ANALYSIS OF CORPORATE SAVING AND ITS CONTRIBUTION TO CAPITAL FORMATION: A CASE STUDY OF PAKISTAN

Zafar Iqbal *, Azhar Abbas, Raza Ullah, Almazea Fatima

Institute of Agricultural & Resource Economics, University of Agriculture Faisalabad, Pakistan

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ABSTRACT

This study evaluates how much corporate saving contributes to capital formation in Pakistan as well as how they behave and how dependent they are on one another. In order to determine long-run cointegration, the model specification has been refined and applied to the Johansen cointegration and ADRL econometric models after the time series data period 1981–2021 used in the study was examined for time series properties. A basic linear trend regression was fitted to determine whether the capital creation and corporate saving rates showed any statistically significant rising or decreasing trends for the whole 1981–2021 period. The trend regression of capital formation rates is statistically significant at five percent and has a negative coefficient value of -0.10. The business savings rates show an increasing trend coefficient value of 0.04. The study also shows a moderately negative relationship between corporate sector saving rates and capital formation rates, with a simple correlation coefficient value of -0.51. Finally, the findings of the Johansen and ARDL approaches demonstrate that there has never been a long-term cointegration between corporate saving rates and capital formation rates.

* Email: ziqbalsahu@gmail.com

INTRODUCTION

Corporate savings are the portion of a company's annual profits that are saved and used for business expansion rather than being distributed to shareholders as dividends from joint stock operations. Individual savings are a combination of savings from both small businesses and households. As per Vaseer (2015) notion, if business taxes are reduced and investment incentives are offered, corporate savings will be stimulated. It is well acknowledged that saving is a crucial component of the development process. Savings contributes to development in two ways: directly by directing national resources towards capital production and indirectly by promoting technological improvement since new capital goods are typically the result of current technology. While few would argue that saving can spur development without improvements in socioeconomic institutions, education, and popular behaviour patterns, few would argue that sustained economic development in developing nations is impossible without eventually requiring a rise in the national saving propensity. Capital accumulation is defined as capital formation that involves diverting a portion of society's income from immediate consumption to capital goods production, such as instruments, machines, plants, and transport facilities, thereby increasing the stock of capital goods for future production. As per Professor Singer (1952), capital formation is the combination of tangible goods like plants, tools, machinery, and intangible goods like education, health, and research, including human capital.

Grants and loans from outside the country can also be used to finance an economy's capital production process. However, an economy's capacity and desire to generate sufficient domestic resources for investment determine its ability to maintain the progress it has made toward development. Prominent economists acknowledged unequivocally the significance of capital formation via saving. "Capitals are diminished by misconduct and increased by parsimony," as Adam Smith (1776) states. He adds that the percentage one saves each year for profit is immediately used as capital. According to Ricardo (1817), capital accumulation grows as a result of the capitalist class investing its profits, while Mark (1867) believes that surplus value created by labour is what leads to capital accumulation and is pocketed by the capitalist. Schumpeter (1995) focused on the activities of entrepreneurs while Nurkse (1953) considers capital formation as an influencer of the vicious cycle of poverty, Lewis (1954) links economic growth to an increase in capital formation, and Cairncross (1963) advocates a close relationship between Capital accumulation and economic growth. It is made clear that the higher the percentage of saving in an economy, the higher the resources allocated to investment, and consequently, the higher the level of capital stock in a nation would be. As a result, an economy's capital generation, and saving and investment levels are positively correlated. Thus, rather than development being a function of capital generation, it is alternatively believed that capital is generated during the process of development.

Techniques for resource mobilization determine how quickly capital is formed. Generally, there are two ways for a nation to quicken its capital formation rate, firstly through the mobilization of internal resources, and secondly through external resource mobilization. Internal resource mobilization approaches are divided into two primary groups. The first one includes savings-drive initiatives, which have the dual effect of lowering consumption and reallocating funds for investments. For such a drive, the policies are intended to encourage public, business, and

household saving. This can be achieved through improving the function of money and capital markets, which can be accomplished through monetary policy that is implemented well. Consequently, different financial entities such as banks are used to raise the investible capital. The second approach includes fiscal measures to reduce extravagant consumer expenditures. Monetary and fiscal policies are tailored to discourage extravagant consumption and to stimulate saving. The government receives the resources from producers and consumers and uses them to create capital. In order to finance investments that can raise productivity, accelerate economic growth, and raise living standards in the future, national savings and foreign borrowing are needed, hence constituting external resource mobilization. A higher quality of living for themselves and the payment of the government's obligations to the elderly would be simpler for future workers to attain with increased economic growth resulting from greater savings now, according to Posner and Irving (2001). Lewis (1954) asserts that the saving ratio is not solely determined by income level but also by the amount of capital surplus and the income distribution between wage workers and profit earners. Lewis argues that the developing nations' low savings rates are not a result of extreme poverty but rather a small scale of their capitalist industries. Furthermore, according to him, no country is so impoverished that it cannot invest and save at least 12% of its GDP. Development is reliant on capital formation and saving, which are reliant on growth and level of per capita income.

The money that companies keep after paying taxes and dividends has been known as corporate savings. These retained earnings are used to fund future investments. If business taxes are reduced and incentives are offered for investment, corporate savings can be stimulated. According to Keynes (1936), businesses would likewise show a precautionary need for cash savings in the event of financial frictions as do households. Businesses prioritize internal and external money from markets (debt or equity) and do cost-benefit evaluations of funding sources (Modigliani and Miller, 1958). A company's choice to invest also depends on its capacity to obtain funding from outside sources. Stated differently, external funding would be expensive if enterprises were required to raise capital because of asymmetric information in capital markets (Fazzari et al., 1987; Kaplan and Zingales, 1997). It makes sense in such a situation for financially strapped businesses to put money aside for upcoming investments. According to Pecking Order Theory, retained earnings, or a company's internal funds, are the least expensive source of funding (Myers and Majluf, 1984). Because corporate savings make up a small percentage of all domestic savings, they generally did not receive much attention in previous literature. However, since the early 2000s, research has started to concentrate on the growing trend of corporate saving. Hsieh and Parker (2006) discovered that Chile's low corporate tax rates were the primary source of the increase in corporate savings. Corporate tax rates were lowered from 50% to 10% in 1984–1986 as a result of tax reforms. This helped stimulate corporate saving in an undeveloped financial sector, which was subsequently accompanied by a remarkable increase in investment and GDP growth rates. There were no comparable corporate rate tax cuts in India; however, between 2000 and 2009, there was an increase in corporate saving. Among other things, this increase can be linked to strong growth in sales and profitability. In advanced economies (like US, UK, Canada, France, Germany, Italy, Japan, Korea, and the Netherlands), empirical evidence shows that the determinants of corporate cash holding were transaction motives, precautionary or uncertainty motives, agency motives, and lower effective tax rates. Expanding firms and R&D spending by public

firms accounted for the rise in the higher rate of excess savings, and declining tax rates were also playing a significant role in boosting corporate net lending over the last 15 years (Dao and Maggi, 2018). Cash flow positively impacted firm stock changes in 11 Asian economies, leading to increased savings when cash flow increased as noted by Horioka and Terada-Hagiwara (2014). They further found that cash flow positively influenced cash stock changes in small firms in developed economies, while it declined with firm size in developing economies. In 1986, gross corporate savings in the USA reached 9.3 percentage points, while net corporate savings reached 4.8 percentage points. The decrease in corporate savings is primarily attributed to higher interest rates and decreased profits (GAO, 2001). Some relevant work of researchers on corporate savings, capital formation, and development is briefly discussed next.

Pitelis's (1987) study explored the imperfect substitute relationship between individual savings and corporate retention savings. For this purpose, they used time series data, for which there existed no long and short-run substitute relation. The study explained that it was unwise to exclude corporate savings from the determinants of savings and consumption. OECD (2007) found that net saving had been unusually high since 2002 in the OECD corporate sector, which negatively affected net lending and resulted in a low rate of interest. It was found that relatively lower prices of capital goods, lower dividend payments, weak investment, country-level differences, and an increasing share of buy-backs are prominent factors contributing to the rise in corporate saving.

Riddick and White (2009) explored the phenomenon of why firms hold liquid assets instead of investing funds in the physical investment of non-financial firms in the USA (from 1972 to 2006) and Canada, the U.K., Japan, France, and Germany (from 1994 to 2005). It has been found that a positive productivity shock increases both cash flow and marginal propensity to invest; firms lose some of their existing cash- savings to invest. So cash savings are reduced with an increase in cash flow, and it was also found that firms tend to save more because of income uncertainty rather than the presence of external finance constraints. Rodrigo et al. (2013) studied a sample of firms (from Germany, Italy, Japan, and the UK) for the period 1997–2011 and found that excess savings and a decline in gross capital formation were a result of firm's credit constraints and a low firm growth process.

Horioka and Terada-Hagiwara (2014) found that Asian firms saved more for future investment opportunities because borrowing was constrained while cash flow had a positive effect on the changes in cash stock in the smallest firms in developed economies, but in developing economies, the impact of cash flow declined with firm size. A small firm's propensity to save was positively related to Tobin's q and cash flow. They also found that this saving propensity declined since the 2007–2008 financial crisis. This study on corporate savings considered 11 Asian economies (firm-level data) for the period 2002–11. Karabarbounis and Neiman (2014) identified that the decline in the global share of labour in the industry was due to the low relative price of capital and the share of income from labour had declined in the majority of countries and industries. The global investment was funded by corporate savings instead of household savings. Over the last 35 years, the share of labour in industries has declined globally. It was also observed that 5% of the aggregate labour share in industries got reduced as a result of a 20% rise in corporate savings.

Chen et al. (2017) identified that investment spending was mostly funded by the corporate sector after the 1980s instead of the household saving sector at the global level, and the corporate

sector changed its position and became a net lender of funds in the global economy. It was observed that corporate profit increased because of the decline in the prices of investment capital, the real interest rate, and corporate income taxes. The firms used the flow of savings to repurchase shares, with some of it used to accumulate cash and financial assets. It was noted that the share of labour at the global level had declined. Gao and Xu (2018) explored the role of corporate savings over the business cycle and found that firms during recession accumulate more internal funds and a hump-shaped relation between firm size and the counter-cyclicality of corporate saving prevailed. Firms cut investment and shift resources to ready cash for future operations, and low capital investment further lowers future income and borrowing limits, which guide to and enforce precautionary saving of cash.

Need for the Study
Pakistan's savings rate has not shown significant long-term growth over the observed period, and its average rates have consistently and notably been lower than those of various nations, including developing, developed, and emerging countries. This is evident from the lack of substantial growth trends and consistently lower rates compared to other nations, indicating a relative stagnation in savings behavior. Growth models emphasize the necessity of high savings rates in the formation of capital; however, Pakistan's saving rate is inadequate to bridge the gap between saving and investment. Other South Asian and regional economies, such as China, India, Bangladesh, and Sri Lanka, have greater saving rates compared to Pakistan. This raises the question of why the nation's saving rates are low despite gaining independence in a similar era and being located in a similar geographic area. Political and economic stressors like instability, rising oil and food prices, and load-shedding can lead to fluctuations in savings. Many of the national economic issues can be easily managed if impediments to a higher saving rate are identified and handled prudently.

This study has two objectives: 1) to analyze the behaviour of corporate savings rates and capital formation rates along with evaluating their trends in Pakistan and 2) to find the impact of corporate saving on capital formation and also find the co-integration between them.

METHODOLOGY
This section provides the theoretical framework, graphical way, and econometric techniques to investigate the capital formation and corporate saving behaviour, specifically its growth in Pakistan, correlation, and cointegration between them. The first Section presents the methodology adopted for the objective to analyze the behaviour of corporate savings rates and capital formation rates along with evaluating their trends in Pakistan. The second section presents the empirical methodology setup for objective 2 to investigate the effect of corporate saving on corporate saving behaviour in the case of Pakistan. In addition to the above aims, this study also had the aim of finding the long-run and short-run relationships among the exogenous and endogenous variables.

Theoretical and Empirical Framework to Analyze Objective-1
For the analytical purpose of this work, corporate saving and capital formation are explained by using the following methods, with a specific overview and underpinning in the theory. Firstly, year-wise time series data and overall average period are presented to analyze behaviour of variables (Similarly, the capital formation in Pakistan with some developed countries like Japan,

UK, USA, South Asian economies Bangladesh, India, Sri Lanka, and China, the same period is compared); secondly, a graphic representation of the connection between corporate saving, and capital formation is provided; thirdly, a linear trend model was used to observe the growth of corporate saving and capital formation in Pakistan. Fourthly; the interdependence technique is used to find the degree of association between variables. The estimation of the relationship between variables utilized the yearly time series data period (1981–2021). Such data were labeled as 'Time Series'. The distribution of the data included the following variables in Table 1.

Table 1. Variables and their sources.

Code	Variable Names	Period	Source
CF	Capital Formation	1981-2021	WDI
CS	Corporate Saving	1981-2021	SBP

Methodological Setup for the Objectives 2
This section presents the empirical and econometric technique to investigate long-run cointegretion between corporate saving and capital formation. The model focuses on capital formation influenced by corporate sector savings, considering both long-term and short-term effects of explanatory variables. Model specification, data collection, and their cautions, tests of stationary (unit root test), econometric technique Johansen Cointegration Regression is used to trace out long run cointegration between variables and ARDL technique also applied for cross results. Similarly, further diagnostic tests for the model, such as the Ramsey Reset Test and Jarque-Bera Normality Test Breusch-Godfrey Serial Correlation LM Test, White Heteroskedasticity Test, Durbin-Watson Test, and, finally, stability tests for the model i.e., the CUSUM test, the CUSUM square test are applied to investigate the stability of the model.

Specification of the model, data collection, and stationarity of data
Creating an empirical model for a research study would require avoiding specification errors or biases such as the omission of relevant variables, inclusion of unnecessary ones, incorrect functional form adoption, measurement errors, and incorrect stochastic error term specification and not normally distributed error term. The model might be biased and inconsistent if the above-mentioned errors are present. The following mathematical model has been specified for this analysis: CF = f (CS). The model is transformed into an econometric equation as follows:

$$CF = \beta_0 + \beta_1 CS + \varepsilon_t \qquad (1)$$

where CF and CS represent capital formation and corporate saving. Parameter (β_1) is the long-run elasticities of CF with respect to NS, respectively. The variables and hypotheses formed under this analysis are listed in Table 2.

Table 2. Variables and research hypotheses on the influence of capital formation.

Variables	Research Hypothesis(H1)
Corporate Saving	CS has a contributing role in capital formation in the country
Long Run Relationship	Long-run relationship exist between variables

Null Hypothesis (Ho): CS has no influence on Capital Formation.

After the specification of the model of the study, data collection began after defining the research problem and creating a research plan. Secondary data were being used from secondary sources. Researchers must exercise caution when using secondary data, as it must ensure the following necessary characteristics regarding data: reliability of data, suitability of data and adequacy of data.

The econometric approach is chosen when a model is specified, including choosing variables, gathering data, using descriptive statistics for normality, and checking data for stationarity.

The unit root test is a widely used method to verify the stationarity of data by determining whether a time series is stationary or not. The Augmented Dickey Fuller (ADF) test, proposed by Dickey and Fuller (1979, 1981), was used to verify the stationarity and order of integration of each variable in the model. The Augmented Dickey Fuller (ADF) test involved estimating the following equation:

$$\Delta Y_t = \beta_1 + \beta_{2t} + \delta Y_t - 1 + \sum_{i=1}^{m} a_i \Delta Y_{t-i} + \varepsilon_t \qquad (2)$$

In the above equation, t' is the time period, ε_t is a pure white noise error term.

$$\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2}) = \Delta Y_{t-2} = (Y_{t-2} - Y_{t-3}) = \Delta Y_{t-3} = (Y_{t-3} - Y_{t-4})$$ and so on.

In the above equation, the error term is serially uncorrelated, allowing for an unbiased estimate of δ, the coefficient of lagged Yt-1, with Eviews 10 automatically selecting lag length based on Akiake, Schwarz, and other criteria (Gujarati and Porter, 2005).

Johansen Cointegration Regression

The study utilized the Johansen et al. (1990) test to confirm long-term relationships and to determine the number of cointegrating vectors. The Johansen test is a statistical method used to examine cointegrating relationships between non-stationary time series data. The Johansen test, unlike the Engle-Granger (1987) test, permits multiple cointegrating relationships. The null hypothesis for both tests was that there are no cointegrating equations, with the alternate hypothesis being the trace test which requires at least one cointegrating relationship. Johansen test was used for stationary variables at the first difference, while ARDL was a general method applicable to variables at different levels, depending on their characteristics.

Autoregressive Distributed Lag Model

The methodology for this work is a purposeful autoregressive distributed lag (ADRL) framework developed by Pesaran and Shin (1995 and 1999), Pesaran et al. (1996), and Pesaran et al. (2001). Lags values of both dependent and explanatory variables on the right-hand side were included by Pesaran and Shin (1995, 1999) to estimate and illustrate the long-run and short-run relationship with dependent variables, for example, $Y_t = \alpha + \beta_0 X_t + \beta_1 X_{t-1} + \gamma Y_{t-1} + U_t$. The ADRL model has the following advantages over the Granger (1986) and Engle and Granger (1987) tests: Maximum likelihood-based Johansen (1988, 1991,1992), Johansen and Juselius (1990), Banerjee et al. (1993), and Gregory and Hansen (1996) assert, on the one hand, that the ARDL approach to cointegration can be applied to small sample sizes (Pesaran et al., 2001), and on the other hand, it can also be used if all variables are stationary at level 1(0) or first difference 1(1) or some on level 1(0) and others on first difference 1(1). There is no doubt that the methods mentioned above are popular and widely used for cointegration among the variables (for long-term relationships).

RESULTS AND DISCUSSION
Behaviour, Trend and Association of Corporate Saving and Capital Mobilization

This section documents the behavior of corporate saving in the overall economy. Table 3 shows the corporate savings (CS) and average CS over the period 1981–2021. The figures uncover a fair degree of fluctuation in the corporate saving rates in Pakistan. This is also revealed adequately in the variability of corporate saving as a percentage of GDP. A more careful examination of the time path of the rates of corporate saving in Pakistan, however, indicates that the rates have fluctuated substantially. The corporate rates generally did not stay around their initial value in the early 1980s. The period 1981-1986, saw the rate being a minor decline afterward, the percentage of corporate savings started to trend up slowly and reached above 2 percent of GDP in 2020. In the last, ninth years of the economic journey, corporate saving level remained above two percent of GDP, except in 2019. Overall, the average corporate saving rate in the country prevailed at 1.53 percent in the last 41 years' observation of data. These patterns point towards a highly consumption-oriented society (corporate sector) making it hard to produce sufficient corporate savings that can be made available for investment. It is not a good sign for securing ample savings as they are merely some percent of GDP of the country.

Table 3. Corporate saving (CS) as a percentage of GDP in Pakistan.

Series	CS	Series	CS	Series	CS	Series	CS
1981	0.611	1991	1.456	2001	1.581	2011	1.997
1982	0.636	1992	1.408	2002	1.789	2012	1.995
1983	0.746	1993	1.380	2003	2.043	2013	2.006
1984	0.440	1994	1.555	2004	0.103	2014	2.018
1985	0.403	1995	1.470	2005	1.824	2015	2.468
1986	0.557	1996	1.216	2006	1.856	2016	2.044
1987	1.050	1997	1.273	2007	1.877	2017	2.516
1988	0.947	1998	1.681	2008	1.926	2018	2.680
1989	0.856	1999	1.266	2009	1.930	2019	1.767
1990	1.203	2000	1.677	2010	1.973	2020	2.628
Average		1.53				2021	2.043

Average mean the overall period (1981-2021).

Table 4. Capital formation (CF) as percentage of GDP in Pakistan.

Series	CF	Series	CF	Series	CF	Series	CF
1981	18.77	1991	18.90	2001	17.40	2011	14.12
1982	19.26	1992	20.13	2002	16.12	2012	15.08
1983	18.79	1993	20.69	2003	16.67	2013	14.96
1984	18.27	1994	19.40	2004	16.43	2014	14.64
1985	18.33	1995	18.55	2005	17.72	2015	15.71
1986	18.76	1996	19.00	2006	19.33	2016	15.94
1987	19.13	1997	17.92	2007	18.79	2017	16.33
1988	18.01	1998	17.71	2008	19.21	2018	17.07
1989	18.91	1999	15.56	2009	17.55	2019	15.50
1990	18.94	2000	17.58	2010	15.80	2020	14.82
Average		17.47				2021	14.64

Average mean for the overall period (1981-2021).

The analysis was carried out for an examination of the behaviour of capital formation in the economy as a whole during the study period. Table 4 shows the capital formation as a percent of GDP (average saving) and average rates of capital formation over the period 1981–2021. It is seen that there is a fair degree of fluctuation in the propensity to formation in Pakistan. This also reveals the variability of the marginal rate of capital formation. These results support the overall finding that, due to the quick institutional and structural changes that occur during the early phases of development, the inclination to form tends to be significantly more variable in developing nations than in mature ones. A more careful examination of the path of the rates of capital formation in Pakistan, however, indicates that although the rates

have fluctuated noticeably. It's feasible to identify sub-periods within the overall period that exhibit notable variations in the capital formation rate's behaviour. There were times when the rate increased, and this increase was often maintained for a few years. In a similar vein, there were times when the rate fell below the recent historical levels and remained there for a few years. Data further indicate that the capital formation rate generally did not show an upward trend in percentage as a whole period of study. The period 1981-1993 saw the percentage rate constant and rising slowly, but afterward continued the decline trend in capital formation till 2021, except for the 2006, 2007, and 2008 years.

The description above indicates that, when considering the entire time under review and excluding variations from year to year, one can make a rough distinction based on the overall direction and size of changes in the rate of capital formation. The rates observed at the beginning of the study period were higher than those that prevailed toward the end of the study period. It is observed that there has been a declining trend in total investment and capital formation over the last twenty-six years. National saving stood always less than total investment except for three years (i.e., 2002, 2003, 2004). That is why a saving investment gap exists, which is not good for the growth of the economy. The need for foreign savings to cover the saving-investment gap is merely a reflection of the current account deficit in the balance of payments.

It has been found that capital formation for three countries in the region, viz., India, Sri Lanka, and Bangladesh, outpaced Pakistan, the findings of which are also shown individually in Table A in the appendix. It is seen that capital formation in India has significantly risen from 18.7 percent in 1973 to 31.15 percent in 2022, and India has average capital formation of 28.73 percent in the last 51 years. Sri Lanka had a capital formation of 13.06 percent in 1973 and 34.39 percent in 2022. Even Bangladesh reports rates of capital formation that are substantially higher than those in Pakistan. It was just 8.71 percent in 1973, and now Bangladeshi society has reached 32 percent in 2022. Whereas capital formation has an upward trend in India, Sri Lanka, and Bangladesh, but it is declining in Pakistan. China has wonderful facts regarding capital formation: 43.31 percent in 2021, which is very high for even the most developed countries in the world.

In a similar fashion, the study looked only at the trends in capital formation in Pakistan, yet it is also needed to look at the level the rate has achieved over the period under study and see how well it competes with the levels attained in other developing nations over roughly the same period. In Table A of the appendix, it has been shown rates of capital formation relating to some individual countries for a few years. It also shows the capital formation as a percent of GDP relating to some developed countries as well as some developing countries. It is seen that capital formation rates in Pakistan are much lower than average rates in developing nations. Table A shows that capital formation in these developed countries (Japan, USA, UK) has gradually declined. Therefore, they have established enough capital assets in their countries for economic growth. Comparing the capital formation in Pakistan with that of developing Asian countries, it is found that capital formation in Pakistan is still significantly stagnant. In this context, it outlines the opinions of many economists on capital production and its significance. It is evident from Smith (1776) that saving is crucial as the foundation for capital accumulation. Keynes (1936) was a strong proponent of raising investment. Harrod (1939) and Domer (1946) believe that capital serves two purposes: it boosts economic productivity in addition to producing revenue.

According to Nurkse (1953), the low ability to save is the cause of the capital shortage.

Another graphic way to analyze the capital formation rates and corporate saving rates in Pakistan showed different behavior in Figure 1. There was a slowly upward trend in corporate savings throughout the period except from 1981 to 1985, and in 2004 there was a huge decline in it. On the other side, it was observed that there was a declining trend in capital formation after 1993. It is pertinent to note that capital formation and corporate saving have not shown a positive association. They tend to go in the opposite direction in the last twenty-eight years. Its proof has been produced by Figure 1 of both variables showing a different trend. There is an opposite-direction trend between them.
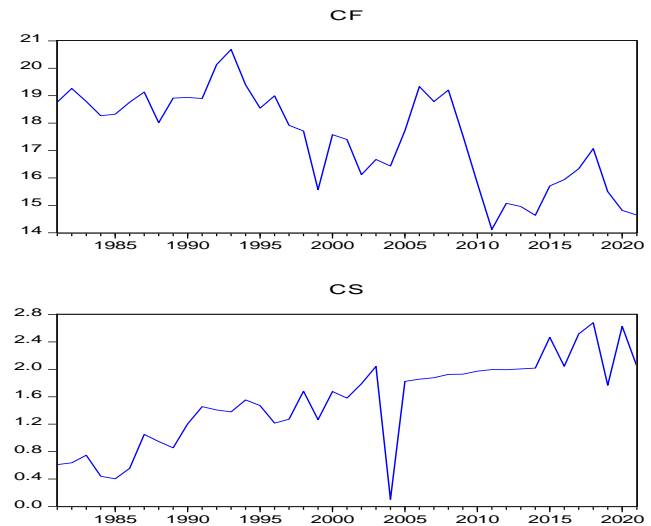

Figure 1. Association between corporate saving rates and capital formation rates.

One fact that occurs from the above debate is that one can get different impressions about the path of movement in the capital formation rates and corporate saving rates over the years. A significant question that occurs from this is whether it is possible to discern any secularly skyward movement in the rates. To see if there is any statistically significant upward or downward trend in the capital formation rates and corporate saving rates over the entire period of 1981–2021, simple linear trend regressions were fitted, with time 't' as the independent variable, to the series. In order to determine whether the capital formation rates had any statistically significant trends across the full 1981–2021 period, it is fitted a simple linear trend regression to the series using time 't' as the independent variable. The regression findings for capital formation rates are shown in Table 5.

Table 5. Results of linear trend regression of capital formation (%GDP).

Variables	Values of coefficients	T-Statistics	Probability
Constant	19.72	53.17	0.000
Time	-0.1	-6.97	0.000
R2	0.55	Ramsey Test	2.30(0.13)

It is noted that the coefficient on 't' is negative and statistically significant at five percent; the size of the coefficient is fairly small. This shows a sluggish downward trend through the observed yearly variations in the capital formation rates over the period covered by this study. The F value of Ramsey's RESET test shows that the model is correctly specified, and the CUSUM square test is also stable. Table 6 displays the findings of the corporate saving rate regression:

Table 6. Results of linear trend regression of corporate saving (%GDP).

Variables	Values of coefficients	T-Statistics	Probability
Constant	0.59	5.40	0.000
Time	0.04	9.88	0.000
R2	0.71	Ramsey Test	0.79 (Prob. 0.37)

It is detected that the coefficient on 't' is positive and statistically significant at the five percent level; the size of the coefficient is also quite small. This shows a slow upward trend running through the observed annual fluctuations in the corporate saving rate over the period. The Ramsey Reset test of model specification is insignificant at the five percent level, which shows the model is correctly specified.

Prior to doing a correlation test to fix the degree of relationship between the variables, it was first to verify that the data for the years 1981–2021 were normal. The variables have statistically normal data, as indicated by descriptive statistics. Jarque-Bera is statistically insignificant because its probability value is greater than five percent. Each of the two variables has a minor negative skew.

The first step is to determine the degree of association between the corporate saving rates and capital formation rates of the Pakistani economy. It assessed a numerical simple correlation coefficient as a measure of the relationship between variables for the period of 1981–2021. The simple correlation coefficient value, R = -0.51, indicates a moderately negative degree of relationship between corporate saving rates and capital creation rates. It is pertinent to note that corporate saving rates and capital formation rates have a negative association. They tend to go the opposite way. Its proof has been produced by Figure 1 of both variables. The conventional wisdom is that there is a positive correlation between corporate saving and capital formation.

It has been found that, first, the rates have undergone a fairly degree of fluctuation in average and marginal savings rates in both variables. Second, an upward trend is noted in the corporate savings rate and a downward trend in capital formation. Third, it is also observed that the corporate sector saving rates and capital formation rates graphically and the econometrics interdependence technique showed that there is an opposite direction between them. It is seen that capital formation rates in Pakistan are much below the average rates in developing countries.

Empirical Results for Capital Formation Model Nexus of Long-Run Relationship

In this section, the study has estimated results and presents a discussion related to objective 2, i.e., to evaluate the effect of corporate sector savings on capital formation behavior in the case of Pakistan and to find the short-run and long-run relationships among the endogenous and exogenous variables. The results of the following models and tests are presented in Section 4.2 onwards, including the Unit Root Test (ADF TEST) for stationarity of variables, the Johansen Cointegration Regression (even cross-verification results of the Auto-regression Distributed Lag (ARDL) model for long-run relationships), further results of diagnostic tests, and results of stability of model tests, respectively.

To determine whether the variables (CS and CF) have mutual relationships, first, it is necessary to check the stationarity of the variables. Table 7 indicates that the variables corporate saving and capital formation are stationary at first difference I(1). The null hypothesis (H # 0) of the variables on corporate saving and capital formation is accepted at level but rejected at first differences. The next step involved presenting the results of

Johansen Cointegration Regression and ARDL to analyze the relationships between variables in both the long and short run.

Table 7. Augmented Dicky Fuller test for stationarity of variables.

Variables	Test	I(0)	I(1)
CS	ADF	No integrated	Integrated
CF	ADF	No integrated	Integrated

To see if there was any statistically significant cointegration between the variables over the entire period of 1981–2021, the Johansen Cointegration Regression was run to test the long-term cointegration. This gave the following results, as reported in Table 8.

Table 8. Cointegration trace and max-eigenvalue tests at lag length one.

Test	Hypothesized	Statistics	Probability
Trace	None	12.90	0.11
	At Most1	01.57	0.20
Max-Eigenvalue	None	11.33	.13
	At Most1	01.57	.20

There are no cointegrating equations, as shown by the trace test and the max-eigenvalue test at the 0.05 level, respectively. There is no time series cointegration equation, which indicates that there is no equilibrium relationship between them over the long term. Rodrigo et al. (2013) found that excess savings and a decline in gross capital formation were a result of firms' credit constraints and a low firm growth process. Chen et al. (2017) identified that investment spending was mostly funded by the corporate sector after the 1980s instead of the household saving sector at the global level.

The econometric technique of autoregressive distributed lag (ARDL) is also applied to estimate the equation (1) for the long-run relation of model variables. The equation is estimated for the period 1981–2021 with the order of lag length (2), and the F-statistic value has been computed by using Eviews 10 software to calculate the results of the model and F-statistic at the 5 percent significance level. The results of the F test are shown in Table 9. The calculated value of the F test is 2.96, which is less than the lower bound critical value of 3.93 at the 5 percent significance level.

Table 9. Testing for the existence of long run relationship between the variables.

Order of Lag	F-Statistics	Lower Bound Value	Upper Bound Value	Decision
2	2.96	3.93	4.52	Insignificance

Note: 95 percent significance level.

It is a reason to accept the null hypothesis of no cointegration and reject the alternative hypothesis of long-run cointegration between the variables. It has been found that there is no long-term cointegration between the variables. The F-statistic value is calculated automatically by the EViews 10 software. The computed value of the F-statistic is comparable with Pesaran et al. (2001) table CI (iii) case III: unrestricted, no intercept, no trend given, upper bound value, but calculated value less than the table value (critical value). Additional findings were satisfactory from the stability of the model tests (CUSUM Test and CUSUM Square Test) and diagnostic testing (Ramsey Reset Test, Breusch-Godfrey Serial Correlation LM Test, Jarque-Bera Normality Test, White Heteroskedasticity Test, Durbin-Watson Test).

After the analysis of years and average rates of corporate saving and capital formation, comparisons are made between developed and developing countries. For this, econometrically, findings

linear trend model, the degree of correlation, and co-integration between the variables of corporate saving rates and capital formation rates. There is no long-run relationship between variables and a reasonable upward growth trend in it. However, capital formation and investment as a percentage of GDP have a negative or downward growth trend, while the analysis of the data showed that there is also a decline in trend between them. Analysis showed that Pakistan has low capital formation as compared to selected South Asian and developed countries. Savings are crucial for economic growth, as they enable sustained accumulation of fixed capital, leading to capital formation, technical innovation, large-scale production, specialization, labour productivity, and an increase in the GDP in countries with sufficient savings. Pakistan's Economic Survey (2015) highlights saving as a key factor in achieving economic growth, mirroring foreign savings needed to finance the investment gap.

The analysis performed makes it clear about the role of saving for capital formation as explained by the Pakistan Economic Survey (2016). Pakistan's consumption-orientated society, with a high marginal propensity to consume, hinders ample savings to pile as a percent of GDP. These results in insufficient savings, low investment, and increased demand for foreign savings. Additionally, the stagnant investment-to-GDP ratio prevents growth spurs and export earnings from increasing as a percent of GDP. The PES (2023) showed that investment remained steady at 14-15% of GDP over the past decade, while consumption increased from 86% to 92%. It is also clearly observed that Pakistan's investment is hindered by low savings rates, limited opportunities, low financial literacy, and limited capital access, resulting in insufficient savings and investment for sustainable growth and capital formation. The current corporate savings and investment levels are insufficient to boost sustainable capital formation in Pakistan for development.

CONCLUSIONS

In this study, we conducted a theoretical, statistical, and econometric analysis of corporate saving and capital formation in Pakistan to assess the relationship between them.

In the first section, the results of the analysis of objective 1 presented as corporate savings rates and capital formation rates were analyzed based on year-to-year and the average of the total period using the data period 1981–2021. The study examined corporate saving trends from 1981–2021, revealing fluctuations in saving propensity and marginal rates, and it was found that the corporate rate generally did not stay above its initial value in the early 1980s. Overall, the corporate saving rate in the country prevailed at 1.53 percent in the last 41 years' observation of data. The trend regression model indicated a slow upward trend running through the observed annual fluctuations in corporate saving rates over the period. A trend regression model showed a slow downward trend in capital formation rates. Pakistan's capital formation rates were significantly stagnant as well as compared with developing Asian countries. The study found a moderate negative association between corporate saving rates and capital formation rates from 1981 to 2021. It is seen that capital formation rates in Pakistan are much below the average rates in developing countries. The second section provided a comprehensive summary estimation and empirical results of objectives 2. The Johenson Cointegration Regression was utilized to analyze the long-term correlation between variables from 1981 to 2021, indicating no potential equilibrium relationship. The study also used the ARDL model to estimate the long-run association of model variables for the same period mentioned

above. The F-statistic value of 2.96 is less than the critical lower bound value of 2.18, indicating no long-term relationship.

In order to significantly increase the contribution of corporate saving to capital mobilization, the business sector should increase the saving rate in accordance with the needs of the investment-saving gap that exists in Pakistan. These funds invest in capital products and capital stocks.

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APPENDIX

Table A. Gross capital formation of countries (%GDP).

Country	BGD	CHN	Germany	IND	MYS	PAK	LKA	UK	USA	JPN
Series	GCF	GCF	GCF	GCF	GCF	GCF	GCF	GCF	GCF	GCF
1973	8.71	32.96	29.28	18.7	23.64	12.81	13.74	27.21	23.33	42.45
1974	7.37	33.21	26.45	22.51	28.49	13.18	15.71	27.76	22.69	41.61
1975	6.15	35.04	24.42	19.55	23.38	16.39	15.58	23.96	20.28	36.55
1976	9.91	33.22	25.56	19.42	21.84	17.47	16.21	26.08	22.04	35.51
1977	11.52	33.88	25.2	21.1	23.85	18.31	14.45	25.45	23.53	34.4
1978	11.55	37.6	25.5	22.65	26.67	16.99	20.05	24.83	24.83	34.46
1979	11.2	36.3	27.43	23.6	28.91	17.11	25.82	24.98	25.11	36.23
1980	14.44	34.61	27.21	19.56	30.42	17.67	33.77	21.47	23.31	35.95
1981	17.16	32.95	24.61	25.56	34.99	18.77	27.77	19.37	24.28	34.74
1982	17.36	31.98	23.15	25.13	37.31	19.26	30.76	20.17	22.07	33.56
1983	16.56	31.93	23.94	21.04	37.57	18.79	28.89	21.09	22.25	32.16
1984	16.48	34.38	23.7	23.29	33.56	18.27	25.83	22.21	25.1	31.97
1985	15.83	39.06	23.12	26.45	27.58	18.33	23.82	22.02	24.19	31.85
1986	16.18	37.73	23.14	26.07	25.99	18.76	23.66	21.77	23.74	31.78
1987	15.47	37.32	22.54	25.83	23.08	19.13	23.33	22.72	23.62	32.67
1988	15.74	39.08	23.28	26.28	26.36	18.01	22.78	25.44	22.83	34.64
1989	16.12	37.21	24.25	26.86	29.87	18.91	21.72	26.08	22.51	35.48
1990	16.46	34.16	24.83	27.34	32.36	18.94	22.21	23.18	21.53	36.05

1991	16.9	35.24	25.77	25.14	37.79	18.9	22.87	19.77	20.11	35.84
1992	17.31	39.07	25.26	27.44	35.36	20.13	24.28	19.01	20.08	34.15
1993	17.95	43.28	23.94	22.72	39.18	20.69	25.56	18.55	20.39	32.36
1994	18.4	40.05	24.33	26.31	41.2	19.4	27.03	19.56	21.28	30.65
1995	19.12	38.84	24.33	29.15	43.64	18.55	25.73	18.66	21.27	30.93
1996	20.73	37.54	23.26	22.76	41.48	19	24.25	18.85	21.7	32.03
1997	21.82	35.52	23.38	25.69	42.97	17.92	24.39	17.64	22.41	31.11
1998	22.12	34.81	24.02	24.98	26.67	17.71	25.14	18.17	22.96	29.59
1999	22.72	34.11	24	30.96	22.38	15.56	27.29	18	23.42	28.2
2000	23.81	33.57	24.49	25.68	26.87	17.58	28.04	18.33	23.68	28.42
2001	24.17	35.54	22.96	29.91	24.4	17.4	22	18.13	22.18	27.75
2002	24.34	36.15	20.78	30.25	24.78	16.12	23.29	18.27	21.72	25.9
2003	24.68	39.62	20.44	30.84	22.76	16.67	22.02	17.92	21.75	25.66
2004	24.99	41.85	19.84	35.1	23.05	16.43	25.25	17.7	22.65	25.64
2005	25.83	40.35	19.49	37.43	22.4	17.72	26.83	17.89	23.38	26.05
2006	26.14	39.91	20.57	39	22.7	19.33	27.98	18.27	23.54	26.08
2007	26.18	40.48	21.38	41.95	23.41	18.79	27.95	18.53	22.56	25.77
2008	26.2	42.27	21.45	38.42	21.46	19.21	27.55	17.49	21.04	25.87
2009	26.21	45.36	18.56	39.26	17.84	17.55	24.43	14.98	17.77	22.6
2010	26.25	46.56	20.07	39.79	23.39	15.8	.	16.24	18.67	22.59
2011	27.42	46.66	21.64	39.59	23.19	14.12	.	15.87	19.03	23.54
2012	28.26	46.23	19.72	38.35	25.75	15.08	.	15.88	19.95	24
2013	28.39	46.4	20.05	34.02	25.94	14.96	.	16.48	20.34	24.42
2014	28.58	45.82	20.37	34.27	24.98	14.64	.	17.61	20.78	25.04
2015	28.89	43.23	19.74	32.12	25.42	15.71	34.28	17.76	21.2	25.17
2016	30.24	42.63	19.97	30.17	26	15.94	36.45	17.94	20.57	24.84
2017	30.95	43.01	20.96	30.98	25.55	16.33	39.73	18.35	20.81	25.21
2018	31.82	43.79	21.92	32.34	23.9	17.07	38.06	18.1	21.21	25.64
2019	32.21	43.25	22.12	30.1	21.05	15.5	34.11	18.27	21.32	25.79
2020	31.31	43.37	22.09	28.75	19.7	14.82	32.98	17.26	21.05	25.26
2021	31.02	43.14	23.29	31.23	22.27	14.64	36.74	18.29	21.1	25.6
2022	32.05	.	24.83	31.16	23.89	15.14	34.39	18.77	.	.
Average	21.22	38.78	23.05	28.74	27.74	17.23	26.1	19.97	21.98	30.08