



Research Article

An Estimation of Harrod-Dommer Model on the Pakistan Economy: A Case Study from 1980 to 2019

Sardar Javaid Iqbal Khan (Ph.D)¹, Sardar Adil Iqbal Khan² & Rashid Nasir³

¹ Kashmir Institute of Economics, University of Azad Jammu & Kashmir, King Abdullah Campus, Muzaffarabad – Pakistan

² Applied Economics Research Center, University of Karachi, Karachi – Pakistan

³ Department of Economics, International Islamic University, Islamabad – Pakistan

ARTICLE INFO

Article history:

Received: October 17, 2024

Revised: December 26, 2024

Accepted: December 26, 2024

Published: December 31, 2024

Keywords:

Economic growth

Foreign savings

Harrod-Dommer model

National savings

Pakistan economy

ABSTRACT

Considering its importance, this study tests the empirical nexus between investment and saving over the period in the Pakistan economy. By using the Harrod-Domar Model, we have estimated the link between national saving and national investment in the Pakistan economy over the time 1980 to 2019. Various cross-country studies in the literature are evidence of a positive relationship between saving and investment. The econometric method “Ordinary Least Square (OLS)”, has been used to estimate the model. It concludes that national and foreign savings are proportionally related to investment in the Pakistani economy. From the estimates, it is also recommended that both national variables have a perfect relation in the economy. In the Pakistan economy, more savings would be needed for significant improvement in the investment. The government of Pakistan should pay more attention to enhancing encouragement through policy for not only investment but also saving rates to sustain investment in the country because the savings rate has been the main obstacle to capital availability for economic growth and development. Moreover, to enhance investment trends in the Pakistan economy, more and more savings would be needed with mega reforms harmoniousness like China Pakistan Economic Corridor (CPEC) and Special Investment Facilitation Council (SIFC).

Copyright © 2024 | International Journal of Trends and Innovations in Business & Social Sciences

Published by International Research and Publishing Academy – Pakistan. This is an open access article licensed under CC BY:

<https://creativecommons.org/licenses/by/4.0>

INTRODUCTION

Saving money means storing it safely so that it is available when we need it and it has a low risk of losing value. Saving means: such segment of income, which is not spent on present consumption. Saving has considered an important factor in economic growth of a nation. The productive capacity of an economy is increased by saving. Further, the Harrod-Domar Model (HDM) explains the concept precisely (Hochstein, 2017). Moreover, the Two-Gap Model has examined the role of saving in capital accumulation and economic development (Van Wijnbergen, 1986). In short, it plays a very important core

Author Biographies

Sardar Javaid Iqbal Khan (Ph.D) is a Professor at the Kashmir Institute of Economics, University of Azad Jammu & Kashmir, King Abdullah Campus in Muzaffarabad – Pakistan. He obtained his Doctorate in Economics from the University of Karachi in Karachi – Pakistan.

Sardar Adil Iqbal Khan is a Research Scholar at the Applied Economics Research Center, University of Karachi in Karachi – Pakistan. He received his M.Phil. Degree in Applied Economics from the University of Karachi in Karachi – Pakistan.

Rashid Nasir is a Research Scholar at the Department of Economics, International Islamic University in Islamabad – Pakistan. He received his M.Phil. Degree in Economics from the International Islamic University in Islamabad – Pakistan.

*Corresponding author:

Sardar Javaid Iqbal Khan (Ph.D) | Kashmir Institute of Economics, University of Azad Jammu & Kashmir, King Abdullah Campus, Muzaffarabad – Pakistan
e-mail: drsjikhan@ajku.edu.pk

How to Cite:

Khan, S. J. I., Khan, S. A. I., & Nasir, R. (2024). An Estimation of Harrod-Dommer Model on the Pakistan Economy: A Case Study from 1980 to 2019. *International Journal of Trends and Innovations in Business & Social Sciences*, 2(4), 442–452.

DOI: <https://doi.org/10.48112/tibss.v2i4.903>

relation in the growth for any developed also developing nations.

On the other hand, investment is the creation of resources to be employed in production, or capital formation. Investments are the additions to the country's capital stock that are included in the national income accounts. Technically speaking, change in capital stock is the flow of expenditure that further increases the physical stock of capital for investment in macroeconomics. Giving up present consumption to boost future consumption is known as investing. Alternatively, any type of spending that improves the physical stock of capital is known as investment. Since it deals with the generation of new capital, it is known as the flow idea; in contrast, capital means stock, since it deals by the volume of it has been accumulated. Investing involves purchasing material or monetary goods. Investment increases the economy's potential for production, which is crucial for a nation's economic progress. In an economy, savings are thought to be the primary source of investment. It contributed significantly to the expansion of numerous developing economies.

The HDM states that the only way to achieve economic growth is through saving (Hochstein, 2017). When perfect capital mobility exists, an increase in saving in one nation will spur investment in numerous other nations. In any nation, investments and savings are crucial to the stability of economic growth. The portion of the GDP that is most erratic is investment. It is the creation of resources for use in production or capital formation. It is susceptible to non-economic factors, including political unrest, war, and other disruptions both inside and outside the economy. Investment and saving have long been seen as essential components of economic expansion. It raises the economy's potential for production. Pakistan makes investments in tangible assets to fuel its economy. Funding is also necessary for the capital generation process itself. Both internal and external resources, such as foreign savings and national savings, may be used to finance this.

Objective of the Study

- To analyze an association among saving and investment in the Pakistan economy by using HDM over the period of experiment.

Hypothesis

- Investment and saving have relationship with the Pakistan economy

LITERATURE REVIEW

On the subject topic of the paper, in this section a detailed and latest review of the literature on Pakistan and global economies have been sighted. Saving and investment has positive association. Marrinan (1990) has found that for many nations, there is a strong link between the rates of investment and total savings in both data. Under the cross-sectional correlation and moment produced by splitting saving and investment into public and private components are two other measures of the saving-investment relationship that this study expands upon. It was discovered by him that a model with complete capital mobility could explain cross-sectional correlation and a wide range of time series. The paper contends that short-term capital mobility is probably going to be greater than long-term. Shahbaz et al., (2013) have examined the importance of mobilizing both domestic and international deposits for capital accumulation and national growth, in addition to the previously mentioned points. However, in emerging and least developed nations, low income, low savings, and low investment lead to poor growth, which makes the vicious cycle of poverty unbreakable.

In addition to the literature, Nasir et al., (2004) investigated if there is any Ricardian equivalency between savings in Pakistan, government investment, and the budget deficit. Nonetheless, because of govt's increased recurring spending, greater means are made available to the labor higher value, and the government can release more liabilities. The study demonstrates that while the nation's saving habits are unaffected by interest rates, economic growth has a considerable impact on savings. Many people save money for future expenses like weddings and education. Thus, to encourage more saving, the financial industry needs to be restructured. Like this relationship, Bibi et al., (2012) demonstrated the existence of perfect capital mobility by demonstrating that an increase in saving in one nation will increase in investment in numerous other nations. This study examines the existence of capital mobility using the technique co-integration on spanning for 39 years, although it is unable to establish correlation among

home saving and investment. It has been discovered that trade openness influences investment. When capital mobility is considered, it shows a negative relation among home investment; that is, when trade is open, there is a greater likelihood of capital flowing out of the economy. Comparably, Chaudhry et al., (2014) have seen the relationships, both terms (shorter and longer period), among national savings and the country's both policies (monetary and fiscal) variables in Pakistan for 38 years. The M2, deposit rate, inflation rate, and budget deficit are the monetary determinants in this study. The government savings, government expenditures, and government revenue (taxation) from national savings are the fiscal determinants.

The integrated cointegration bounds testing method is applied, which works not care the variables are of order 0 or order 1. To estimate the short- and long-run elasticities both ECM and ARDL techniques are used. The analysis concludes that there is a positive long- and short-term association between national saving, the deposit rate, and government spending. M2 has a long-term negative but highly significant relationship with national savings. Positive association among inflation rate with national savings. Compared to the long term, the government's saving coefficient is higher in the short term. In both models, serial correlation is absent. A combination of sound prudential rules for financial institutions and macroeconomic stability could lead to an environment that increases national savings. The relationship between Pakistani household income and saving is examined by Burney and Khan (1992). The study discovered that rural households had a significantly higher inclination to save than their urban counterparts. The study concluded that savings were positively correlated with H income, the income level of the house head, the work status of the house head, and the profession of the house head. Ahmad et al., (2006) calculated the factors influencing household savings in Pakistan's economic development process from 1972 to 2003.

The State Bank of Pakistan, the Economic Survey of Pakistan, and the World Development Series provided the data used in this study. The long- and short-term relationships were estimated using the Johansen Multiple Co-integration and Error Correction Model. The study found that while young dependency ratio, old dependency ratio, and inflation rate had a negative impact on public saving both in the short and long term, growth rate per capita income, per capita income, and interest rate had a favorable effect. The model would converge towards the long-run equilibrium with a 0.05 percentage point modification per year, according to the error correction term of -0.05. Like this relationship, Faridi and Bashir, (2010) calculated the factors influencing household savings in Pakistan's Multan area. The author employed 293 respondents' main data in total. Field surveys were used to gather the data in 2009–2010. Home savings were significantly negatively correlated with home head education level, the costs of the children's education, the size of the family, the obligations to be paid, the marital status, and the property value. The life cycle hypothesis was also validated by the study.

The relation among savings and total and non-oil economic development in Iran, this study confirms the findings of Najarzadeh et al., (2014) that savings are essential for economic growth. In Iran's economy, he also examined the long-term causation between the variables. For the empirical results, an Autoregressive Distributed Lag Model is applied to annual data covering the years 1972–2010. The study's findings demonstrate that savings have a favorable and substantial influence on overall and non-oil economic growth. Finding of the study that savings are positively and significantly impacted by both forms of economic growth. Furthermore, such estimates show the existence of a two-way long-term causal relationship among saving and both economic growth and non-oil economic growth. Kaya (2010) has found the association between domestic saving and investment in Turkey in addition to the literature. According to a useful study, a relationship between national saving and investment would not be anticipated in the scenario of perfect capital mobility. In case of perfect capital mobility, domestic saving and investment have no relationship, and savings go where the greatest return is found. Most open economies show a strong correlation among saving and investment, according to several empirical studies. Turkey underwent complete capital account liberalization in 1989; as a result, it is a perfect testing for examining the relationship among saving and investment while taking FH point of view. He employs two distinct data sets i.e. private investment saving and total investment saving for the years 1984Q1–2007Q3, to evaluate the corresponding relationship.

Similarly, regarding this link, Taylor (1996) found that while market integration has received little

empirical examination, economic historians have focused on the long-term development of global capital markets. By examining both long- and short-term conditions for capital mobility using cross sectional and time-series analysis of the relationship between saving and investment for twelve nations since 1850, this study adds to the body of literature. The findings paint a complex picture of the development of the capital market. There is a lot of cross-country variation in the sample. All things considered, the interwar period—particularly the Great Depression—marks the beginning of a period of declining capital mobility, with a tentative recovery to the level of capital mobility that was common in the late nineteenth century only recently becoming apparent. The findings of the Feldstein-Horioka test provide some credence to the traditional qualitative explanations of long-term trends in the global capital market (Ho, 2002). The findings demonstrate tightening of the correlation among saving and investment in cross-sectional data during times of global economic crisis, which is indicative of a decline in capital mobility during those times. The results of the time series indicate significant variation in the experiences of individual countries, which calls for more research.

In the same way, Husain (1995) described private saving and its factors. Although it has gradually increased over the last 20 years, Pakistan's private saving rate is still low when compared to several other developing Asian nations. Most of the increase in private saving in Pakistan, according to empirical research on the long-run behavior of saving, may be attributed to financial deepening, albeit at a very early stage of development. The age structure of the population in Pakistan has largely remained unchanged due to high rates of population growth, which also seem to be the reason for the difference in saving rates between Pakistan and Southeast Asia. This contrasts in case of the experience in the economies of Southeast Asia, because the population's demographic structure has already changed significantly over the past 20 years. Therefore, a decrease in the pace of population growth and additional financial development are probably needed to raise the long-run rate of private saving. Hussain (2005) has examined the long-term trends in Pakistan the behavior private saving and contrasted to the economies of region Southeast Asia in his research review. According to the study, Pakistan's saving rate between 1970 and 1992 was 50% lower than that of other Southeast Asian nations.

To do an econometric analysis, time series data covering the years 1970–1993 were used. The long-term behavior of saving was examined using the cointegration methodology. The study found that saving behavior was positively correlated with the percentage of the population that works, income growth, and financial dependence. Further, in addition to the literature, Hunte (2004) showed an association, remittances positive effects on financial deepening, and national research users considered the possibility that an increase in remittance flow might have an impact on saving habits. For the microeconomic variable, the author used panel data collected from 18 nations between 1983 and 2001, which was then analyzed using the OLS method. The study concluded that the calculated coefficients for the income variable were negative and statistically significantly correlated with remittance. For nations such as Bangladesh, the country intercept terms were statistically significant and positive. For high-income nations, the computed coefficient was statistically significant and negative. According to the findings, remittance flows are often lower in grater income nations than in small income countries. Remittances as a percentage of income multiplied by interest rates (Y_i) were another variable that significantly and positively impacted both remittances and savings and financial deepening.

Chaudhry et al., (2009) has conducted an analysis on foreign debt impact and the repayment of debt on the investment and nation's saving endeavors. Time series data from 1973 to 2006, used in this analysis. The State Bank of Pakistan, Ministry of Finance, Economic Survey annual reports provided data. Every variable, the Unit Root was tested using the enhanced Dickey-Fuller test. The real gross domestic product remained stable at a rate of five percent. At first, all other variables were found to be stationary. The analysis concluded that savings had a negative relationship with real GDP and real interest rate. According to the theory, the real interest rate, real GDP growth rate, and lagged investment all have regression coefficients. Further, Chaudhry et al., (2010) tried to address both the short- and long-term factors influencing Pakistan's national saving in his research review. Every variable was expressed as a percentage of GDP expressed in millions of US dollars. The study employed VECM for short-run dynamics across variables and the Johansson co-integration technique to analyze long-run relationships. The analysis indicated that public loans had a negative long-term influence on Pakistan's national savings, while the CPI, interest rates, exports, worker remittances, and government consumption had favorable

long-term effects. In the same direction, Mansoor and Khattak (2014) have investigated household saving influenced by the factors in developing nations like Pakistan. Five years' worth of data (a time series) have been gathered for this rationale from a variety of sources, including the Pakistan Economic Survey, World Bank and State Bank of Pakistan annual reports.

Because of the time limits, the primary variables have been chosen, and secondary data is being used. It has been discovered that while tax burden and inflation have a strong but negative relationship with saving behavior, employment and household income have a positive and significant association with saving behavior. Here coefficient of correlation (R^2) of 0.99, the exogenous and indigenous variables have a very strong relationship. More technically the study presents and analyzes by Kazmi and Bilquees (1993) an evaluation of saving functions for Pakistan from sixty to eighty in addition to the literature. The availability of reliable time series data was used. There are nine sections in the study. The behavior of the private sector in Pakistan shows positive responsiveness to a wide range of demographic, fiscal, and monetary factors, including the real interest rate, exports, participation rate of labor force, foreign capital inflow, and govt expenditure, in addition to income (both absolute level and growth rate). Conversely, there is a persistent negative link between private saving and imports, the inflation rate, and government saving. In the same manner, income is defined by Barr (2020) as an opportunity for saving or consuming that is often stated in monetary terms and retained by an entity for a predetermined amount of time. Additionally, it can take the form of profits, wages, salaries, rent, interest payments, and earnings that are earned over time in a variety of ways. Income is defined as an individual's total amount of monetary and non-monetary consumption capacity.

The study conducted by Iqbal (2018) shows how empirically significant human development and economic progress are. Pakistan must make consistent efforts to prioritize and advance human development to meet the formidable task of rapidly increasing growth of economy. To achieve the positive cycle of economic growth through some legal option of democracy, the health and education systems should be given the highest priority. Examining the nature of human development and how it affects Pakistan's economic growth is the primary goal of the study. In same way, Majeed and Khan (2008) have investigated connection among personal investment determinants and commercial and public investment in Pakistan. This study examined the criteria that are crucial in deciding an individual's level of personal investment in Pakistan. For a considerable amount of time, every developed and developing nation in the world has had a somewhat extensive and diverse theoretical literature on private funding. Additionally, research was used to distinguish between public and private finance, suggesting that each type of capital had unique uses and was productive (e.g., empirical results that were in line with Pakistan's time- data from 1970 to 2006). According to Ashraf et al., (2019), there is a negative correlation among investment and interest rate but positive correlation for saving and interest rate. In the same way, Khan et al., (2018) have examined the Gross Domestic Savings (GDS) of eighteen Asian nations. Study found that while tax plays little part in saving, wide money, GDP, and age dependency all significantly affect the indicator of savings.

Ismail et al., (2018) have examined saving practices in Malaysia in a similar manner. This study's primary goal was to determine saving behavior by utilizing variables related to knowledge, status of religious belief, and service quality. Data were gathered by using a mixed-methods approach. The authors of this study employed a mostly quantitative methodology, utilizing a qualitative survey. Additionally, they performed interviews as a means of cross-checking the quantitative results. This study's data analysis was done using SPSS. The study's findings demonstrated that every variable examined had a major effect on Malaysia's private sector's saving habits. Like this, Ogbokor and Musilika (2014), investigated the connection among investment and saving in the country Namibia. They provided evidence that there is no meaningful correlation, either in the short or long term, between potential savings and investments in Namibia. Dickey Fuller Unit Augmented The stationary was tested using the root test. The Granger causality test and the Johansen co integration test is used to determine, whether the variables are jointly causative. It is believed that civilizations can steer the economy in the right direction by raising government spending and lowering taxes.

MODEL SPECIFICATION

Theoretical Model

Investment = F (Saving)

Where Saving = National Saving + Foreign Saving

Total Investment = F [N S, F S]

Mathematical Model

$TI = f (NS, FS)$

$Y_t = \beta_0 + \beta_1 NS_t + \beta_2 FS_t$

Where

$Y = TI$, $t = 1980$ to 2019

Y , NS , FS , β_0 and β_1 are explained below.

Econometric Model

$Y_t = \beta_0 + \beta_1 NS_t + \beta_2 FS_t + U_t$

Where

Y is total investment

β_1 , β_2 are parameters

NS is national saving

FS is foreign saving

U is Error term

β_0 is intercept

Data

Timely data (1980 to 2019) has taken for following indicators. Total investment (Total investment to GDP). National saving (National saving to GDP). Foreign saving (Foreign saving to GDP).

Definition of Variables

Here, we are going to present definitions of variables.

Investment (TI = Y)

Total Investment is amount of available funds for investment. Its data is taken for total investment on growth is taken from the Economic Survey of Pakistan etc.

Domestic/National Saving (NS)

In the economy total income that remains after paying for consumption and government purchases. The data for domestic/national saving on growth is taken from the Economic Survey of Pakistan etc.

Foreign Saving (FS)

Foreign saving suggests that country has saved a specific amount in its external accounts. The data for foreign saving on growth is taken from the same sores Economic Survey of Pakistan.

Source of Data

For the paper, we have used secondary data and collected timely data (1980-2019). This research is limited till 2019 due to estimation of data of some variables relevant to the paper. Data were collected from many sources as mention above and State Bank of Pakistan (SBP), Statistical Year Book of Pakistan (SYBP), and World Development Indicators (WDI).

RESULTS & FINDINGS

By keeping in view the sense of HDM, in this section, firstly, we have presented the scope and significance of saving and investment status in the Pakistan economy. Secondly, the interpretation of

results is being presented. Savings and investing are extremely important in Pakistan's economy as well as in the economies of the developed and developing worlds. In an economy, savings are thought to be the primary source of investment. Due to its scarcity, it contributes significantly to the expansion of numerous developing economies. The HDM states that the only way to increase the economy is through saving. Perfect capital mobility means that if savings rise in a nation, investment will rise as well. Investments and savings both contribute significantly to an economy's stability. The portion of the GDP that is most erratic is investment. It is the process of creating resources to be employed in production or capital formation. Investment is defined as positive change and addition to the country capital stock in the national income accounts. Technically speaking, investment in macroeconomics refers to the process/flow of expenditure that improve /increase the physical stock of capital in an economy. It is susceptible to non-economic factors, including political unrest, conflict, instability, and other disruptions both inside and outside the economy.

Investment and saving have long been recognized as essential components of economic growth since they raise an economy's potential for production. Pakistan makes investments in both human and physical resources to boost economic activity. Funding is also necessary for the capital generation process itself. Both internal and external resources, such as foreign savings and national savings, may be used to finance this. To determine the significance of investment and saving and their relationship to the Pakistani economy, we gathered data on both variables and employed the econometric method known as Ordinary Least Square (OLS), which meets our goal and yields satisfactory findings. There are two types of estimated results: macro-level and micro-level. We have shown the econometric results (R square, Adjusted R square, and F statistic) at the macro and individual variable testing at the micro levels.

Descriptive Statistics

For examine the relationship between investment and saving in Pakistan economy. We have used the information for 1980 to 2019. Data sources are the World Development Indicators (WDI) and Economic Survey of Pakistan etc. The following table demonstrates that we have forty observations for the total investment, with a low/minimum value of 0.53 and a high/maximum value of 33.5. Average/ mean value of the gross/total investment is 5.14325, and the reliability measure/standard deviation value is 6.36983, indicating the reliability of the variable in Percentage of total investment growth to gross domestic product growth. We have forty observations for the national saving, with a minimum of 8.44 and a maximum of 171.5. The mean of national saving value is 22.77525, and the reliability measure/ standard deviation value is 25.81827, indicating the reliability of the variable. We have forty observations for the foreign saving variable, with a low/minimum value of -4.41, and a high/maximum value of 78.5. Average/ mean value of abroad/foreign savings 5.83625, and standard deviation is 12.46871, indicating reliability of the variable.

Interpretation of the Finding

The findings are according to the economic theory, which already presented in the methodology section, because the theory narrates that with an enhance in saving, the economy gets more funds for investment. Larger funds for investment mean more investment will be in the future, it is clear and evident from the results that saving is positive and significant with investment. The finding shows that if national saving increases by one percent on average, then investment increases by at the rate of coefficient that is 0.15. Therefore, the regression results show that in the Pakistan economy, there is positive relationship between saving and investment as the theory says. The result shows that if one-unit changes in the national saving (NS), consequently, total investment (TI) will be change by the rate of 0.015 unit. Next, the role of independent variable, national saving (NS) is statistically significant with the dependent variable, which is total investment (TI). The result also shows that if one-unit changes in the foreign saving (FS), so total investment (TI) will be change by the rate of 0.355 unit. The finding is also drowned from OLS methodology. Moreover, the role of independent variable, foreign saving (FS) is statistically significant with the dependent variable total investment (TI).

Result Table

$$Y_t = \beta_0 + \beta_1 NS_t + \beta_2 FSt + U_t$$

$$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 NS + \hat{\beta}_2 FS$$

$$\hat{Y} = 2.9 + 0.15 NS + 0.33 FS$$

Parameters: $\beta_0 = 2.9$, $\beta_1 = 0.15$, and $\beta_2 = 0.33$

Stderror: $\beta_0 = 1.17$ $\beta_1 = 0.1447$ $\beta_2 = 0.0699$

t statistic: $\beta_0 = 2.48$ $\beta_1 = 2.26$ $\beta_2 = 0.22$

Prob t: $\beta_0 = 0.018$ $\beta_1 = 0.030$ $\beta_2 = 0.827$

This analysis shows that the model is near to fifty explain our objective, alternatively good fitted because the value of R square is 48 percent. It also shows simultaneous significance, because F-statistics F statistic = 17.36 and F-significance = 0.0000. There is no autocorrelation, which we have seen from the Durban Watson test value, which is 2, showing no autocorrelation.

R2 (Goodness of fit)

The goodness of fit of the model is near to fifty percent ($R^2 = 0.484$). This shows that the selected explanatory variables are exactly specified. Adjusted R2 value is (0.456), which is also on average that think to be encouraging.

R Square (Adj)

Adjusted R square adjusts the degree of freedom. It is used to adjust R square with the degree of freedom of the data set. when its value comes very high then it is divided by the degree of freedom. Adjusted R square is 46 percent.

Table 1
ANOVA

	Model	Sum of squares	Df	Mean Square	F	Sig
	Regression	1582.36644	38	41.6412222	866.62	0.0269
1	Residual	.048049982	1	0.048049982		
	Total	1582.41449	39	40.5747306		

F-Test

F-test shows the overall significance. It shows the overall relationship between dependent and independent variables. The relationship among both explained variation and unexplained variation in dependent variables. Its larger/maximum 'F' value means the unexplained variation is low/small. Regarding maximum/ large 'F' value is a positive indication for our estimated regression result. The results show, model has simultaneous significance because F-test = 866.62 and Fsig = 0.0269.

Degree of Freedom

The number of independent variables and number of observation (sample size) is presented by such degree. It means more and more observations leads to the perfection of the results. It is calculated by the formula (N-K).

Table 2

Statistical Test

Total investment	Coefficients	Standard error	T	P>{t}	{95% confidence interval}	
National saving	.015	.069	0.22	0.827	.126	.156
Foreign saving	.326	.144	2.26	0.030	.0331	.619
Constant	2.889	1.163	2.48	0.018	.531	5.247

In the analysis the dependent variable is gross total investment (Y), the model is regressed in such a way, the ratio of total investment growth to GDP growth as a dependent variable and for independent

variables the ratio of National saving growth to GDP growth, ratio of foreign saving growth to GDP growth. The model average explains the relation of saving and investment. In more detail, Firstly, the mode's explanatory variable, which is national saving growth (NS) and its coefficient value ($\beta_1 = 0.015$), it is statistically significant, T-statistic is (0.22) and probability of insignificance (0.827). These estimates show that national saving is positively related to total investment. β_1 value shows that 1 unit change in national saving will change or leads to 0.015-unit changes in total investment. The FS is explanatory variable is foreign saving, coefficient value $\beta_2 = 0.326$, it is statistically significant, the T-statistic value is 2.26 and probability of significance equal 0.030. Moreover, the estimates also show that foreign saving is positively related with total investment. β_2 shows that one unit change in foreign saving will leads to 0.326-unit changes in total investment. Now we can present conclusion and recommendation of the paper.

CONCLUSION

The concept is particularly relevant to developing countries like Pakistan. The saving gap is a concept in economics that relates to the difference between the amount of savings needed to finance Pakistan desired level of investment and the actual level of domestic savings available. The relationship between saving and investment is explored in the light of HDM on the Pakistan economy. After performing the analysis, we have found that national saving and foreign saving both are positively related to total investment in the Pakistan economy. The analysis was completed on time series data for the thirty-nine years. Moreover, we can conclude that regression analysis, national saving and foreign saving are positively related to total investment for the time. The results show and guide us that for increase in investment, we must enhance the saving in the country by the measure of national and foreign saving. The coefficient of national saving has positive sign, which is evident that higher level of national saving leads to higher level of investment. Foreign saving found are also found positively significant. Higher level of foreign saving leads to higher level of investment in the Pakistan economy.

Recommendations

From the above conclusions, we can recommend: analysis show that saving and investment have on average perfect relation with each other. For increase in investment the Pakistan economy, more and more saving would be needed. In a country optimal saving rate is necessary, a nation cannot be developed without financing from both domestic and foreign sources. So, Government of Pakistan should attach more attention to enhance the investment as well as saving and investment ought to be finance through first national and then foreign sources. The paper is more related to the saving importance, which is highlighted in domestic gap and foreign gap theory of Pakistan. Moreover, the research can be extended considering the Two Gap Model. Nowadays, the interest rate is high, which is encouraging for saving but costly for investment, so it should be viable / optimal for the Pakistan economy. Moreover, to enhance investment trend in the Pakistan economy, more and more saving would be needed with mega reforms harmoniousness like China Pakistan Economic Corridor (CPEC) and Special Investment Facilitation Council (SIFC).

COMPETING INTERESTS

The authors declared no competing interests.

REFERENCES

- Ahmad, M. H., Atiq, Z., Alam, S., & Butt, M. S. (2006). The impact of demography, growth and public policy on household saving: A case study of Pakistan. *Asia Pacific Development Journal*, 13(2), 57-72.
- Ashraf, M. F., Latif, M. M., & Kanwal, H. (2019). Factors inducing the investment and saving behaviour in Pakistan. *iRASD Journal of Economics*, 1(2), 82-88.
<https://doi.org/10.52131/joe.2019.0101.0007>
- Barr, N. (2020). *Economics of the welfare state*. Oxford University Press, USA.

- Bibi, S., Khan, U. A., & Bibi, A. (2012). Determinants of investment in Pakistan. *Academic Research International*, 2(2), 517.
- Burney, N. A., & Khan, A. H. (1992). Socio-economic characteristics and household savings: An analysis of the households' saving behaviour in Pakistan. *The Pakistan Development Review*, 31-48.
<https://www.jstor.org/stable/41259536>
- Chaudhry, I. S., Malik, S., & Ramzan, M. (2009). Impact of foreign debt on savings and investment in Pakistan. *Journal of Quality and Technology Management*, 5(2), 101-115.
- Chaudhry, I. S., Riaz, U., Farooq, F., & Zulfiqar, S. (2014). The monetary and fiscal determinants of national savings in Pakistan: An empirical evidence from ARDL approach to co-integration. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 8(2), 521-539.
<https://hdl.handle.net/10419/188153>
- Chaudhry, I., Faridi, M. Z., Abbas, M., & Bashir, D. F. (2010). Short run and long run saving behavior in Pakistan: An empirical investigation. *Journal of Money, Investment and Banking*, 16, 57-66.
- Faridi, M. Z., & Bashir, F. (2010). Households saving behaviour in Pakistan: A case of Multan District. *Pakistan Journal of Social Sciences (PJSS)*, 30(1), 17-29.
- Ho, T. W. (2002). The Feldstein–Horioka puzzle revisited. *Journal of International Money and Finance*, 21(4), 555-564.
[https://doi.org/10.1016/S0261-5606\(02\)00005-0](https://doi.org/10.1016/S0261-5606(02)00005-0)
- Hochstein, A. (2017). The Harrod-Domar model in a Keynesian framework. *International Advances in Economic Research*, 23, 349-350.
<https://doi.org/10.1007/s11294-017-9639-7>
- Hunte, C. K. (2004). Workers' remittances, remittance decay and financial deepening in developing countries. *The American Economist*, 48(2), 82-94.
<https://doi.org/10.1177/056943450404800208>
- Husain, A. M. (1995). Long-run determinants of private saving behaviour in Pakistan. *The Pakistan Development Review*, 34(4), 1057-1066.
<https://www.jstor.org/stable/41259922>
- Hussain, I. (2005). Key issues in managing Pakistan's economy. *Lahore Journal of Economics*, 10, 1-26.
- Iqbal, K. (2018). Human development and economic growth in Pakistan. *SocioEconomic Challenges*, (2, Iss. 3), 66-75.
- Ismail, S., Khairuddin, N. S., Alias, N. E., Koe, W. L., & Othman, R. (2018). An empirical analysis of saving behavior among Malaysian employees. *International Journal of Academic Research in Business and Social Sciences*, 8(10), 1070-1080.
- Kaya, H. (2010). Saving investment association in Turkey. *Topics in Middle Eastern and North African Economies*, 12.
- Kazmi, A. A., & Bilquees, F. (1993). National Savings Rates of India and Pakistan: A Macroeconometric Analysis [with Comments]. *The Pakistan Development Review*, 32(4), 1313-1324.
<https://www.jstor.org/stable/41259736>
- Khan, M. I., Khan, M. K., Rehan, M., & Abasimi, I. (2018). Determinants of gross domestic saving: An evidence from Asian Countries. *Economic Research*, 2(10), 1-14.
- Majeed, M. T., & Khan, S. (2008). *The determinants of private investment and the relationship between public and private investment in Pakistan* (No. 49301). University Library of Munich, Germany.

- Mansoor, A., & Khattak, S. K. (2014). Analyzing the determinants of household's saving behaviour in Pakistan: A theoretical approach. *City University Research Journal*, 4(1).
- Marrinan, J. E. (1990). *The effects of fiscal policy on saving and investment in an open economy*. University of Minnesota.
- Najarzadeh, R., Reed, M., & Tasan, M. (2014). Relationship between savings and economic growth: The case for Iran. *Journal of International Business and Economics*, 2(4), 107-124.
- Nasir, S., Khalid, M., & Mahmood, A. (2004). Saving-investment behaviour in Pakistan: An empirical investigation [with Comments]. *The Pakistan Development Review*, 665-682.
<https://www.jstor.org/stable/41261020>
- Ogbokor, C. A., & Musilika, O. A. (2014). Investigating the relationship between aggregate savings and investment in Namibia: A causality analysis. *Research Journal of Finance and Accounting*, 5(6).
- Shahbaz, M., Shabbir, M. S., Malik, M. N., & Wolters, M. E. (2013). An analysis of a causal relationship between economic growth and terrorism in Pakistan. *Economic Modelling*, 35, 21-29.
<https://doi.org/10.1016/j.econmod.2013.06.031>
- Taylor, A. (1996). *International capital mobility in history: The saving-investment relationship* (No. 5743). National Bureau of Economic Research, Inc.
- Van Wijnbergen, S. (1986). Macroeconomic aspects of the effectiveness of foreign aid: On the two-gap model, home goods disequilibrium and real exchange rate misalignment. *Journal of International Economics*, 21(1-2), 123-136.
[https://doi.org/10.1016/0022-1996\(86\)90009-7](https://doi.org/10.1016/0022-1996(86)90009-7)