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## An investigation into the determinants of savings and investment

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### Abstract

*This study investigated the correlation between savings, investment, and economic growth. An implication of this research is the identification of the input of production that has a greater impact on economic growth. The study used an ARDL model to analyze time series data collected over a period of twenty years. The findings indicate a direct correlation between savings, investment, and economic growth. The study's most notable finding is the confirmation of labor's significant influence on economic growth, surpassing the contribution of capital.*

**Keywords:** Savings, investment, economy, Solow.

### 1. INTRODUCTION

Within the framework of promoting and sustaining economic growth, the majority of nations have recognized the significance of saving as the foundation of investment. Economic growth is driven by the latter, which stabilizes economic activity and sustains capital formation (Karakı et al., 2023; Khaddam et al., 2023). The relationship between saves and investment is a mutually reinforcing one, characterized by a funding connection (Abueid et al., 2018). This connection involves using savings to finance investments, with the ultimate goal of promoting economic growth. Conversely, in the context of productivity, preserving foundation for investment. Furthermore, savings are converted from monetary form into tangible assets such as machinery, buildings, equipment, and other items that contribute to production (Alzghoul et al., 2023). The success of an investment policy and the realization of its objectives rely on the presence of an effective savings policy, given the interdependence between the two (Al-kasasbeh et al.,

2022). Various economic theories have diverged in their characterization of the link between savings and investment (Kasasbeh, 2021). Traditional economists get their perspective on the correlation between saves and investment from Adam Smith's assertion that all annual savings are annually invested (Yamin et al., 2023). Classical economists view savings as a type of expenditure used to purchase investment products. This implies that every instance of saving is automatically transformed into an investment, preventing any decrease in overall demand and ensuring that the entire national income is spent (Alzghoul et al., 2023). Classical analysis focuses on the preservation of resources as a vital requirement for fostering economic growth (Kasasbeh, 2021). Due to its enduring connection with investment, they perceive savings and investment as the fundamental pillars of capital formation. Therefore, based on classical ideology, deposits are the exclusive reservoir of funds accessible for lending purposes. Put simply, savings serve as the foundation for

investment and provide a robust connection between the two. In other words, it eliminates the option of funding investment by relying on individuals who hoard their money.

Keynesian economic philosophy diverged from classical economic thought. Keynes argued that saving is primarily influenced by income rather than interest rates. He also rejected the notion that more saves automatically result in lower interest rates and increased investment. According to Keynes, the rate of interest is regulated by the demand and supply of money. Keynes sought to elucidate the events that transpired during the Great Depression of the 1930s. The decline in interest rates did not result in a decrease in savings or an increase in investment that would facilitate recovery from the crisis. Consequently, the fluctuations in interest rates did not stimulate economic activity.

A long-standing view of the macro-economic dynamics of the growth process was that rising savings when transformed into prolific investment would help obtain an economic rebound (Harrod, 1939; Domar, 1946; Solow, 1956). Solow (1970) suggests that the rise in the savings rate boosts steady-state production by more than its immediate effect on investment, as savings are boosted by the induced rise in income, leading to a greater increase in investment. The theories of endogenous growth, typified by Romer (1986, 1990), Lucas (1988) and Barro (1990) after the mid-1980s reaffirm the belief that the accumulation of physical capital is the essential driver of long-run economic growth. Bacha (1990) and Jappelli and Pagano (1994) also claim that savings contribute to higher investment and higher GDP growth in the short-run. Since then economists have been studying the relationship between saving and investment with renewed vitality.

## 2. LITERATURE REVIEW

The correlation between investment and savings has garnered significant scrutiny in economic literature, resulting in several empirical investigations conducted in various developed and developing nations. For instance, Seshaiyah and Vuyyuri (2008) specifically explored the connection between savings and investment. The study conducted in India from 1970 to 2002 utilized the Distributed Automatic Delay (ARDL) method. The findings also indicated the integration of savings, investment, and yield spread. The findings indicate a unidirectional causal connection from savings to investment. Additionally, the results demonstrate the presence of cointegration among savings, investment, and yield spread in India.

Mishra et al (2010) conducted a study to analyze the dynamics of the relationship between savings and investment in India. Utilized yearly data spanning from 1950-51 to 2008-09. The study uncovered a direct cause-and-effect connection between investment and savings in India. In addition, Ramakrishna and Rao (2012) conducted a study on the enduring correlation between saving and investment in Ethiopia using data from a specific time period. Applying Johanson's joint integration method, the findings suggest that there is no long-term causal relationship between savings and investment in both directions in Ethiopia. Foreign aid has a significant role in determining investment levels, as Ethiopia is unable to generate enough domestic savings to meet investment needs. Consequently, Ethiopia faces the challenge of dependence and the potential hazards associated with external shocks. In a study conducted by Nasiru and Usman (2013), the relationship between savings and investment in Nigeria was examined using the ARDL Bounds test. The study focused on analyzing long-term

correlations between 1980 and 2011. The Bounds test findings indicate a persistent correlation between savings and investing.

Empirical research generally demonstrates that the correlation between savings and investment is more robust in industrialized nations compared to emerging nations. The research aims to investigate whether there exists a durable and consistent correlation between savings and investment in the Jordanian economy over an extended period of time. In order to address this inquiry, we will examine the hypothesis that there exists a durable and consistent relationship between savings and investment in the Jordanian economy. It is worth noting that the existing literature on the relationship between savings and investment in an emerging country such as Jordan is insufficient. To achieve this objective, we will categorize this study into three primary segments: the initial segment will outline the research methodology employed; the subsequent segment will present the findings derived from conducting stability tests and cointegration testing. Ultimately, we shall endeavor to elucidate and deliberate upon the attained outcomes.

## 3. DATA AND Methodology

The data for this study were obtained from the Department of Statistics Jordan, World Bank Database, and Central Bank of Jordan. Data pertaining to savings, investment, and other variables have been gathered in the Jordanian economy from 1990 to 2020. The study utilizes the yearly data on specific factors during the designated time frame. To establish the causal relationship between savings and investments in Jordan. This article distinguishes itself from other research in the literature by performing a unit root test that identifies a significant change in the time series structure and by examining the connection between savings and investment through the application of the Autoregressive Distributed Lag (ARDL) approach to cointegration. In this study, we employed a linear regression model to ascertain the nature of the correlation between investment and savings. The approach is described as follows:

$$I_t = c_0 + c_1 S_t + \varepsilon_t \quad (1)$$

Where  $I_t$  gross national investment as a proportion of is gross domestic product (GDP);  $S_t$  is gross national saving as a proportion of GDP;  $a$  is the constant; and  $\varepsilon_t$  is the disturbance term.

### Discussion of the Results

The unit-root test helps to determine whether or not a variable is stationary. To prevent false associations between variables, these tests are important. Before undertaking cointegration, checking for the inclusion of the unit root in the variables is the primary task. In the following table, the augmented Dickey-Fuller and philip peron unit root test values of the variables are presented.

Table 1: ADF and PP Unit Root Tests

Variables	ADF		PP	
	Level	1st Diff.	Level	1st Diff.
	T Statistics	T Statistics	T Statistics	T Statistics
IG	-1.712	-3.803*	-2.113	-4.527*
SG	-2.681	-5.825*	-2.250	-5.012*

Note: \*, \*\*, \*\*\* denotes 1%, 5% and 10% level of significance respectively, Schwarz Information Criteria (SIC) were used in lag selection.

The result of the ADF and PP unit root test is presented above from the result, all of the variables are non-stationary series but became integrated and stationary after taking the first difference.

Table 2: Lumsdaine and Papell Unit Root Test

Variables	Model	Lag	Break Dates	Test Statistics	Critical Values		
					1%	5%	10%
IG	AA	0	1989	-3.382	-5.38	-5.16	-4.59
			2018				
	CC	0	1999	-5.154	-6.19	-5.48	-5.73
			2014				
SG	AA	0	1989	-3.382	-5.38	-5.16	-4.59
			2017				
	CC	0	1974	-5.154	-6.19	-5.48	-5.73
			2015				

Note: Critical values were taken from Ben David et al. (2003)

According to Table 2 above shows, Lumsdaine and Papell test is a unit root test that allows for two structural breaks. According to the results presented test statistics of IG and SG series for both Model AA and Model CC were smaller (in absolute value) than the critical values. For this reason, the basic hypothesis of unit root with the structural break is accepted. Thus, the series has a unit root.

Using the ARDL bound testing technique, the long-run relationship between IG and SG is tested. Table 3 summarizes the findings of the bounds test.

Table 3: Bounds Test Results

F-Statistic Critical Values at 5%. Lower bound Upper bound		
$F_{IG(SG)} = 13.2419$	4.2708	5.3958
$F_{SG(IG)} = 2.5079$	4.2708	5.3958

Source: Authors' calculation.

The results indicate the existence of cointegration, as shown in Table 3 above. In this case, investment is considered the dependent variable, with a computed value of 13.2419, which exceeds the upper bound critical value at a 5% significance level. However, when considering saving as the dependent variable, there is no evidence of cointegration because the calculated variable, which equals 2.5079, is lower than the crucial value at the 5% significance level. These findings suggest a long-term association between the variables, since they align with the Feldstein-Horioka hypothesis. Specifically, the dependent variable of investment indicates minimal capital mobility in Jordan. These findings align with the outcomes reported by Esso and Keho (2010), Narayan and Narayan (2010), and Seth (2011).

Table 4: Estimated Long-run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.015	0.248848	-4.481537	0.0001
LNIG (-1)	0.586	0.155421	3.045061	0.0009
LNIG(-2)	-0.244	0.150882	-3.967920	0.0032
LNSG(-1)	0.125	0.024449	2.591755	0.0274

Table 4 displays the outcomes in the long term, specifically on the relationship between investment and other variables. In Jordan, the long-run elasticities on investment are predominantly positive. The enduring impact of saving on investment is 0.13 and statistically significant at a 5% significance level, suggesting that a 1% increase in saving would lead to a corresponding 0.13% increase in investment.

Table 5: Estimated Short-run Coefficients

Dependent Variable: D(LNIG)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.006	0.024695	-0.068990	0.817
D(LNIG(-1))	0.036	0.169695	3.548990	0.002
D(LNIG(-2))	-0.428	0.145918	-3.397659	0.001
D(LNSG(-1))	0.086	0.069695	1.428990	0.163
ECM(-1)	-1.113	0.275245	-4.042515	0.000

Theoretically, the ECM (-1) value should be both significant and negative, which aligns precisely with the findings provided in Table 4. The presence of the error correction phrase indicates that the adjustment method used to reestablish equilibrium is highly efficient. A higher correction coefficient of error indicates a more refined approach of enhancement. The coefficient, with a value of -1.11, is statistically significant at the 1% level. This indicates that the convergence to equilibrium in Jordan, following an investment shock, occurs slightly over a period of 1 year.

## Conclusion

This work conducted an empirical analysis of the dynamic relationship between savings and expenditure, utilizing the Autoregressive Distributed Lag (ARDL) model and Error Correction Model (ECM). The results indicated an enduring correlation between saving and spending. This finding aligns with several prior literature studies that have demonstrated the necessity of integrating savings and investment over an extended period. The results additionally corroborate the findings that reinforce the Feldstein-Horioka (1980) theory, which posits limited international capital mobility. The results suggest that a substantial share of domestic savings remains inside the Jordanian economy to support domestic investment. The analysis also indicated the presence of a negative and statistically significant error correction term, suggesting that the mechanism for restoring balance is highly effective. The literature widely acknowledges that international capital mobility plays a crucial role in efficiently allocating resources. However, there are concerns regarding the movement of capital into and out of the country. Capital inflows serve as a catalyst for investment and economic expansion in the recipient country, thereby enhancing the welfare of its population.

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