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THE RELATIONSHIP BETWEEN SAVINGS AND INVESTMENT: EVIDENCE FROM JORDAN

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ABSTRACT

Purpose: This study aimed to examine the relationship between savings and investment in the Jordanian economy during the period (1980-2020).

Design/Methodology/Approach: This study was done using Augmented Dicky Fuller and Phillips-Perron unit root tests, and Lumsdaine and Papell unit root tests with structural breaks to determine if the time-series variables are stable or not. The Autoregressive Distributed Lag (ARDL) Bounds test method was used in this study to test long-run relationship between savings and investment

Findings: The findings of the Bounds test suggest a term savings-investment relationship. This outcome is consistent with a number of recent research reviewed in the literature that have shown that saving and investment are co-integrated in the long term.

Practical implications: keeping a sustainable supply of savings should be a top policy goal for economic stability, which can assist policymakers and institutions in selecting their future actions.

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A RELAÇÃO ENTRE POUPANÇA E INVESTIMENTO: EVIDÊNCIAS DA JORDÂNIA

RESUMO

Objetivo: Este estudo teve como objetivo examinar a relação entre poupança e investimento na economia jordaniana durante o período (1980-2020).

Concepção/Metodologia/Proteção: Este estudo foi feito usando testes de raiz de unidade Dicky Fuller e Phillips-Perron, e testes de raiz de unidade Lumsdaine e Papell com quebras estruturais para determinar se as variáveis da série temporal são estáveis ou não. O método de teste Autoregressive Distributed Lag (ARDL) Bounds foi utilizado neste estudo para testar a relação a longo prazo entre economia e investimento.

Conclusões: Os resultados do teste Bounds sugerem uma relação de poupança-investimento a prazo. Este resultado é consistente com uma série de pesquisas recentes analisadas na literatura que demonstraram que a poupança e o investimento são co-integrados a longo prazo.

Implicações práticas: manter um suprimento sustentável de poupança deve ser um objetivo político de primeira linha para a estabilidade econômica, o que pode ajudar os formuladores de políticas e as instituições a selecionar suas ações futuras.

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Palavras-chave: Poupança, Investimento, Economia Jordaniana, ARDL.

LA RELACIÓN ENTRE AHORRO E INVERSIÓN: DATOS DE JORDANIA

RESUMEN
Objetivo: Este estudio pretende examinar la relación entre ahorro e inversión en la economía jordana durante el periodo (1980-2020).
Diseño/metodología/enfoque: En este estudio se utilizaron las pruebas de raíces unitarias de Dicky Fuller aumentado y Phillips-Perron, y las pruebas de raíces unitarias de Lumsdaine y Papell con rupturas estructurales para determinar si las variables de las series temporales son estables o no. En este estudio se utilizó el método Autoregressive Distributed Lag (ARDL) Bounds para comprobar la relación a largo plazo entre el ahorro y la inversión.
Resultados: Los resultados de la prueba Bounds sugieren una relación a largo plazo entre ahorro e inversión. Este resultado es coherente con una serie de investigaciones recientes revisadas en la literatura que han demostrado que el ahorro y la inversión están cointegrados a largo plazo.
Implicaciones prácticas: mantener una oferta sostenible de ahorro debería ser un objetivo político de primer orden para la estabilidad económica, lo que puede ayudar a los responsables políticos y a las instituciones a seleccionar sus actuaciones futuras.

Palabras clave: Ahorro, Inversión, Economía Jordana, ARDL.

INTRODUCTION

In the context of the promotion and maintenance of economic growth, most countries have noticed the importance of saving, which is the mainstay of investment. The latter is the engine of economic growth, through which economic activity is stabilized and capital formation is maintained. The relationship looks between savings and investment a double relationship, it is in terms of funding relationship, in the sense of financing savings for investment in order to achieve economic growth. On the other hand, Productivity relationship, saving is the source of investment, in addition to the savings are transformed from cash to real capital such as machinery, buildings, equipment and other productive goods (Al-kasasbeh et al., 2022; Adelakun, 2015). And the success of investment policy and the achievement of its objectives depend on availability an efficient savings policy in light of the relationship between them.

Economic theories have differed in the type of relationship between savings and investment. Classic economists base their vision on the relationship between savings and investment on what Adam Smith said of all that is saved annually it invests annually (Nasiru and Usman, 2013). Classic economists see savings as another form of spending on buying investment goods, meaning that each savings necessarily turns into an investment, so that it cannot lead to a reduction in aggregate demand, that the national income is spent in full. Thus, classical analysis is concerned with saving and as a necessary condition for promoting economic development (Al-Kasasbeh, 2022). Because it has a permanent relationship with investment, they see that savings and investment are the basis of capital formation. Thus,

according to classical thought, savings are the only source of balances available for lending. In other words, savings are the source of investment and a strong relationship between them. That is, it excludes the possibility of financing investment through the dragging of hoarders.

But Keynesian economic thought took a different form from classical economic thought. Keynes said saving is a function in income rather than interest rates, nor does it believe that increased savings lead to lower rates of interest and increased investment because it is considered that the rate of interest is determined by the demand and supply of money. Keynes's view was to explain what happened during the Great Depression of the 1930s. Interest rates fell, savings did not fall, and investment did not increase in a way that would lead to the exit from the crisis, which meant that interest rate movements failed to provide the impetus for a return to economic activity.

According to a long-held perspective of the macroeconomic mechanics of the growth process, increased savings converted into robust investment would contribute to economic recovery (Harrod, 1939; Domar, 1946; Solow, 1956). Solow (1970) proposes that the increase in the savings rate enhances steady-state output by a bigger amount than its immediate effect on investment, as the increase in savings is caused by an increase in income, resulting in a larger increase in investment. After the mid-1980s, the theories of endogenous growth, exemplified by Romer (1986, 1990), Lucas (1988), and Barro (1990), emphasise that the accumulation of physical capital is the primary engine of long-term economic expansion. Bacha (1990) and Jappelli and Pagano (1994) contend that savings lead to increased investment and GDP growth in the short term. Since then, economists have investigated the connection between saving and investment with fresh vitality.

REVIEW OF RELATED LITERATURE

The relationship between investment and savings has received considerable attention in economic literature, translated into several applied studies, including many developed and developing countries, including Seshaiah & Vuyyuri (2008) examined the relationship between Savings and investment. In India covered the period 1970-2002, the study used the Distributed Automatic Delay (ARDL), the results also showed Integration of savings, investment and yield spread. The results revealed showed that there is a one-way causal relationship from savings to investment, the results also showed cointegration between savings, investment and yield spread in India.

Mishra et al (2010) explained the study the dynamics of the relation between savings and investment in India used annual data for the period (1950-51 to 2008-09). The study used Johansen test and bounds technique for cointegration and Granger Causality Test. The study revealed the cointegration between savings and investment and suggests the feedback causality between them.

Tehranchian & Behravesh (2011) assessed the long-run and short-run relationship between savings and investment in Iran's economy. They employed Vector Error Correction Model and ARDL test. The results indicate the long-run equilibrium link between savings and investment, and the long-run direct influence of savings on investment is higher than its short-run counterpart. The predicted coefficient of error correction term indicates that it will take more than two years to settle the investment shock. As a proposal for policy, the paper suggests providing the essential infrastructure for foreign investment.

Ramakrishna and Rao (2012) on the long-term relationship between saving and investment in Ethiopia for data covering the period Using the method of joint integration of Johanson, the results indicated that there is no causal relationship in the long term between savings and investment in both directions in Ethiopia, Investment depends to a large extent on foreign aid and Ethiopia cannot raise its domestic savings to meet the requirements of investment, and thus face the problem of dependence and the risks of external shocks.

Obi et al. (2012) employed cointegration and Error Correction Model (ECM) approach to study the relationship among savings, investment and growth rate in Nigeria. The results showed that investment-GDP ratio, real growth rate of GDP and gross domestic savings lagged by one year. There is a robust link among investment, growth and savings. Given the prevalence of low savings rates and inevitably low investment rates, the study suggests that constructive steps be taken to increase Nigeria's savings and investment potential, which would have a major effect on growth. This can be accomplished by establishing a policy agenda that promotes an investor-friendly climate as well as the development of human capital and technology.

Nasiru and Usman. (2013) investigated the relationship between savings and investment in Nigeria covering the period 1980-201. The study used ARDL Bounds test to examine for long-term relationships. The Bounds test findings show that there is a long-term relationship between savings and investment. The error correction model also captures the short-run dynamics (ECM). The findings of the Bounds test show that savings and investment have a long-term relationship. This outcome is in line with the results of a number of studies reviewed that considered saving and investment to be cointegrated in the long run. The findings also support the Feldstein-Horioka (1980) theory.

Adelakun (2015) examined the relationship between savings, investment, and economic growth using the granger causality test and error correction model. A corollary of the study is determining which of the production inputs contributes the most to economic growth over a twenty-nine-year timeframe. The result shows an affirmative association between savings, investment and economic growth. The inflation rate, among the determinants of savings considered in the study, has a negative impact on saving, while interest rate influences saving positively.

Nwanne (2016) used ordinary least square regression to investigate the effects of savings and investment on economic development in Nigeria from 1981 to 2014. The regression results indicated that changes in gross domestic savings have a negative and substantial influence on changes in Nigerian economic growth, whereas changes in gross domestic investment have a significant positive effect on changes in Nigerian economic development.

Khan (2017) investigated the presence of savings and investment organisations in 22 OECD countries. A time-varying parameter model with Kalman filtering was used in the inquiry. According to the data, the majority of nations' time-varying saving retention coefficient has gradually fallen since the mid-1970s. The total sample's average time-varying saving retention coefficient fell progressively as well. The degree of capital mobility is increasing as international financial markets become more integrated over time. As a result, the savings and investment relationship will undergo a dynamic process. The study aimed to capture this dynamic relationship between savings and investment using a state-space model.

Hungwe & Odhiambo (2019) studied savings and investment dynamics in South Africa in order to achieve a deeper understanding of the country's savings-investment gap saving rates in South Africa have been relatively poor, although investment rates have been uneven over time. Both variables showed an upward trajectory from 1960 to the 1970s. However, the savings rate had fallen dramatically by 2015, while investment rates remained poor and volatile as compared to the period between 1964 and 1984. To make the country more attractive to foreign direct investment, the study proposes enacting policies that will increase the cost of capital and returns on investment.

In general, applied studies indicate that the relationship between savings and investment is stronger in developed countries than in developing countries. The question to be addressed in this research is: Is there a long-term stable relationship between savings and investment in the Jordanian economy? To answer this question, we will check the hypothesis that savings and investment have a long-term stable relationship in the Jordanian economy, it is also cleared that the literature lacks satisfactory studies on savings and investment relationship in an emerging

economy like Jordan. For this purpose, we will divide this research into three main sections: the first is the method used in the research; the second is the results obtained from the application of stability tests and cointegration tests. Finally, we will try to explain and discuss the results achieved.

In recent years, the analysis of the dynamic relationship between savings and investment has gotten a lot of interest, particularly in emerging economies like Jordan. After the 1980s, the importance of savings and spending in fostering Jordan's economic growth has been emphasized. Savings and investment have long been regarded as two crucial macroeconomic factors with microeconomic foundations for promoting employment opportunities and achieving price stability thereby leading to long-term economic growth. Jordan's growth process has been almost stable over the last three decades. Several empirical studies indicate that the Jordanian economy's year-to-year volatility in growth rate was one of the lowest. Given this, the role of savings and investment in proving the economy's fundamental growth impulses cannot be overstated.

Theoretical Framework

Two savings, investment and growth hypotheses will be used to describe the effect of saving and investment on economic growth in Jordan: the neoclassical theory and the endogenous growth theory of savings and investment.

Neoclassical Theory

Neoclassical Economics is the name assigned to an economic hypothesis established in Europe at the end of the nineteenth and beginning of the twentieth centuries. Léon Walras, Alfred Marshall and Vilfredo Pareto were significant contributors to this theory. The distribution of power between industrialists and workers was the issue that neoclassical economics tackled in order to ensure adequate savings and investment.

Today, neoclassical theory is of significant concern for millions worldwide. The fundamental issues facing people are: How much should they save on their income in the future? What are the threats they should be insure against? How are they going to invest the savings? According to this theory, consumption is a function of disposable income, and savings is income that has not been spent, while investment is income that has been spent. This implies that savings and investment are also determined by disposable income. Savings determine investment, according to this theory states, because it is more concerned with market

equilibrium and economic growth at full employment than with under-employment of resources.

Endogenous Growth Theory

This study is also focused on Pagano's endogenous theory (1993). The theory identifies the possible impacts on economic growth of savings and investment as a linear function of capital accumulation. The theory suggests that efficient financial sector will impact economic growth by means of three channels: decreased transaction costs, better capital allocation and savings rates.

The two theoretical frameworks are highly important since they give significant explanations for how savings and investments impact Jordan's economic growth. The neoclassical savings and investment theory describes how saves and investment drive the rate of economic development. To encourage economic growth, the endogenous growth hypothesis establishes a link between accumulated savings and productive investments (through lending activities). All of these characteristics of the theories make them useful for our inquiry.

DATA AND METHODOLOGY

The data for this study have been collected from the Department of statistics Jordan, World Bank Database and central Bank of Jordan. The data on savings, investment and other variables are collected in the Jordan economy during the period (1980-2020). The study uses the annual data on select variables for the sample period. In order to verify the causality between saving-investment relationships in Jordan. This article differs from other studies in the literature by conducting a unit root test that establishes a structural break in the time series and by analyzing the relationship between savings and investment using the Autoregressive Distributed Lag (ARDL) approach to cointegration For the purposes of this study, we used a linear regression model to determine the nature of the relationship between investment and savings as follows:

$$I_t = a_0 + \beta_1 S_t + \varepsilon_t \qquad (1)$$

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 ε_t is the disturbance term.

Before dealing with the cointegration test, the stationarity of the employed variables must be investigated. In order to test the order of integration of the variables, the ADF, P.P and Lumsdaine and Papell unit root test will be applied. Following the stationarity test, Pesaran et al. (2001)'s Autoregressive Distributed Lag (ARDL) bounds testing technique to cointegration would be employed to investigate the variables' long-run correlations. This method is employed because it performs better in small samples than other methods. It can also be utilised regardless of the order of integration of the regressors in which the regressors are integrated. Estimating an unlimited error correction model with the general form described below, in which each variable functions as a dependent variable in turn.

$$\Delta LN(IG_t) = \alpha_0 + \alpha_1 LN(IG_{t-1}) + \alpha_2 LN(SG_{t-1}) + \sum_{i=1}^{q} \alpha_{1i} \Delta LN(IG_{t-i}) + \sum_{i=1}^{p} \alpha_{2i} \Delta LN(SG_{t-i}) + \varepsilon_{1t} \quad (2)$$

$$\Delta LN(SG_t) = \beta_0 + \beta_1 LN(SG_{t-1}) + \beta_2 LN(IG_{t-1}) + \sum_{i=1}^{q} \alpha_{1i} \Delta LN(SG_{t-i}) + \sum_{i=1}^{p} \beta_2 i \Delta LN(IG_{t-i}) + \varepsilon_{2t} \quad (3)$$

The bounds test is based primarily on the joint F-statistic, which has a nonstandard asymptotic distribution under the null hypothesis of no cointegration. The first step in the ARDL bounds test method is to approximate equations (2) and (3) using OLS, which performs an F-test for the joint significance of the coefficient of the lagged level of the variables to test for the presence of a long-run relationship among the variables. consequently, the no-cointegration null hypothesis for equations (2) and (3) are stated as follows:

$H_0: \alpha_1 = \alpha_2 = 0$ against $H_1: \alpha_1 \neq \alpha_2 \neq 0$

$H_0: \beta_1 = \beta_2 = 0$ against $H_1: \beta_1 \neq \beta_2 \neq 0$

The upper and lower critical bound are utilize to know whether variables are co-integrated for the long-run association. If all the variables are stationary at I(0), then lower critical values are used to examine the cointegration between the series. Upper critical bound is used to analyze long-run cointegration among the series if the variables are at the mixed stationery of I (1) (Shahbaz et al., 2010).

DISCUSSION OF THE RESULT

Unit Root Test

Since time series data were used in this study, it was important to test whether data were stationary at levels or required to be differenced to make them stationary. To prevent false associations between variables. The results obtained after data analysis were thus guaranteed to be valid. These tests are important. Before undertaking cointegration, checking for the inclusion of the unit root in the variables is the primary task. This study applies the first generation unit root tests which neglect the structural breaks but were commonly utilised in the literature on economic growth, specifically, the Augmented Dicky-Fuller, 1987 (ADF) and Phillips-Perron, 1988 (PP) test. 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

	ADF		PP	
Variables	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 table above shows the results of the Augmented Dicky-Fuller and Phillips-Perron unit root show the results of the unit root analysis of the variables are non-stationary and not integrated at the level both with constant and with constant and trend 1%, 5% and 10% levels of significance, but became integrated and stationary after taking the first difference.

Unit Root with Structural Break

Lumsdaine and Papell (1997) this test specifies the unit root tests allowing for introducing structural breaks, which has a structural breaking two-point in its sequence. Many of the studies use the template (A, which makes the two-time change in series and model (C) rate, which incorporates two-time change in series level and the slope of the trend function.

Table 2: Lumsdaine and Papell Unit Root Test

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

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

Table 2 above shows, Lumsdaine and Papell test is a unit root test that allows for two structural breaks. According to the results, the break date for the IG series is 1989 and 2018 in model A and 1999 and 2014 in model C. Since the test statistics are smaller (in absolute value) than the critical values at all significance levels in both models, the series has a unit root.

Likewise, in the SG series, the break occurred in 1989 and 2017 in model A. Since the test statistics are smaller (in absolute value) than the critical values at 5% and 1% significance levels. The break date for model C is 1974 and 2015, and the test statistics, which is smaller (in absolute value) than the critical values at all significance levels. For this reason, the basic hypothesis of unit root with the structural break is accepted. Thus, the series has a unit root.

Lag Order Selection Criteria

Table 3 Lag Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-99.3067	NA	0.002027	4.150306	4.312505	4.210457
1	77.76921	234.1346*	4.18e-07*	-3.125873*	-2.14878*	-2.825117*
2	87.23908	10.88389	6.78e-07	-2.738140	-1.278349	-2.196779
3	94.5111	10.65605	1.16e-06	-2.386869	-0.278281	-1.604903
4	96.0756	10. 19280	1.62e-06	-2.185255	0.572129	-1.162685

Following the unit root test, the ARDL model must choose a lag duration in order to generate F-statistics for cointegration (Shahbaz and Rahman, 2010). Five different information criteria were utilised to calculate the appropriate lag time for the VAR model. Table 3 shows that one lag is the best latency to employ. The values of the variables utilised in the study delayed by one period.

ARDL Bound Cointegration Test

Recent research has revealed that some regressions may be misleading if the time-series properties of the variables are nonstationary. Even when part of the regressors are endogenous,

the ARDL technique provides unprejudiced assessments of the long-run model and appropriate t-statistics. Sollis and Harris (2003).

Furthermore, the ARDL method includes determining whether or not a long-term relationship exists between the variables in a model. A "bounds testing" technique has been devised for this determination (Pesaran et al., 2001). As a result, the following ARDL model is defined to determine if there is a long-run relationship between IG and SG in Jordan. Table 4 presents the boundaries test results.

Table 4: Bounds Test Results

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

The findings suggest the presence of cointegration, based on Table 4 above, where investment is the dependent variable as the calculated = 13.2419 is greater at 5 % level than the upper bound critical value. However, when saving is taken as a dependent variable, there is no proof of cointegration as the calculated variable = 2.5079 is lower than the lower bound critical value at 5% level. In other words, these finding indicate a long-term relationship between the variables because, in line with the Feldstein-Horioka hypothesis, investment is taken as a dependent variable that inevitably means low capital mobility in Jordan. These outcome are in line with the results of Esso and Keho (2010), Narayan and Narayan (2010) and Seth (2011).

Table 5: Estimated Long-run Coefficients Dependent Variable: (LNIG)

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 5 represents the long-run results, when investment is taken as dependent variable, the long-run elasticities on investment in Jordan are generally positive. The long-term influence of saving on investment is 0.13 and statistically significant at 5% level, indicating that a 1% rise in saving would result in an increase in investment of 0.13%.

Table 6: 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

In theory, the value ECM (-1) must be significant and negative which is exactly the results are presented in Table 6. The error correction term implies that the method of adjustment to restore equilibrium is very effective. A relatively high correction coefficient of error means a smoother method of improvement. The coefficient is -1.11 and is vital at the level of 1%, which means that the convergence to equilibrium in Jordan after an investment shock takes a little more than 1 year.

CONCLUSION

This paper analyzed the empiric study of the dynamic relation between savings and investment by using the model Autoregressive Distributed Lag (ARDL) and Error Correction Model (ECM). The findings showed that saving and spending have had a long-term relationship. This finding is consistent with a number of previous literature studies which showed that savings and investing had to be combined in the long term. The results also support the findings further underpin the Feldstein-Horioka (1980) theory that there is poor capital mobility internationally. The results indicates that a significant proportion of domestic saving remains in the Jordan economy to fund domestic investment. The analysis also revealed that a negative and significant error correction term, which means the mechanism of adjustment for restoring balance is very successful. It is generally accepted in the literature that international capital mobility is of utmost importance in the allocation of resources for their optimal use. There are issues, though, relating to capital inflows and outflows. Capital inflows act as a stimulant for investment and economic growth in the receiving country and thus increasing the wellbeing of the country's people. As a result, this study recommends that ensuring a sufficient supply of savings should be a key policy priority for economic stability. The economy's exposure to abrupt fluctuations in foreign capital flows is reduced by a national savings rate that is largely in line with investment needs.

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