between variables, we will use the Wald Test. If the variable has a probability less than 5% in this case we can say that dependent variable cause independent variable in the short term. However, if the variable has a probability greater than 5% in this case, there is no causal relationship between variables in the short run.

To inspect whether there is a long-term equilibrium relationship in the estimation of vector error correction model (VECM), we use the method of Gauss-Newton linear regression. The coefficient of the Error Correction Term (ECT) must be negative and has a probability of less than 5%.

4. Empirical Results

Stationarity of each variable was checked through ADF with constant, constant and trend, without constant and without a trend. The below Table.2 examined the stationarity of each variable through ADF. The estimated results indicate that Y, DI, X, and M are stationary at first difference. The examined results confirm that Johansen Test can be applied with I (1) order.

Table.2 Test for Unit Test ADF

Variables	ADF Test		
	Constant	*Constant and Trend*	*None*
Log (Y)	(4.405565)*** [4.195397]***	(3.712343)** [4.631443]***	(5.823315) [3.243802]***
Log (DI)	(2.717631)* [4.602554]***	(3.267304)* [4.668510]***	(2.177443) [4.433843]***
Log (M)	(1.033659) [4.903941]***	(2.158673) [4.835945]***	(2.944798) [4.475212]***
Log (X)	(2.346542) [6.468603]***	(1.611668) [7.144465]***	(5.812467) [1.588614]

*****; ** and * denote significances at 1%; 5% and 10% levels respectively**
( ) denotes stationarity in level
[ ] denotes stationarity in first difference

Table.3 indicates the results of AIC, SC, and HQ with order test for lag selection based on VAR Model. According to the results of SC and HQ, lag zero is suitable (which is impossible), but AIC indicates that lag Seven is suitable for the model. We used AIC information criterion with indicate that lag seven is suitable for our model.

Table.3 VAR Lag Order Selection

VAR Lag Order Selection Criteria						
Lag	*LogL*	*LR*	*FPE*	*AIC*	*SC*	*HQ*
0	259.0410	NA*	3.40e-11*	-12.75205	-12.58316*	-12.69098*
1	267.0008	13.92967	5.11e-11	-12.35004	-11.50560	-12.04472
2	278.7118	18.15208	6.51e-11	-12.13559	-10.61560	-11.58601
3	290.6627	16.13363	8.51e-11	-11.93313	-9.737589	-11.13929
4	302.6809	13.82099	1.19e-10	-11.73405	-8.862950	-10.69595
5	318.4573	14.98760	1.52e-10	-11.72287	-8.176219	-10.44051
6	347.4756	21.76372	1.18e-10	-12.37378	-8.151582	-10.84717
7	394.0054	25.59140	5.06e-11	-13.90027*	-9.002521	-12.12940

*** indicates lag order selected by the criterion**
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion

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HQ: Hannan-Quinn information criterion

The results of the Johansen co-integration test for series Y, DI, X, and M are reported in Table 3. The likelihood ratio tests show that the null hypothesis of absence of co-integrating relation (R=0= can be rejected at 5% level, but the null hypothesis of the existence of at most one co-integrating relation (R<1) cannot be rejected at the 5% level. This implies that in our case there are three co-integrating equation at the 5% level. Thus, we conclude that Y, DI, X, and M are co-integrated. That is, there is a long-run relationship between economic growth, domestic investment, exports and imports for Brazil.

Table.4 Johansen co-integration test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	***Eigenvalue***	***Trace Statistic***	***Critical Value 0.05***	***Prob.****
None *	0.942665	180.3875	47.85613	0.0000
At most 1 *	0.636214	68.89280	29.79707	0.0000
At most 2 *	0.520610	29.45640	15.49471	0.0002
At most 3	0.019852	0.782020	3.841466	0.3765

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
*** denotes rejection of the hypothesis at the 0.05 level**
****MacKinnon-Haug-Michelis (1999) p-values**

Since there are 3 cointegrating equations at the 5% level, Vector Error Correction Model can be returned. The estimation of the vector error correction model (VECM) has two steps. The first is to estimate the equation of long-run equilibrium by applying Gauss-Newton linear regression. The second step is to determine the causal links between the different variables in the short term by applying the WALD test.

The equations of the vector error correction model are presented as follows:

D(DLOG(Y))= C(1)*(DLOG(Y(-1)) - 0.30743433369*DLOG(X(-1)) + 0.0921173554092*DLOG(M(-1)) - 0.479377945542*DLOG(DI(-1)) - 0.00195092631235) + C(2)*D(DLOG(Y(-1))) + C(3)*D(DLOG(Y(-2))) + C(4)*D(DLOG(Y(-3))) + C(5)*D(DLOG(Y(-4))) + C(6)*D(DLOG(Y(-5))) + C(7)*D(DLOG(Y(-6))) + C(8)*D(DLOG(Y(-7))) + C(9)*D(DLOG(X(-1))) + C(10)*D(DLOG(X(-2))) + C(11)*D(DLOG(X(-3))) + C(12)*D(DLOG(X(-4))) + C(13)*D(DLOG(X(-5))) + C(14)*D(DLOG(X(-6))) + C(15)*D(DLOG(X(-7))) + C(16)*D(DLOG(M(-1))) + C(17)*D(DLOG(M(-2))) + C(18)*D(DLOG(M(-3))) + C(19)*D(DLOG(M(-4))) + C(20)*D(DLOG(M(-5))) + C(21)*D(DLOG(M(-6))) + C(22)*D(DLOG(M(-7))) + C(23)*D(DLOG(DI(-1)))

+ C(24)*D(DLOG(DI(-2))) + C(25)*D(DLOG(DI(-3))) + C(26)*D(DLOG(DI(-4))) + C(27)*D(DLOG(DI(-5))) + C(28)*D(DLOG(DI(-6))) + C(29)*D(DLOG(DI(-7))) + C(30) (2)

D(DLOG(X)) = C(31)*(DLOG(Y(-1)) - 0.30743433369*DLOG(X(-1)) + 0.0921173554092*DLOG(M(-1)) - 0.479377945542*DLOG(DI(-1)) - 0.00195092631235) + C(32)*D(DLOG(Y(-1))) + C(33)*D(DLOG(Y(-2))) + C(34)*D(DLOG(Y(-3))) + C(35)*D(DLOG(Y(-4))) + C(36)*D(DLOG(Y(-5))) + C(37)*D(DLOG(Y(-6))) + C(38)*D(DLOG(Y(-7))) + C(39)*D(DLOG(X(-1))) + C(40)*D(DLOG(X(-2))) + C(41)*D(DLOG(X(-3))) + C(42)*D(DLOG(X(-4))) + C(43)*D(DLOG(X(-5))) + C(44)*D(DLOG(X(-6))) + C(45)*D(DLOG(X(-7))) + C(46)*D(DLOG(M(-1))) + C(47)*D(DLOG(M(-2))) + C(48)*D(DLOG(M(-3))) + C(49)*D(DLOG(M(-4))) + C(50)*D(DLOG(M(-5))) + C(51)*D(DLOG(M(-6))) + C(52)*D(DLOG(M(-7))) + C(53)*D(DLOG(DI(-1))) + C(54)*D(DLOG(DI(-2))) + C(55)*D(DLOG(DI(-3))) + C(56)*D(DLOG(DI(-4))) + C(57)*D(DLOG(DI(-5))) + C(58)*D(DLOG(DI(-6))) + C(59)*D(DLOG(DI(-7))) + C(60) (3)

D(DLOG(M)) = C(61)*(DLOG(Y(-1)) - 0.30743433369*DLOG(X(-1)) + 0.0921173554092*DLOG(M(-1)) - 0.479377945542*DLOG(DI(-1)) - 0.00195092631235) + C(62)*D(DLOG(Y(-1))) + C(63)*D(DLOG(Y(-2))) + C(64)*D(DLOG(Y(-3))) + C(65)*D(DLOG(Y(-4))) + C(66)*D(DLOG(Y(-5))) + C(67)*D(DLOG(Y(-6))) + C(68)*D(DLOG(Y(-7))) + C(69)*D(DLOG(X(-1))) + C(70)*D(DLOG(X(-2))) + C(71)*D(DLOG(X(-3))) + C(72)*D(DLOG(X(-4))) + C(73)*D(DLOG(X(-5))) + C(74)*D(DLOG(X(-6))) + C(75)*D(DLOG(X(-7))) + C(76)*D(DLOG(M(-1))) + C(77)*D(DLOG(M(-2))) + C(78)*D(DLOG(M(-3))) + C(79)*D(DLOG(M(-4))) + C(80)*D(DLOG(M(-5))) + C(81)*D(DLOG(M(-6))) + C(82)*D(DLOG(M(-7))) + C(83)*D(DLOG(DI(-1))) + C(84)*D(DLOG(DI(-2))) + C(85)*D(DLOG(DI(-3))) + C(86)*D(DLOG(DI(-4))) + C(87)*D(DLOG(DI(-5))) + C(88)*D(DLOG(DI(-6))) + C(89)*D(DLOG(DI(-7))) + C(90) (4)

D(DLOG(DI)) = C(91)*(DLOG(Y(-1)) - 0.30743433369*DLOG(X(-1)) + 0.0921173554092*DLOG(M(-1)) - 0.479377945542*DLOG(DI(-1)) - 0.00195092631235) + C(92)*D(DLOG(Y(-1))) + C(93)*D(DLOG(Y(-2))) + C(94)*D(DLOG(Y(-3))) + C(95)*D(DLOG(Y(-4))) + C(96)*D(DLOG(Y(-5))) + C(97)*D(DLOG(Y(-6))) + C(98)*D(DLOG(Y(-7))) + C(99)*D(DLOG(X(-1))) + C(100)*D(DLOG(X(-2))) + C(101)*D(DLOG(X(-3))) + C(102)*D(DLOG(X(-4))) + C(103)*D(DLOG(X(-5))) + C(104)*D(DLOG(X(-6))) + C(105)*D(DLOG(X(-7))) + C(106)*D(DLOG(M(-1))) + C(107)*D(DLOG(M(-2))) + C(108)*D(DLOG(M(-3))) + C(109)*D(DLOG(M(-4))) + C(110)*D(DLOG(M(-5))) + C(111)*D(DLOG(M(-6))) + C(112)*D(DLOG(M(-7))) + C(113)*D(DLOG(DI(-1))) + C(114)*D(DLOG(DI(-2))) + C(115)*D(DLOG(DI(-3))) + C(116)*D(DLOG(DI(-4))) + C(117)*D(DLOG(DI(-5))) + C(118)*D(DLOG(DI(-6))) + C(119)*D(DLOG(DI(-7))) + C(120) (5)

The equation of long-run equilibrium is presented as follows:

$$Log(Y)= 0.001951 + 0.479378Log(DI) + 0.307434Log(X) - 0.092117Log(M) \qquad (6)$$

Table 5: Estimation of VECM (Results of causality in Long run and short run)

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	Log (Y)	Log (M)	Log (X)	Log (DI)
Log (Y)	-	(0.1840)	(0.0834)*	(0.0022)***
Log (M)	(0.0509)**	-	(0.5953)	(0.0124)**
Log (X)	(0.0018)***	(0.2769)	-	(0.0668)*
Log (DI)	(0.0160)**	(0.1217)	(0.4255)	-
ECT	[-7.553584]***	[-13.24822]	[-3.168606]	[-11.55755*]

; ** and * indicate significance at 1%, 5% and 10%, respectively

( ) denotes the value of the probability of the variables in the short term

[ ] denotes the significance of long-term co-integration equations

The estimation of the vector error correction model shows the following results:

In the long run:

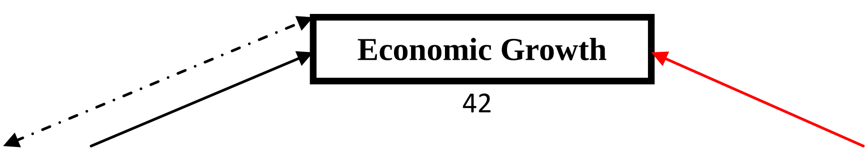
- ✓ Domestic investment and exports have a positive effect on economic growth.
- ✓ Imports have a negative effect on economic growth.
- ✓ Economic growth and imports have a positive effect on domestic investment.
- ✓ Exports have a negative effect on domestic investment.
- ✓ Economic growth, exports, and domestic investment don't have any effect on imports.
- ✓ Economic growth, domestic investment, and imports don't have any effect on exports.

In the short run

- ✓ Imports, exports, and domestic investment cause economic growth.
- ✓ Economic growths cause exports.
- ✓ Exports, imports, and economic growth cause domestic investment.

We have summarized these results in Graph 1 below:

Graph.1: The links between the four variables



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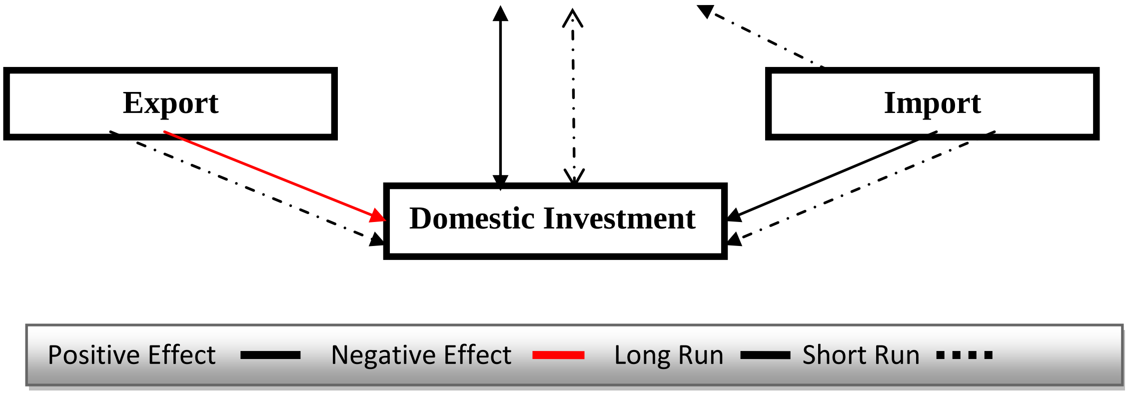

To verify the credibility and the robustness of our error vector correction model, we apply a set of diagnostic tests. These are the heteroscedasticity tests and the residual autocorrelation test. The results of various diagnostic tests are given in the lower segment of Table 6. The diagnostic tests show that the estimation results are acceptable and that the model meets the MCO application conditions. Indeed, the probabilities of heteroscedasticity tests and the residual autocorrelation test are greater than 5%.

Table.6 Diagnostics tests

Log (Y)				**Log (X)**			
Breusch-Godfrey Serial Correlation LM Test:				*Breusch-Godfrey Serial Correlation LM Test:*			
F-statistic	0.928774	Prob. F(2,7)	0.4388	F-statistic	1.215117	Prob. F(2,7)	0.3524
Obs*R-squared	8.178831	Prob. Chi-Square(2)	0.0167	Obs*R-squared	10.05056	Prob. Chi-Square(2)	0.0066
Heteroskedasticity Test: Breusch-Pagan-Godfrey				*Heteroskedasticity Test: Breusch-Pagan-Godfrey*			
F-statistic	0.254462	Prob. F(36,2)	0.9714	F-statistic	1.647106	Prob. F(36,2)	0.4496
Obs*R-squared	32.01114	Prob. Chi-Square(36)	0.6588	Obs*R-squared	37.72748	Prob. Chi-Square(36)	0.3902
Scaled explained SS	2.167196	Prob. Chi-Square(36)	1.0000	Scaled explained SS	1.602586	Prob. Chi-Square(36)	1.0000
Heteroskedasticity Test: Harvey				*Heteroskedasticity Test: Harvey*			
F-statistic	0.470240	Prob. F(36,2)	0.8660	F-statistic	1.702904	Prob. F(36,2)	0.4389
Obs*R-squared	34.87926	Prob. Chi-Square(36)	0.5218	Obs*R-squared	37.76786	Prob. Chi-Square(36)	0.3884
Scaled explained SS	16.81432	Prob. Chi-Square(36)	0.9973	Scaled explained SS	19.06252	Prob. Chi-Square(36)	0.9908
Heteroskedasticity Test: Glejser				*Heteroskedasticity Test: Glejser*			
F-statistic	0.314654	Prob. F(36,2)	0.9464	F-statistic	1.587372	Prob. F(36,2)	0.4616
Obs*R-squared	33.14746	Prob. Chi-Square(36)	0.6050	Obs*R-squared	37.68122	Prob. Chi-Square(36)	0.3922
Scaled explained SS	7.872062	Prob. Chi-Square(36)	1.0000	Scaled explained SS	7.370156	Prob. Chi-Square(36)	1.0000
Heteroskedasticity Test: ARCH				*Heteroskedasticity Test: ARCH*			
F-statistic	0.900587	Prob. F(1,36)	0.3490	F-statistic	1.208840	Prob. F(1,36)	0.2789
Obs*R-squared	0.927419	Prob. Chi-Square(1)	0.3355	Obs*R-squared	1.234544	Prob. Chi-Square(1)	0.2665

Log (M)				Log (DI)			
Breusch-Godfrey Serial Correlation LM Test:				*Breusch-Godfrey Serial Correlation LM Test:*			
F-statistic	0.663073	Prob. F(2,7)	0.5449	F-statistic	0.870781	Prob. F(2,7)	0.4595
Obs*R-squared	6.211721	Prob. Chi-Square(2)	0.0448	Obs*R-squared	7.769885	Prob. Chi-Square(2)	0.0205
Heteroskedasticity Test: Breusch-Pagan-Godfrey				*Heteroskedasticity Test: Breusch-Pagan-Godfrey*			
F-statistic	1.303012	Prob. F(36,2)	0.5284	F-statistic	0.237973	Prob. F(36,2)	0.9771
Obs*R-squared	37.40518	Prob. Chi-Square(36)	0.4044	Obs*R-squared	31.61854	Prob. Chi-Square(36)	0.6770
Scaled explained SS	2.883968	Prob. Chi-Square(36)	1.0000	Scaled explained SS	2.027724	Prob. Chi-Square(36)	1.0000
Heteroskedasticity Test: Harvey				*Heteroskedasticity Test: Harvey*			
F-statistic	1.569472	Prob. F(36,2)	0.4653	F-statistic	0.592470	Prob. F(36,2)	0.8008
Obs*R-squared	37.66669	Prob. Chi-Square(36)	0.3929	Obs*R-squared	35.65651	Prob. Chi-Square(36)	0.4848
Scaled explained SS	28.84370	Prob. Chi-Square(36)	0.7958	Scaled explained SS	34.48312	Prob. Chi-Square(36)	0.5408
Heteroskedasticity Test: Glejser				*Heteroskedasticity Test: Glejser*			
F-statistic	1.871071	Prob. F(36,2)	0.4094	F-statistic	0.288570	Prob. F(36,2)	0.9580
Obs*R-squared	37.87541	Prob. Chi-Square(36)	0.3838	Obs*R-squared	32.70385	Prob. Chi-Square(36)	0.6262
Scaled explained SS	10.50250	Prob. Chi-Square(36)	1.0000	Scaled explained SS	8.099435	Prob. Chi-Square(36)	1.0000
Heteroskedasticity Test: ARCH				*Heteroskedasticity Test: ARCH*			
F-statistic	0.027791	Prob. F(1,36)	0.8685	F-statistic	0.504870	Prob. F(1,36)	0.4819
Obs*R-squared	0.029312	Prob. Chi-Square(1)	0.8641	Obs*R-squared	0.525548	Prob. Chi-Square(1)	0.4685

5. Conclusion

We attempt to treat the nexus between domestic investment, exports, imports, and economic growth for the emerging power of South America the Brazilian case over the period 1970-2017. In our framework, we use the VECM technique.

The short-run analysis pointed out that imports, exports, and domestic investment cause economic growth. The findings outline that economic growth cause exports. Finally, the highlights reveal that exports, imports, and economic growth cause domestic investment.

In the long-run, our results pointed out a positive influence of the domestic investment and exports on economic growth. However, the imports exert a negative impact on economic growth. Also, the short-run findings recorded that economic growth and imports have positive effect on domestic investment. Moreover, the results revealed a negative impact of exports on domestic investment in the Brazilian economy. However, economic growth, exports, and domestic investment have no significant impact on imports. Also, economic growth, domestic investment, and imports have no significant impact on exports.

From this outlook, our results pointed out the importance of exports, importance, and domestic investment to provide the phenomenal economic performance of the emerging economy such as Brazil as one of the G20 member States. Hence, the importance of the contribution of exports, imports, and domestic investment in economic growth following the neoclassical model. Besides, Brazil is invited to orient their exports, importance, and domestic investment towards sustainable goods and practices under the Sustainable Development Goals (SDGs) background of the United Nations.

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