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The role of investment tunnels in influencing the trade balance in Iraq (2010-2022)

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Abstract
This research aims to study and understand investment spending and its impact on the trade balance, as investment spending is considered an effective fiscal policy that plays a significant role in boosting economic activity, expanding and establishing infrastructure projects for the economy, and increasing productivity. It also plays a role in improving the export side of the trade balance and reducing imports, thus significantly contributing to achieving balance in the trade balance. The study starts from the hypothesis of whether there is a positive relationship between the study variables, represented by investment spending and the trade balance in Iraq for the period (2010-2022). It also aims to shed light on the reality of investment spending in Iraq and its impact on the trade balance. The research concludes with the most important recommendation to use various and diverse regulatory policies on investment spending, in order to ensure that it reaches its investment goals and to eliminate the degree of deviation that may occur.

Keywords: Iraq, Investment expenditure, exports, imports, trade balance.

Introduction
Investment spending plays an important role in balancing the trade balance, as it represents a balance between exports and imports. Investment spending contributes to enhancing productive capacity in exporting goods, which in turn will lead to increased financial returns for the state in hard currencies. It also helps reduce the volume of imports, contributing to increased production of various goods and services. Investment spending is considered one of the important tools of fiscal policy used to direct economic activity towards growth across all productive sectors. Additionally, the impact of investment spending is positive on the Gross Domestic Product (GDP) due to its effective role in economic activity. Investment spending plays a significant role in the Iraqi economy and contributes to achieving overall balance in the trade balance.

Importance of studying
The importance of the research lies in clarifying the real effects of the relationship between investment spending and the trade balance. This study aims to address the structural imbalance of the trade balance and tackle these imbalances, as well as their impact on society. Additionally, this study seeks to demonstrate the extent to which a balance can be achieved between the trade balance and investment spending, and to analyze the reality of investment spending in comparison to the economic reality of Iraq.

Study problem
The research problem lies in the impact that investment spending can have on achieving balance in the trade balance, as it contributes to reducing the negative effects of the imbalance between exports and imports in the Iraqi trade balance, which suffers from structural imbalances in both exports and imports, and the extent to which these effects reflect on society.?

Study hypothesis
The research is based on a fundamental hypothesis that states:

Is there a positive relationship between the study variables, represented by investment spending, and the trade balance in Iraq during the period? (2010-2022).

Study goal:
The research aims to identify the reality of investment spending, as well as to measure and analyze the relationship between investment spending and the trade balance in Iraq for the period. (2010-2022).

Scientific study methods
In order to prove the research hypothesis, achieve its objectives, and obtain results that serve the research, the study relied on the descriptive method and the inductive method, in addition to the quantitative (statistical) approach to understand the relationship between the research variables.

Limits of the study
The spatial boundaries of the research are the study of the Iraqi economy, while the temporal boundaries are represented by the duration. (2010-2022).

Structure of the study paper
The research is divided into three main axes. The first axis includes the conceptual framework of investment spending, while the second axis encompasses the conceptual framework of the trade balance. The third axis addresses the impact of the relationship between investment spending and the trade balance in Iraq during the specified period. (2010-2022).

Axis One: The Conceptual Framework of Investment Expenditure

The concept of investment expenditure
Investment expenditure is defined as the spending on operations related to capital formation, such as purchasing goods and services, and in investment projects like constructing dams or building production units that achieve self-sufficiency in importing goods and services (Najm al-Din *et al*., 2019: 22) [12].
Investment expenditure is also defined as the sacrifice of a certain financial outlay in specific investment projects that will create a financial difference in the future, contributing to an increase in gross domestic product and national income (Ayouhat: 18:2005) [1].

The importance of investment spending
Investment spending is of great importance to the economy as a whole and in improving the economic situation. Here are some of its main advantages (Al-Kubaisi and Al-Obaidi: 25, 2017) [10]:

1. Increasing production and productive capacity: Investing in various projects and industries leads to an increase in the productive capabilities of the economy and creates additional productive capacity.
2. Stimulating economic growth: Investment in infrastructure and capital industries contributes to increasing aggregate demand and stimulating long-term economic growth.
3. Creating job opportunities: New investments lead to the direct creation of new job opportunities in projects or indirectly in related sectors.
4. Transfer and development of technology: Investing in modern projects contributes to the transfer and application of advanced technology and technical knowledge.
5. Diversifying the economy and increasing productivity: Investing in new areas leads to diversifying the economic structure and enhancing productivity.
6. Increasing exports and improving the trade balance: Investing in export industries boosts exports and enhances the country's trade balance.
7. Improving income and wealth distribution: Investing in productive and service projects contributes to enhancing income and the fair distribution of wealth.

Objectives of investment spending:
There are several main objectives of capital expenditure, which are as follows (Ayyab: 25, 2010) [7].

1. **Achieving economic growth:** Investing in productive projects and infrastructure leads to increased production and productivity, contributing to sustainable economic growth.
2. **Finding job opportunities:** Investing in new projects and expanding existing ones leads to the creation of new job opportunities, which contributes to reducing unemployment rates.\
3. **Improving the standard of living:** Increasing production and productivity, and providing job opportunities, lead to a rise in income levels and individual well-being.
4. **Achieving social development:** Investing in educational, health, and infrastructure projects contributes to improving social services and elevating society.
5. **Improving competitiveness and export capacity:** Investing in technology and productivity development enhances the competitiveness of goods and services, thereby increasing export capacity.
6. **Achieving self-sufficiency:** Investing in productive and agricultural projects leads to achieving self-sufficiency in goods and services, and reducing reliance on imports.
7. **Achieving economic stability:** Investing in various projects leads to diversification of production and exports, which reduces the economy's dependence on a single source of income and achieves economic stability.

Types of investment expenditure
The functional classification divides investment expenditures, providing a clear picture of the investment landscape of the state, distinguishing between the state's investment expenditures and capital formation. Among the relevant productive sectors are: hydrocarbons, manufacturing industries, mining and energy, agriculture and irrigation, and other productive services. Each sector is divided into sub-sectors, which in turn are broken down into specific activities that fall within the national economic activities, characterized by precise definable features. The allocation of funds to branches and activities is subject to regulatory competencies. Additionally, investment spending can be divided into two types: (Qusay and Adnan: 19, 2019) [9].

1. **Direct investment spending:** This type consists of various branches of production, as it involves establishing large projects such as industrial and agricultural ones, etc. Which results in goods and

services, and the increase in its production will lead to an increase in the gross national product. It will also contribute to rising inflationary pressures through an increase in total supply and an increase in exports, which will enhance the trade balance.

2. **Indirect investment spending:** This refers to the amounts allocated for establishing essential production structures and necessary foundational infrastructure to stimulate economic activity. It will lead to an increase in production, as the government requires a long period to establish such investments, which fall under its responsibility rather than that of the private production sector.

Axis Two: The Conceptual Framework of the Trade Balance

The concept of the trade balance

The trade balance is defined as the balance of commercial transactions (purchases and sales of goods and services) of a country, represented by exports and imports (Hashish and Shahab: 55, 2003) [3].

It is known as "the difference between the monetary value represented by the currency of the country and the value of exports and imports with another country over a specific period of time" (Khalaf: 234, 2011) [5].

The importance of the trade balance

The importance of the trade balance lies in its reflection of a country's international economic relations, as it serves as a helpful tool through which one can gauge the level of development of the national economy in terms of the volume of trade exchanges. Moreover, it is considered the most significant economic indicator and the primary benchmark for the status of a country's foreign trade. The trade balance also represents the most crucial component of the balance of payments through its connection to exported and imported goods and services. It allows for the analysis of the commodity structure of exports and imports based on the types of materials imported and exported, as well as the degree of diversification in the country's productive activities.

Spending on research and development

The term "investment in research and development" refers to the practice of allocating resources (both monetary and human) to advance understanding and proficiency in a certain area. New discoveries and advances in research and development can help improve products, services, and processes, which in turn contribute to economic growth and innovation. Countries and businesses that consistently rank high in terms of economic prosperity tend to be heavy philanthropists when it comes to funding R&D. A lot of money goes into research, studies, and tests so we can find new ideas and make our goods and processes better. Investing in R&D has the potential to pay off in the form of innovative products and services, higher quality and efficiency, lower costs, and more market competitiveness. Investing in R&D can boost societal scientific and economic advancement by creating new technologies employed in a variety of industries. A country's or a company's interest, strategy, and priorities determine the amount of investment in R&D. Some nations set aside substantial funds for R&D because they see it as an important part of their national strategy, and large corporations also set aside substantial funds to invest in R&D so that they can stay ahead of the competition. To sum up, spending money on R&D is essential for expanding human understanding, creating new technologies, and driving economic and scientific advancement in many different sectors.

Components of the trade balance

The trade balance consists of exports and imports, which have taken on multiple concepts as they represent all types of goods and services that are exported or imported, as follows.

a) **Exports:** They are defined as that portion of the Gross Domestic Product (GDP) sold to the outside world, which represents a part of the demand for GDP. Exports are also defined as goods, services, and capital assets sold to foreign countries, moving from the countries that produce them. They can be in the form of goods and services flows, and they may also include flows of capital assets (Sakhri, 2005: 130) [6].

b) **Imports:** It is defined as that part of the national output of other countries, which is used within these countries through the flow of imported goods and services from outside their borders. These goods are sold to citizens within the country, and the value of these goods is accounted for in favor of the foreign state producing them. Imports of goods and services can also be defined as all goods and services provided by non-residents to residents in exchange for payment. An increase in imports will lead to a decrease in demand for local goods and services; therefore, it is subtracted from the value of the Gross Domestic Product, which indicates the production generated within the country's borders. Analyzing the commodity structure of imports is important for clarifying the nature of the development of the national economy and the extent of its connection and dependence on foreign entities.

Balance and imbalance in the trade balance

Although trade imbalances occur constantly and are quite common, we find that a state of equilibrium is rarely achieved in reality. All countries around the world strive to reach a balance in their trade by restricting their imports as much as possible and increasing their exports in order to attain a state of equilibrium, which is the condition that ensures economic stability.

First: Balance in the Trade Balance: The balance in the trade balance accounts refers to the equality of both the credit and debit sides. In other words, it means that the obligations owed by a country to other countries are equal to the obligations of that country towards the outside world. More broadly, it means that exports are equal to imports. This state of balance implies the stability of local prices, which in turn achieves internal balance. As a result of this balance, exchange rates will tend to stabilize, thereby achieving external balance and ultimately reaching a state of internal and external economic equilibrium.

Secondly: The imbalance in the trade balance: The imbalance in the trade balance is one of the consequences of economic cycles, which means that the liabilities side exceeds the assets side. This increase can either be in the rights of the country resulting from receivables in other countries, referred to as a surplus, or when the liabilities side surpasses the assets side in the balance, known as a

deficit, which occurs when the obligations owed by the country to other countries exceed the receivables (Farid, 2017:121) [8].

The third axis: The impact of the relationship between investment spending and the trade balance in Iraq during the period. (2010-2022).

Defining the model variables

The standard model includes three economic variables, where the independent variable is investment spending, while the two dependent variables are exports and imports. Table (1) illustrates the variables used, their symbols, and their types.

Table 1: Description of the research variables

Its type	Code	Variable name
Independent	X1	Investment spending
Dependent	Y1	Exports
Dependent	Y2	Imports

Source: Table prepared by the researcher.

Results of the stability test for time series

We will find the stability test of the research variables using the (Eviews12) program in order to determine whether the variables are stable or unstable, and whether there is a unit root or not. It is essential to test for stability before estimating the standard model to address the issue of spurious regression. Additionally, stable variables return to a state of equilibrium in the long term. Therefore, after testing the stability of the time series, we obtained the following results:

Table 2: Results of the Augmented Dickey-Fuller (ADF) Test for Research Variables at Level

Unit root test table (ADF), at level				
With Constant	Variables	X1	Y1	Y2
	T-Statistic	1.8699-	1.0308-	1.6163-
	Prob.	0.3435	0.7355	0.4671
	Morale level	No	No	No
With Constant & Trend	T-Statistic	1.9663-	1.3770-	2.6878-
	Prob.	0.6053	0.8560	0.2458
	Morale level	No	No	No
Without Constant & Trend	T-Statistic	0.3669-	0.6293	0.9906-
	Prob.	0.5475	0.8491	0.2844
	Morale level	No	No	No
Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant				

Source: Prepared by the researcher based on the outputs of the (Eviews12) program.

Through Table 2, we observe that the variables are not stationary at the level according to the Dickey-Fuller test.

Table 3: Results of the Augmented Dickey-Fuller (ADF) Test for the Research Variables at the First Difference

Unit root test table (ADF), at first difference				
With Constant	Variables	**d(X1)**	**d(Y1)**	**d(Y2)**
	T-Statistic	6.9434-	7.0703-	6.9579-
	Prob.	0.0000	0.0000	0.0000
	Morale level	***	***	***
With Constant & Trend	T-Statistic	6.8715-	7.0789-	6.8860-
	Prob.	0.0000	0.0000	0.0000
	Morale level	***	***	***
Without Constant & Trend	T-Statistic	7.0000-	-7.0000	-7.0000
	Prob.	0.0000	0.0000	0.0000
	Morale level	***	***	***
Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant				

Source: Prepared by the researcher based on the outputs of the (Eviews12) program

As shown in Table 3, all variable data stabilized upon taking the first difference, according to the Augmented Dickey-Fuller test. From this point, we can apply the Autoregressive Distributed Lag (ARDL) approach, as all research variables stabilized at the first difference.

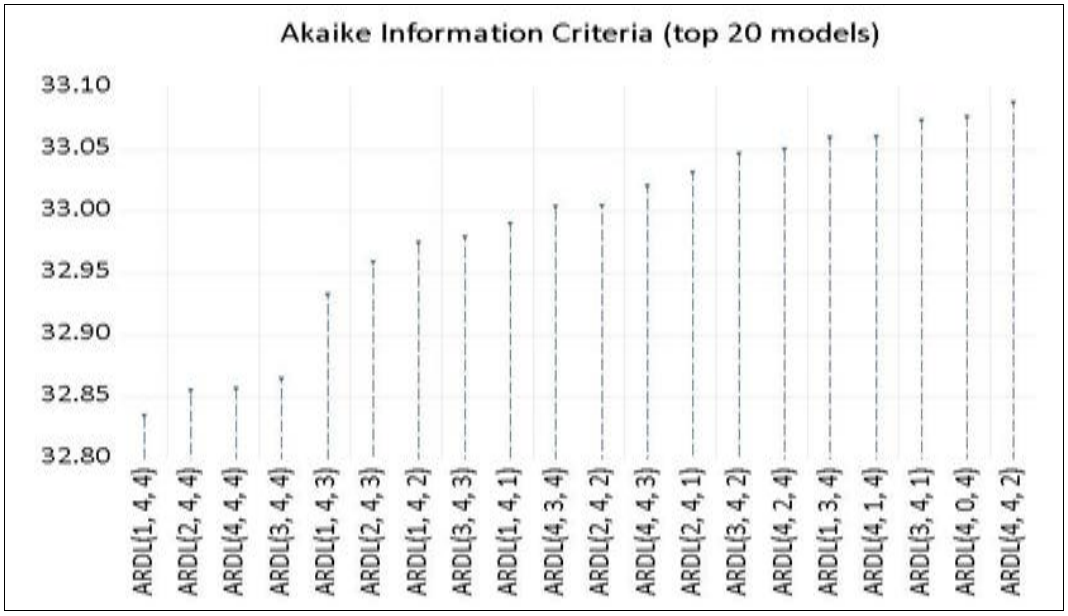
The preliminary assessment of the model

Table 4 illustrates the results of estimating the ARDL model for the relationship between investment spending and the trade balance represented by exports and imports. (2010-2022).

Table 4: Preliminary estimation of the (ARDL) model for the relationship between the research variables.

Dependent Variable: X1 **Method:** ARDL **Selected Model:** ARDL (1, 4, 4)				
Variable	**Coefficient**	**Std. Error**	**Std. Error**	**Prob.***
Y1(-1)	0.098932-	0.036588	2.703919-	0.0106
Y2(-1)	0.255270	0.071807	3.554932	0.0010
X1(-1)	0.600375	0.079238	7.576850	0.0000
C	12933048-	2721814	4.751629-	0.0000
0.915608	0.915608	Mean dependent var	22378986	
0.889821	0.889821	S.D. dependent var	8842535	
2935116	2935116	Akaike info criterion	32.83471	
3.10E+14	3.10E+14	Schwarz criterion	33.30251	
776.0330-	776.0330-	Hannan-Quinn criter.	33.01149	
35.50730	35.50730	Durbin-Watson stat	1.753988	
Prob (F-statistic)	0.00000			

Source: Prepared by the researcher based on the outputs of the (Eviews12) program.



Source: Prepared by the researcher based on the outputs of the (Eviews12) program.

Fig 1: Shown the optimal time lag for the study variables' connection

It is evident from the results of Table 4 and Figure 1 that the optimal lag period for the ARDL model is (5, 3, 4), to clarify the relationship between investment spending and the trade balance, according to the AIC criterion. The coefficient of determination reached (0.91), which means that the independent variable affects the dependent variable by (91%), while the remaining (9%) is the effect of other variables not included in the model. When comparing the adjusted coefficient of determination with the Durbin-Watson stat, we find that it is lower, with the adjusted coefficient of determination being (0.88) and the Durbin-Watson stat being (1.75). This indicates that there is no spurious regression in the estimated model, allowing us to find the long-term relationship between the research variables.

Cointegration test results

In order to find the long-term relationship between the independent variable (investment spending) and the two dependent variables (exports and imports of the trade balance), the F-Statistic was calculated through the cointegration test, and Table 5 shows the results of the boundary test.

Table 5: Results of the research variables' boundary test are presented

Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	8.862132	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

Source: Prepared by the researcher based on the outputs of the (Eviews12) program.

We observe that the calculated Fisher statistic (F) value reached (8.862132), which is greater than both the upper and lower thresholds at a significance level of (10%). This indicates the presence of a cointegrating relationship between the dependent variables and the independent variable. We proceed to estimate the short-term and long-term relationships, as well as the error correction term. Between the research variables.

Table 6: Findings from predicting the research variables' short-term responses

Error Correction Regression				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(Y1(-1))	-0.111894	0.030509	-3.667516	0.0008
D(Y2(-1))	-0.153718	0.062433	-2.462119	0.0187
Coint Eq (-1)*	-0.399625	0.064487	-6.196981	0.0000

Source: Prepared by the researcher based on the outputs of the (Eviews12) program.

From round number 6, it is evident that the value of the error correction coefficient has reached (0.399-) = (CointEq(-1)) for this model, with a probability value that has a very high significance level of (Prob=0.0000). This explains the existence of a dynamic relationship and an automatic error correction mechanism in the short term towards equilibrium in the long term, due to its negative sign and high significance of its probability value. This indicates the possibility of correcting (0.399-) of the errors arising from fluctuations in the independent variable in the short term to achieve equilibrium in the long term. This means that exports and imports for the trade balance require approximately two years and five months to reach its equilibrium value in the long term.

Table 7: Displays the best guess for the research variables' long-term connection.

Long run coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Y1	0.397538	0.057500	6.913693	0.0000
Y2	0.400376	0.082160	4.873143	0.0000
C	-32362943	7510288	-4.309148	0.0001
EC = X1-(0.3975*Y1 + 0.4004*Y2-32362943.1592)				

Source: Prepared by the researcher based on the outputs of the (Eviews12) program.

Through Table 7, the results of estimating the long-term relationship show a significant inverse relationship at a level of less than (1%) between investment spending and both exports and imports in the Iraqi trade balance during the research period. This aligns with what economic theory suggests.

Findings from the homoscedasticity test and autocorrelation

Table 8: Shows the outcomes of the research variables' auto-correlation test.

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.567743	Prob. F (1,35)	0.4562
Obs*R-squared	0.766191	Prob. Chi-Square (1)	0.3814

Source: Prepared by the researcher based on the outputs of the (Eviews12) program.

It is evident from Table 8 that the value of the chi-square probability, which is (0.4562), indicates our acceptance of the null hypothesis that assumes there is no problem of serial autocorrelation in the model, and the rejection of the alternative hypothesis which asserts that the model suffers from the problem of serial autocorrelation of errors, as it is greater than the significance level of (5%).

Table 9: Relationship between study variables tested for non-stationarity and homogeneity of variance

Heteroskedasticity Test: ARCH			
F-statistic	0.722238	Prob. F (1,45)	0.3999
Obs*R-squared	0.742422	Prob. Chi-Square (1)	0.3889

Source: Prepared by the researcher based on the outputs of the (Eviews12) program.

It is evident in Table 9 that the probability value (Prob) for the chi-square statistic reached (0.3999), which explains our acceptance of the null hypothesis stating that the model errors have constant variance and that there is no issue with the research model. We rejected the alternative hypothesis indicating that the model errors are heteroscedastic, as it exceeds the significance level of (5%).

Conclusions and Suggestions

From the information given above, we derive the following conclusions.

Conclusions

1. Through the results of the stability test, we find that the time series for the two variables are unstable at the original level; however, after taking the first difference of both, we achieve stability.
2. The results of the standard analysis demonstrated a negative relationship and a significant positive effect in the short term between the independent variable of investment spending and the two dependent variables of exports and imports for the trade balance in Iraq during the period. (2010-2022).
3. The results of the standard analysis demonstrated a negative relationship and a significant effect in the long term between investment spending and exports and imports in Iraq's trade balance during the period. (2010-2022).
4. The results have shown a general decline in investment spending on the aspects of exports and imports in the Iraqi trade balance during the research period.
5. The results have shown that the rate of investment spending on the trade balance is weak, especially in relation to exports, which leads to an increase in the volume of imports during the research period.
6. The investment spending policy is an effective tool for improving or enhancing the capacity of the Iraqi trade balance, as the government should increase investment spending even further.

Suggestions

1. The government should increase the allocations for investment spending in the general budget, as it plays an effective role in the returns of the gross national product.
2. The necessity for an increase in investment spending arises because investment spending leads to an increase in state revenues in the long term, as well as working

towards diversifying the sources of funding for the public budget.
3. Using various and diverse regulatory policies on investment spending to ensure it reaches the investment goal and to eliminate the degree of deviation present.
4. Directing investment spending to support and reform the trade balance, as it plays a role in providing the country with foreign currency that comes from exports.

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Appendices

Imports (Billion Dinars)	Exports (Billion Dinars)	Investment expenditure (Billion Dinars)	The years
55232658	63880713	16130866	2010
60316542	96531318	17832113	2011
73980251	113151788.2	29350952	2012
39057185.3	108514489.6	40380750	2013
43261711.1	103714534	36731844	2014
48578232.7	67192475.7	18584676	2015
57353324.3	55352469	15894009	2016
37362218.7	75180282.6	16464461	2017
43804511.1	109726005.5	13820189	2018
24803819.7	105083227.8	24422523	2019
18390722.9	60229946	15216488	2020
20438162.8	121560002.4	13322700	2021
31990783.2	180910609.3	26527130	2022

The Central Bank of Iraq-Economic Annual Reports for Various Years (2010-2022)

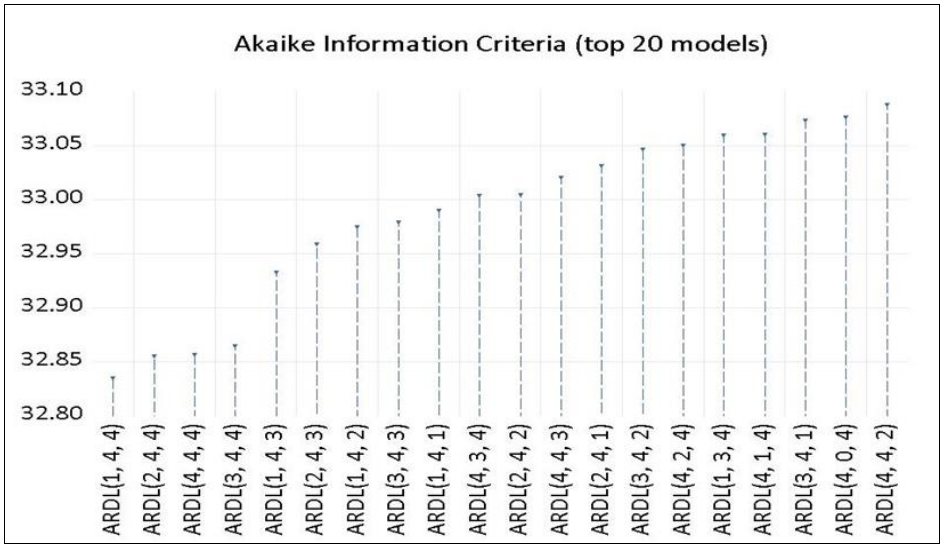
UNIT ROOT TEST RESULTS TABLE (ADF)
Null Hypothesis: the variable has a unit root

		At Level		
		X1	Y1	Y2
With Constant	t-Statistic	-1.8699	-1.0308	-1.6163
	Prob.	*0.3435* n0	*0.7355* n0	*0.4671* n0
With Constant & Trend	t-Statistic	-1.9663	-1.3770	-2.6878
	Prob.	*0.6053* n0	*0.8560* n0	*0.2458* n0
Without Constant & Trend	t-Statistic	-0.3669	0.6293	-0.9906
	Prob.	*0.5475* n0	*0.8491* n0	*0.2844* n0
		At First Difference		
		d(X1)	d(Y1)	d(Y2)
With Constant	t-Statistic	-6.9434	-7.0703	-6.9579
	Prob.	*0.0000* ***	*0.0000* ***	*0.0000* ***
With Constant & Trend	t-Statistic	-6.8715	-7.0789	-6.8860
	Prob.	*0.0000* ***	*0.0000* ***	*0.0000* ***
Without Constant & Trend	t-Statistic	-7.0000	-7.0000	-7.0000
	Prob.	*0.0000* ***	*0.0000* ***	*0.0000* ***

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Y1	0.397538	0.057500	6.913693	0.0000
Y2	0.400376	0.082160	4.873143	0.0000
C	-32362943	7510288.	-4.309148	0.0001

EC = X1 - (0.3975*Y1 + 0.4004*Y2 - 32362943.1592)



F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	8.862132	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5