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The impact of indirect taxes on the total fixed capital formation (capital formation) in Iraq for the period (2003-2020)

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Abstract

The research aims to examine the impact of indirect taxes on the gross fixed capital formation in Iraq during the studied period. Accordingly, the research hypothesis was formulated, stating that indirect taxes exert a weak inverse effect on fixed capital formation in Iraq. The inductive approach was adopted alongside statistical methods to achieve the desired research outcomes. The analysis concluded that indirect taxes exert a weak inverse effect on the gross fixed capital formation within the Iraqi economic system during the studied period (2003-2020). Consequently, the research recommends the establishment of a clear vision and a long-term strategy to mitigate the negative impact of indirect taxes on gross fixed capital formation. This can be achieved by restructuring tax laws and systems to support sectors contributing to capital formation, such as imposing taxes on imports of locally produced goods, reducing or regulating income taxes, or redirecting tax revenues toward productive projects.

Keywords: Indirect taxes, gross fixed capital formation

Introduction

In our contemporary world, taxes, in their various forms, serve as a fundamental pillar for financing the public budget of any state. This role has grown increasingly important as governments expand and diversify their activities across multiple dimensions. Consequently, most countries focus on strengthening their tax systems as they pursue economic diversification and aim to achieve their objectives (social, economic, political, and sovereign). Additionally, taxes function as a tool of economic policy to guide the economy toward specific objectives depending on the desired outcomes. In Iraq, government revenues heavily rely on a single, exhaustible resource, often referred to in economic terms as a "rentier economy." This dependency coincides with a weakened tax system plagued by inefficiencies, inconsistencies, and a lack of alignment with contemporary economic advancements. As a result, the tax system has failed to meet its intended objectives, such as income redistribution and other economic goals. This research particularly focuses on indirect taxes, which have not achieved their intended outcomes.

Research Problem

The inefficiency of the tax system and the failure to implement modern economic approaches have yielded results contrary to the intended tax objectives in the Iraqi economy. While the Iraqi tax system has existed for a long time, it has not evolved to meet current needs. Using the economic objective of indirect taxes as a foundation, the research problem is framed as follows:

What is the role of indirect taxes in influencing gross fixed capital formation in the Iraqi economy during the period 2003-2020?

Research Hypothesis

The hypothesis of this research is as follows: Indirect taxes exert an inverse effect on gross fixed capital formation in Iraq during the period 2003-2020.

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Research Significance

This research is significant because it focuses on the impact of indirect taxes on gross fixed capital formation in Iraq. Indirect taxes, such as sales taxes or customs duties, affect various economic variables, including investment and income, by influencing purchasing power, demand, and gross fixed capital formation. Thus, studying the impact of indirect taxes on gross fixed capital formation is essential for understanding the dynamics of the Iraqi economy.

Research Objective

The research aims to investigate the impact of indirect taxes on gross fixed capital formation in Iraq from 2003 to 2020.

Research Methodology

The research employs an inductive approach, supported by statistical methods, to estimate the required data and achieve the desired research outcomes.

Temporal and Spatial Scope of the Research

- **Spatial Scope:** The nature of the Iraqi economy.
- **Temporal Scope:** The period 2003-2020.

First Section

Theoretical Framework of Research Variables

Theoretical Foundation of Indirect Taxes

Concept and Types of Indirect Taxes

Indirect taxes are paid by the obligated individuals, who then shift their burden onto others. These taxes are imposed on producers, exporters, or importers somehow, but consumers indirectly bear the ultimate burden through increased prices of domestically produced or imported goods. Examples include production taxes, customs duties, indirect taxes such as tariffs, and trade taxes (General Tax Authority, 2011). Some define indirect taxes as "taxes imposed on income, capital, and wealth" (Kamal, 2022: 76; Lahsan and Al-Akhdar, 2018: 114) ^[10, 12].

The main classifications of indirect taxes include:

- Consumption Taxes
- Sales Taxes
- Transaction Taxes
- Production Taxes
- Customs Duties
- Stamp Taxes (Khushnaw, 2021: 279).

Advantages or Benefits of Indirect Taxes

First: Advantages of Indirect Taxes

- Short Collection Time:** These taxes are collected shortly after the event that triggers their imposition.
- Continuous Revenue Source:** They provide a consistent and renewable source of income for the public treasury of any state.
- Sustained Collection:** Their ongoing collection ensures a significant and steady revenue stream for the treasury.
- Consumption Control:** They help reduce the consumption of harmful goods such as alcohol and cigarettes.

Second: Drawbacks or Disadvantages of Indirect Taxes

- High Collection Costs:** Their complexity and variety increase collection costs.
- Obstacle to Production and Trade:** They can act as barriers to production or trade activities.

- Inequity:** Indirect taxes, particularly consumption taxes, often lack fairness as they do not adequately consider societal income disparities. The marginal propensity to consume is higher among the poor than the rich, as per Keynes' Psychological Law of Consumption and Savings.
- Price Increases:** Indirect taxes contribute to higher price levels, weakening the competitiveness of domestic products in the international market. Exempting exported goods from these taxes can mitigate this issue. (Al-Asar, 2022: 162; Adel, 2022: 101; Al-Khasawneh, 2014: 114) ^[1, 6, 5].

Criteria for Distinguishing Between Indirect and Direct Taxes

Several criteria are used to differentiate between indirect and direct taxes as follows (Al-Qaisi, 2008: 148; Al-Janabi, 1970: 145) ^[9, 3].

Tax Shifting Criterion (Transfer of Tax Burden):

Proponents of this criterion distinguish between the two types of taxes based on the original taxpayer's ability to shift the tax burden to others.

- **Direct Taxes:** The burden falls on the original taxpayer and cannot be transferred to others.
- **Indirect Taxes:** The original taxpayer can legally pay these taxes and then transfer the burden or impact to others.

Stability Criterion for Taxable Items: According to this criterion, a tax is considered direct if collected based on a formal schedule and a nominal model specifying the taxpayer's name, income amount, and required information. This method focuses on the manner of tax collection and form completion. However, this criterion is unreliable because changes in collection methods and administrative processes can affect and alter the tax type.

Technical Criterion (Taxable Subject Matter): This criterion differentiates between tax types based on the "taxable subject matter," i.e., income, capital, and their uses.

- **Direct Taxes:** Imposed on fixed elements of the taxpayer, such as income or capital, at the point of their existence.
- **Indirect Taxes:** Levied on the use, movement, or transfer of income or capital from one taxpayer to another, such as consumption or transaction taxes.

Theoretical Foundation of Gross Fixed Capital Formation

Definition of Gross Fixed Capital Formation

Gross fixed capital formation (GFCF) is one of the most significant economic variables contributing to increased production capacity across economic sectors and enhancing economic growth rates. It serves as a vital factor in both advanced and developing economies. To clarify the concept of GFCF, several definitions are provided: It is defined as "the total value of fixed assets minus the value of assets disposed of during the year. It includes the creation of assets, productive assets, or all expenditures on assets that improve their quality, growth, and productivity or extend their expected operational life" (Al-Abdali and Suleiman, 2022: 6). Another definition states that it represents "the value of acquired fixed assets minus the value of assets

disposed of during the year" (*Al-Kanani and Najm Al-Din, 2018: 20*). Investment in fixed capital formation is categorized into three elements based on its impact on production capacity:

- **Direct Impact:** Activities that directly increase production capacity, such as building factories.
- **Indirect Impact:** Activities that indirectly affect production capacity, such as constructing roads or bridges.
- **No Direct or Indirect Impact:** Activities with no direct or indirect influence on production capacity, such as maintaining museums (Boffin, 2021: 63)^[2].

Classifications of Gross Fixed Capital Formation

Gross fixed capital formation is divided into two types: private capital and public capital. Private capital refers to expenditures by companies and individuals to form fixed capital, essentially enhancing existing production capacity. These investments are typically private, short-term projects that yield quick profits. In contrast, public capital involves government spending to create fixed capital, acquire investment goods, or develop existing resources to expand and enhance production capacity. This type of capital is especially significant in developing countries, where the state often controls key production resources and major projects, such as infrastructure development (Iraqi Ministry of Planning, 2022: 1).

Criticisms of Using Gross Fixed Capital Formation

The "Gross Fixed Capital Formation" indicator has faced criticism for overlooking the human aspects directly linked to physical components. The renowned economist Nurske

identifies two methods for determining gross fixed capital formation: the commodity flow or production approach and the expenditure approach. Additionally, this indicator allows for obtaining detailed and accurate data and information (*Agrawi and Mohammed, 2015: 2015*)^[8].

Second Section: Results of Measuring Indirect Taxes and Their Impact on Gross Fixed Capital Formation in the Iraqi Economic System for the Period (2003-2020)

First: Description and Formulation of the Econometric Model Used in the Research

Describing and formulating the econometric model is critical in constructing or developing any statistical model. This phase requires precision, as it identifies the variables to be included in or excluded from the statistical model. Economic theory plays a key role in shaping and describing the nature of the relationship among the studied variables. Additionally, econometric models are employed to quantitatively estimate the effects between these variables, ensuring accurate and logical results.

Second: Economic Variables Used in the Research

The research includes one independent variable and one dependent variable, as discussed in the theoretical framework and aligned with the propositions of economic theory and previous empirical studies. To test the research hypothesis and achieve its objectives, the independent variable was identified as indirect taxes in the Iraqi economy, while the dependent variable was identified as gross fixed capital formation. Table (1) presents the variables and data used in the estimated econometric model.

Table 1: Description of the Variables and Data Used in the Econometric Model

Variable Name	Symbol	Variable	Description	Variable Name	Symbol	Variable	Description
Indirect Taxes	K	X1	independent	Gross fixed capital formation	FC	Y	Dependent
	186790				2685465		
	246000				2857807		
	777000				10182362.2		
	1259500				16911154.7		
	1325811				7530404.4		
	2398214				23240539.1		
	3230093				13471242.2		
	1169639				26252776.8		
	1126149				37255269.4		
	1824833				38139871		
	1741082				55036676.2		
	1169382				55837402.9		
	1210495				50650572.7		
	1970368				28703209.2		
	2557388				32330275.7		
	2264563				31944571.6		
	1089308				32645109.6		
	12023001				30856942.8		

Source: Researcher's Work

Based on the theoretical framework of the study, it is proposed to test the following functional relationship:

$$y_i = a_0 + b_1X_1 + u_i$$

Where:

- **Y:** Represents the dependent variable, Gross Fixed Capital Formation.
- **X₁:** Represents the independent variable, Indirect Taxes.

The study period extends from 2003 to 2020, a relatively short duration that does not fully accommodate the application of advanced econometric methods. Consequently, the data must be transformed into quarterly intervals and logarithmic form to achieve more accurate results. The EViews 12 software provides the capability to convert data from annual to quarterly intervals and apply logarithmic transformations, enhancing the precision of the results.

Third: Results of Stability Tests for Research Variables

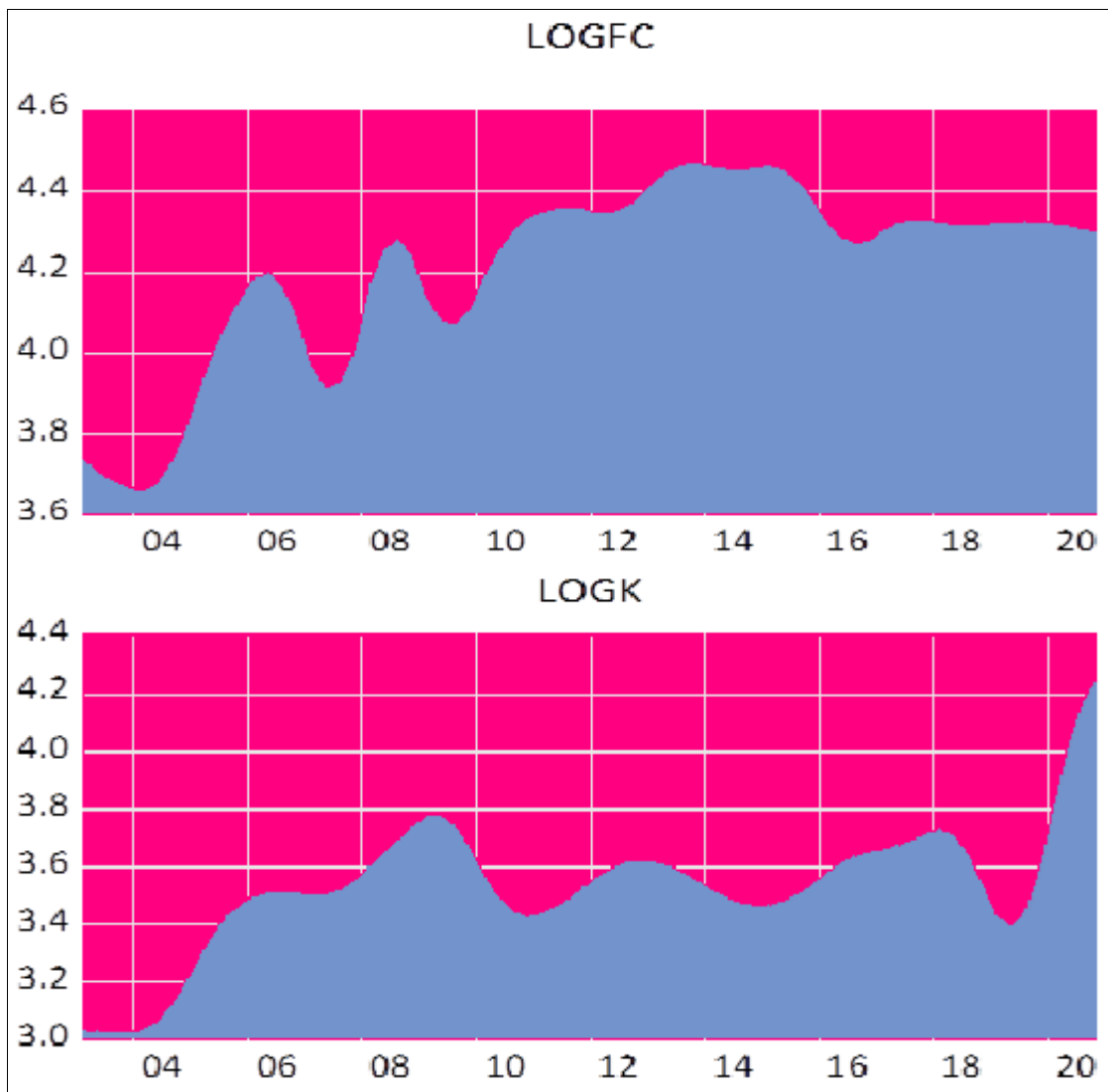
The stability of the research variables was tested using the statistical software EViews 12 to determine whether the studied variables are stable or not, i.e., whether they contain a unit root or not, and to identify the order of integration. Assessing the stability of the variables under study is essential for constructing and estimating econometric models in statistical analysis to avoid spurious (false)

regression during estimation. Moreover, stable time series can overcome shocks they encounter and return to stability or equilibrium in the long run. Accordingly, we employed unit root tests and time series plots to confirm the stability of the time series. After conducting these tests, the following results were obtained from the econometric software EViews 12:

Table 2: Results of the Unit Root Test (Phillips-Perron Test - PP) for Research Variables at the Original Data Level

Unit root test results table (PP)			
Null Hypothesis: The variable has a unit root			
	At Level	LOGFC	LOGK
with constant.	T.statistic	-2.1324	-1.2835
	Proba	0.2329	0.6330
		n ^o	n ^o
With Constant and Trend	T.Statistic	-1.8886	-2.0129
	Proba	0.6500	0.5842
		n ^o	n ^o
Without Constant and Trend	T.statistic	0.8183	1.3249
	Proba	0.8863	0.9522
		n ^o	n ^o

Notes// a: (***) Significant at the 1%, & (No) NoT. Significant (**) Significant at the 5%. (*) Significant at the 10%.
 Source: Researcher's Work Based on the Outputs of the Econometric Software (EViews 12).



Source: Researcher's Work Based on the Outputs of the Econometric Software (EViews 12).

Fig 1: Stability Test Results for the Variables Under Study at the Original Data Level

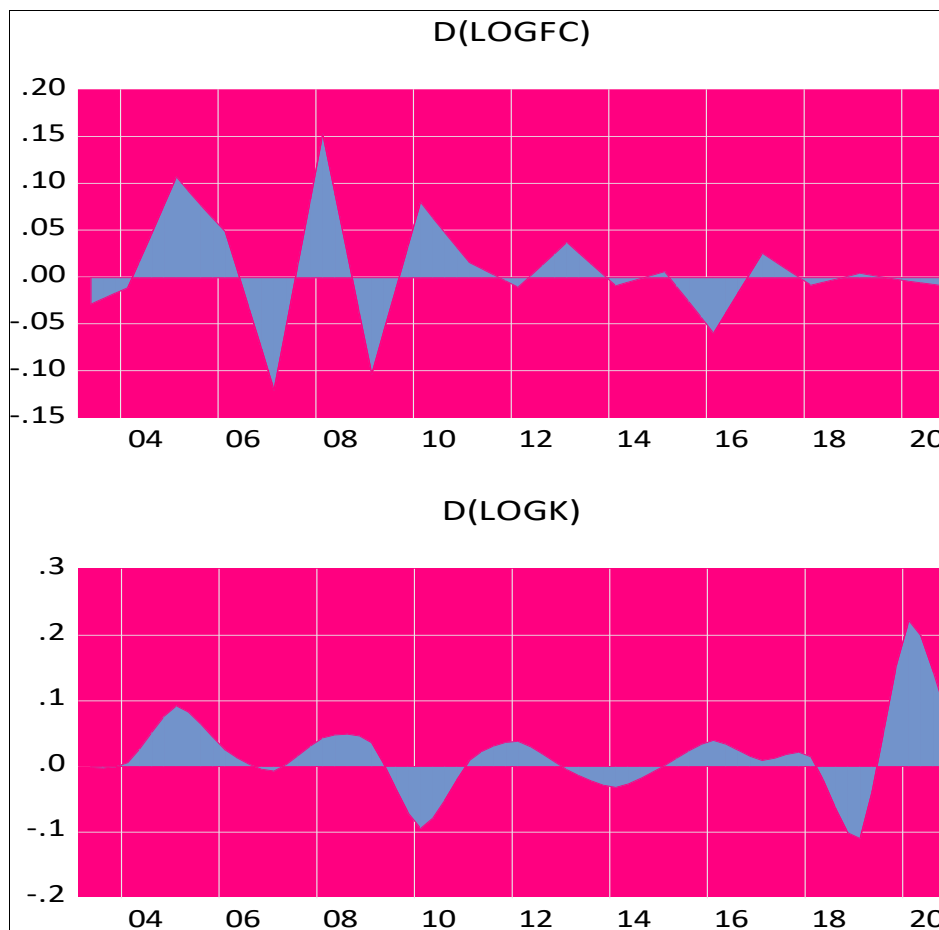
The results from Table (2) and the graphical representations in Figure (1) of the stability tests for the variables under study indicate that the dependent variable (Gross Fixed Capital Formation) is not stable at the original level. Similarly, the independent variable (Indirect Taxes) is also

not stable at the original data level, according to the Phillips-Perron (PP) test. Since all the variables under study are unstable, the first differences were taken to achieve stability, as shown in Table (3).

Table 3: Stability Tests for Research Variables at the First Difference Level

At variance or First Difference			
		d(LOGFC)	d(LOGK)
With. Constant.	T.Statistic	-2.8719	-2.9423
	Proba	0.0538	0.0456
		*	**
With a Constant and trend	T.statistic	-3.6002	-2.8717
	Proba	0.0370	0.0062
		**	***
Without Constant and trend	T.statistic	-2.8259	-2.7843
	Proba	0.0053	0.0060
		***	***

Source: Researcher's Work Based on the Outputs of the Econometric Software (EViews 12).



Source: Researcher's Work Based on the Outputs of the Econometric Software (EViews 12).

Fig 2: Graphical Representations of Stability Test Results for Variables Under Study at the First Difference Level

From Table (3) and the graphical representations in Figure (2) of the stability test results for the variables under study, it is evident that both the independent and dependent variables became stable at the first difference, according to the Phillips-Perron (PP) test. Therefore, the most suitable approach is to apply or adopt the Autoregressive Distributed Lag (ARDL) model, as the variables became stable at the first difference due to the limited number of observations.

Fourth: Indirect Taxes and Their Relationship with Gross Fixed Capital Formation in the Iraqi Economic System for the Period (2003-2020)

Preliminary Estimation of the (ARDL) Model

Table (4) presents the preliminary estimation results of the Autoregressive Distributed Lag (ARDL) model, which demonstrates the relationship between indirect taxes and gross fixed capital formation in the Iraqi economic system during the period (2003-2020).

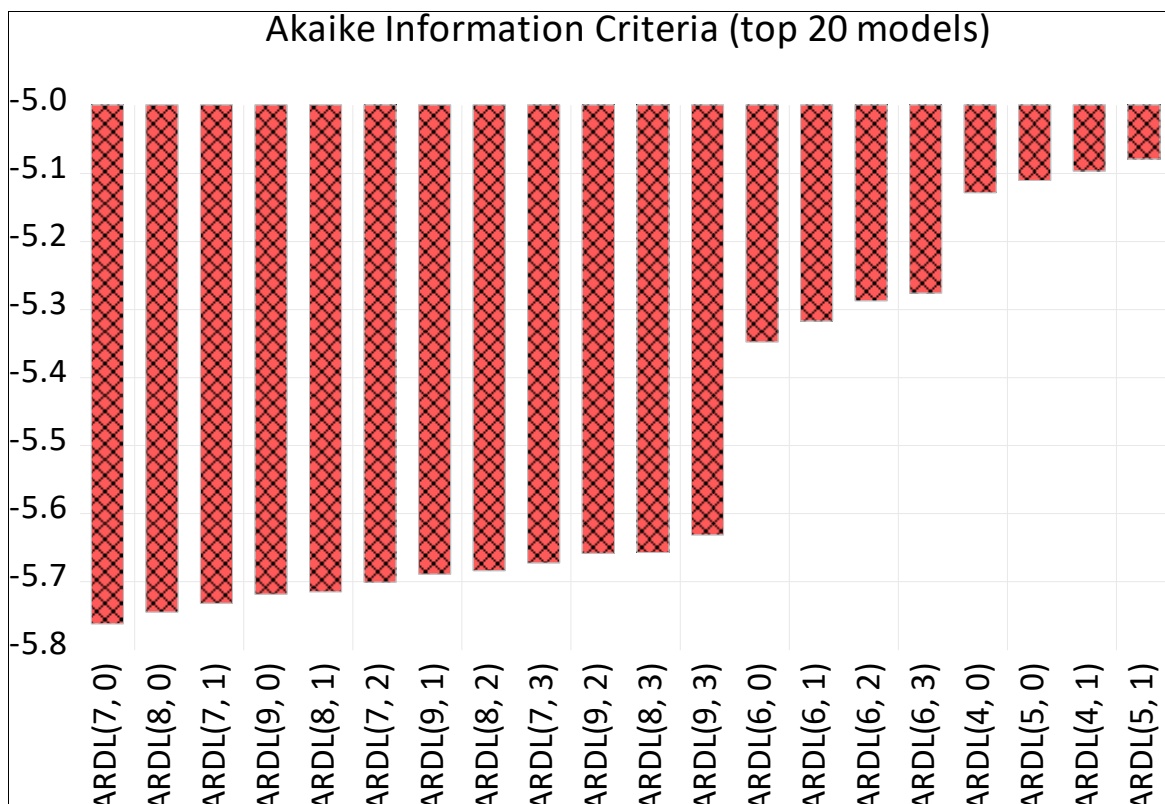
Table 4: Preliminary Estimation of the (ARDL) Model Relationship Between Indirect Taxes and Gross Fixed Capital Formation in the Iraqi Economic System for the Period (2003-2020)

Variable: LOGFC				
Method: ARDL				
Selected Model= ardl (7, 0)				
Variable	Coefficient	Std. Error	T.Statistic	Proba*
LOGFC (-1)	2.321076	0.106048	21.88711	0.0000
LOGFC (-2)	-1.947393	0.234193	-8.315327	0.0000
LOGFC (-3)	0.616962	0.247549	2.492281	0.0157
LOGFC (-4)	-0.807321	0.240417	-3.358002	0.0014
LOGFC (-5)	1.881238	0.247634	7.596852	0.0000
LOGFC (-6)	-1.644440	0.227905	-7.215459	0.0000
LOGFC (-7)	0.546781	0.095755	5.710199	0.0000
LOGK	-0.012045	0.009672	-1.245321	0.2182
C	0.187887	0.051601	3.641136	0.0006
R-squared	0.994382	Mean dependent var		4.268606
Adjusted R-squared	0.993579	S.D. dependent var		0.156331
S.E. of regression	0.012527	Akaike info criterion		-5.793973
Sum squared resid	0.008788	Schwarz criterion		-5.492904
Log likelihood	197.3041	Hannan. Quinn criter.		-5.675182
F	1238.903	Durbin-Watson stat		2.146534

Source: Prepared by the Researcher Based on the Outputs of the Statistical Software (EViews 12).

The results in Table (4) above present the preliminary estimation of the ARDL model, which explains the relationship between indirect taxes and gross fixed capital formation in Iraq (2003-2020). The table indicates that the R² (coefficient of determination) value reached 0.99, suggesting that the model provides a strong explanatory power. This means that the independent variable (indirect taxes) explains approximately 99% of the variations in the dependent variable (gross fixed capital formation). In

comparison, the remaining 1% reflects the influence of other variables not included in the model. The Durbin-Watson (D.W.) statistic indicates no autocorrelation among the studied variables. The results in Table (4) and Figure (3) highlight that the appropriate estimated ARDL model is (0, 7), making it suitable for measuring and analyzing the relationship between indirect taxes and gross fixed capital formation in Iraq during the period (2003-2020).



Source: Prepared by the Researcher Based on the Outputs of EViews 12.

Fig 3: Results Based on the AIC Criterion to Determine the Best Model

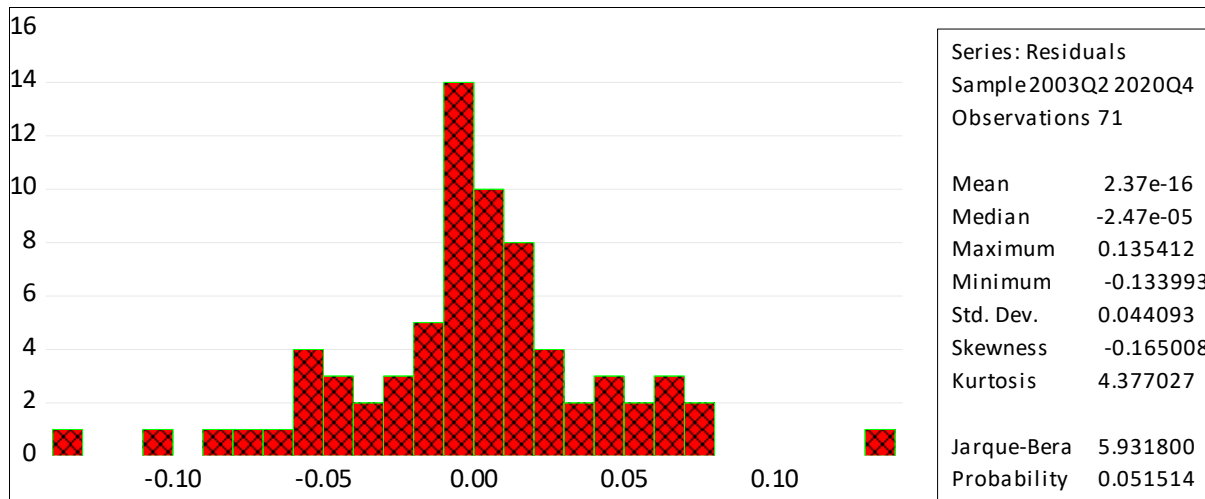
Jarque-Bera (JB) Test for Normality of Residuals

The Jarque-Bera (JB) test assesses the normality of

residuals, where the null hypothesis assumes that the residuals follow a normal distribution if P-value > 0.05, and

the alternative hypothesis assumes non-normality if $P\text{-value} < 0.05$. The kurtosis value indicates whether the distribution is normal ($ku = 3$), elongated ($ku < 3$), or flat ($ku > 3$). With $ku = 4.37$, the distribution is flat. Skewness measures symmetry, where $Sk = 0$ indicates symmetry, $Sk > 0$

indicates right skewness, and $Sk < 0$ indicates left skewness. With $Sk = -0.165$, the distribution is skewed to the left. Based on Figure (4), the JB test confirmed that the data follow a normal distribution, as the p-value of 0.0515 exceeds 0.05, verifying the normality of the residuals.



Source: Prepared by the Researcher Based on the Outputs of EViews 12.

Fig 4: Illustration of the Normal Distribution of Model Residuals

Results of the Bounds Test for Cointegration

To test the long-term equilibrium relationship between indirect taxes and gross fixed capital formation in Iraq for the period (2003-2020), it is essential to conduct the Bounds Test for cointegration. The results are presented in the following table:

Table 5: Results of the Bounds Test for Cointegration Between Indirect Taxes and Gross Fixed Capital Formation in Iraq (2003-2020)

Test Statistic	Value	Signif.	I (0)	I (1)
F-statistic	5.404485	10%	3.02	3.51
k	1	5%	3.62	4.16
		1%	4.94	5.58

Source: Prepared by the Researcher Based on the Outputs of EViews 12.

From Table (5), it is evident that the calculated F-statistic value is 5.4, which exceeds the tabulated F-statistic value at a significance level of less than 5%. This result leads to the rejection of the null hypothesis (H_0), which posits the absence of a long-term equilibrium relationship among the studied variables, and the acceptance of the alternative hypothesis (H_1), indicating the presence of "cointegration" between the model variables. This confirms the existence of a relationship between the explanatory variable (indirect taxes) and the dependent variable (gross fixed capital formation) under a long-term equilibrium relationship, necessitating an estimation of short-term and long-term responses.

Results of Long-Term and Short-Term Relationship Estimation and Error Correction Term

After completing the Bounds Test and confirming the existence of a long-term equilibrium relationship between the dependent and independent variables, it is necessary to estimate the long-term coefficients and the error correction term. Using the econometric software EViews 12, Table (6) presents these results, confirming the presence of

cointegration between the dependent variable (Gross Fixed Capital Formation) and the independent variable (Indirect Taxes).

This is validated by the error correction term (CointEq-1) of -0.033, with an associated p-value (Prob) of 0.002, which satisfies the two primary conditions for the error correction coefficient: it must be negative and statistically significant.

Table 6: Results of Estimating the Short-Term and Long-Term Responses Based on the ARDL Model for the Relationship Between Indirect Taxes and Gross Fixed Capital Formation in Iraq (2003-2020)

ARDL Long Run Form and Bounds Test				
Dependent Variable: D(LOGFC)				
Selected Model: ARDL (7, 0)				
Case 2: Restricted Constant and No Trend				
Sample: 2003Q1 2020Q4				
Included observations: 65				
Variable "	Coefficient	Std. Error	t-Statistic	Prob.
C	0.187887	0.051601	3.641136	0.0006
CointEq(-1)*	-0.033097	0.010388	-3.186005	0.0024
LOGK	-0.012045	0.009672	-1.245321	0.2182
D (LOGFC (-1))	1.354173	0.102353	13.23043	0.0000
D (LOGFC (-2))	-0.593220	0.144086	-4.117137	0.0001
D (LOGFC (-3))	0.023742	0.132005	0.179856	0.8579
D (LOGFC (-4))	-0.783579	0.131770	-5.946580	0.0000
D (LOGFC (-5))	1.097659	0.143498	7.649285	0.0000
D (LOGFC (-6))	-0.546781	0.095755	-5.710199	0.0000
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Proba
LOGK	-0.363940	0.331591	-1.097557	0.2771
C	5.676885	1.212176	4.683220	0.0000

Source: Prepared by the Researcher Based on the Outputs of EViews 12.

Table (6) above presents the results of estimating the long-term response using the ARDL model for the relationship between indirect taxes and gross fixed capital formation in the Iraqi economic system during the period (2003-2020).

The findings are as follows:

1. The error correction term indicates the existence of a long-term equilibrium relationship between indirect taxes and gross fixed capital formation in Iraq for the studied period. This is supported by the error correction coefficient value of -0.033 and its associated p-value (Prob) of 0.002, satisfying the two key conditions: it is negative and statistically significant at a level of less than 1%. This suggests a return to equilibrium within - 0.033 of the time periods.
2. The long-term response results reveal that indirect taxes have a weak inverse effect on gross fixed capital formation in Iraq during the period (2003-2020). This implies that an increase in indirect taxes during the study period leads to a reduction in gross fixed capital formation. This inverse effect is attributed to the influence of taxes on the marginal efficiency of capital by affecting profit rates. Higher profit opportunities lead to increased capital formation, while lower profits

reduce it.

In Iraq, the rise in indirect taxes negatively impacted gross fixed capital formation, albeit weakly. This weak effect is due to low tax awareness among the Iraqi population, with many tax-liable individuals evading payment due to administrative corruption. Tax authorities often fail to collect taxes due to favoritism in exchange for personal benefits or the ability of certain individuals to avoid taxes due to their political positions. These issues have hindered the effectiveness of tax policies, reducing their impact on gross fixed capital formation.

Results of Estimating the Autocorrelation Problem and Testing for Heteroscedasticity

Table (7) presents the results of the tests for autocorrelation and heteroscedasticity in the relationship between indirect taxes and gross fixed capital formation in Iraq for the period (2003-2020).

Table 7: Results of the Autocorrelation and Heteroscedasticity Tests for the Relationship Between Indirect Taxes and Gross Fixed Capital Formation in the Iraqi Economy (2003-2020)

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.569443	Probab. F (2,54)	0.5220
Obs*R-squared	1.342566	Probab. Chi-Square (2)	0.5111
Heteroskedasticity Test: Pagan, Godfrey, Breusch			
F-statistic	2.746645	Probab. F (8,56)	0.0125
Obs*R-squared	18.31727	Probab. Chi-Square (8)	0.0190

Source: Prepared by the Researcher Based on the Outputs of EViews 12.

Table (7) above indicates that the estimated model is free from problems of autocorrelation or heteroscedasticity. This conclusion is based on the test values obtained, which show that the null hypothesis cannot be rejected, confirming the absence of these issues.

Research Conclusions

1. The long-term response results indicate an inverse effect, as indirect taxes exert a weak negative influence on gross fixed capital formation in Iraq during the period (2003-2020). This implies that an increase in indirect taxes during the study period reduces gross fixed capital formation. The reason for this lies in the impact of taxes on the marginal efficiency of capital, specifically through their effect on profit rates. Consequently, the hypothesis has been validated.
2. The error correction term confirms the existence of a long-term equilibrium relationship between indirect taxes and the dependent variable in the Iraqi economic system during the period (2003-2020). This is substantiated by the error correction coefficient CointEq(-1) for the model, valued at -0.033.

Recommendation

1. Develop a clear vision and a long-term strategy to mitigate the negative impact of indirect taxes on gross fixed capital formation. This can be achieved by restructuring tax laws and systems to support sectors that contribute to capital formation. Examples include imposing taxes on imports of goods that are produced locally, reducing or regulating income taxes, or redirecting tax revenues toward productive projects.
2. Reduce indirect and direct taxes imposed on

investments, as these taxes lower the marginal efficiency of investments. Since investment significantly contributes to the formation, growth, and development of available capital, such reductions would promote economic growth.

3. Increase tax awareness among taxpayers and curb tax evasion by imposing appropriate and stringent penalties. Additionally, address corruption and favoritism within the tax collection system, often linked to the position, affiliations, or support of those responsible for tax collection.
4. Strengthen gross fixed capital formation in Iraq by creating conditions conducive to this goal, such as promoting investments that enhance, support, and develop productive capacities.

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