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Determinants of Real Private Investment in Agriculture Sector of Pakistan

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ABSTRACT

This paper explores the determinants of real private investment of agriculture sector in Pakistan. Real development spending and real interest rates representing the economic policy environment along with price of capital and income in agriculture sector are included to determine real private investment of agriculture sector. With the consideration of endogeneity due to reverse causality, we employ 2SLS, LIML and GMM techniques. The growth in agriculture income and developmental spending have positive impact on real private investment whereas higher real interest rates and increasing prices of capital goods reduce real private investment in Pakistan.

Keywords: *Real Private Investment; Developmental outlays; real interest rates; capital goods; economic growth; agriculture; 2SLS; LIML; GMM.*

JEL classification: *E2; E27; E4; E6*

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1. INTRODUCTION

Capital as a factor of production has been a subject of great concern for macroeconomists. From Neoclassicals such as Solow, to New Keynesians, economists vehemently underscore the importance of capital accumulation and investment. In 1956, Robert Solow proposed a "model of long-run growth" that did away with one of the critical assumptions of the famed Harrod-Domar model (Easterly, 1997). Solow hypothesized that capital and labor need not be used in fixed proportions in the long run (Solow, 1956). The emphasis on the variable capital and labor proportions to produce output stressed the marginal product of capital and, subsequently, technological changes. This proposition underlined that capital is accumulated through savings, which translate into investments- noting that some of the capital is depreciated over time. A steady state level of economic growth is achieved when savings are equal to net investment. To enhance the steady state level of economic growth, a savings rate higher than net investment becomes imperative. Eventually, this leads the economy to a higher growth steady state equilibrium. Therefore, savings and investment play a critical role in enhancing the growth trajectory of the economy.

A vast amount of literature expounds upon the importance of capital, and subsequently the impact of macroeconomics policies. on private investment. Empirical research largely postulates that private investment indeed provides a bigger stimulus to economic growth. Moreover, private investment also deems to be more efficient (Hoeffler, 2002; Calamitsis et. al. 1999; Oshikoya 1994). Rodrik (1991) posits that private investment becomes a "necessary ingredient" for highly indebted countries striving to pursue sustainable recovery. Such countries may be entangled in an impasse when they undertake reforms that include structural features. Productive sectors such as agriculture of the economy are needed to react to these reforms for the new policies to be a success, but the businesses would, rationally, wait until the uncertainty created by macroeconomic reforms is done away with. That the businesses are needed to act viz-a-viz the reforms, but they would rationally first wait for the impact to first unfold creates the impasse. An important aspect, given the current macroeconomic reforms carried out in Pakistan, is the impact of policy uncertainty on private investment. Acosta and Loza (2004) investigate the determinants of short and long run private investments in Argentina and finds that investment in the short run depends on the shocks in return and in aggregate demand. In the long run, however, investment decisions are determined by well-developed financial and credit markets as well as fiscal sustainability. Pereira and Roca-Sagales (2001) assess the impact of public capital formation on private investment for Spain. Overall, at the aggregate level, it appears that public capital is indeed crowds-in private inputs while enhancing overall private output as well. Services sector, overall, is apparently helped most by public capital formation. Except for agriculture sector, all sectors seem to gain from public capital formation in the economy. Al Sadig (2013) estimates the relationship between foreign direct investment and domestic private investment in various countries over the long run. The study finds that FDI crowds in domestic private investment. In addition, when countries are grouped based on their income levels, it is discerned that this "crowding in" effect is dependent on the availability of human capital in low-income countries.

Although a disaggregated view on the variables affecting real private investment is presented is relatively uncommon, some studies have estimated the private investment function sector-wise as well. Assessing the relationship between private investment in agriculture and public sector program in Pakistan, Looney (1994) stresses that there exists a negative relationship between them. For manufacturing, Looney (1995) has emphasized that public investment has crowded out private investment in Pakistan. Such spending by the government has diverted other investments, which could have been used in productive activities. Ahmed and Qayyum (2007) assess the impact of macroeconomic uncertainty and public expenditure on private fixed investment. They find a long-run relationship between private fixed investment, market activities, and public expenditure- both

developmental and consumption-oriented. While developmental public expenditure stimulates private fixed investment, consumption oriented public expenditure has the opposite effect. In addition, the paper finds, uncertainty and macroeconomic instability hinders private investment in Pakistan. A wide range of research (Hyder 2001; Hyder & Ahmed 2004; Saeed et al 2006) has estimated the positive impact of both public and private investment on growth and investment in agriculture sector. Besides their complementarity, there is obviously the comparison between private and public investment, in terms of their respective effectiveness.

Empirical research highlights two competing aspects of macroeconomic policies while focusing on private investment viz-a-viz government borrowing. On the one hand, the monetary tightening due to excessive public sector borrowing leads to crowding out of the private sector, thus reducing private investment. On the other hand, expansionary fiscal policy, particularly public sector spending on development, augurs well for private investment. Researchers have strived to quantify impact of both these competing aspects on private investment— contraction due to crowding out and expansion due to fiscal developmental expenditure. This research will contribute to the existing literature in identifying not only the determinants of private investment but also the extent of their impact, with special emphasis on the role of fiscal and monetary policies.

The objective of fiscal and monetary policies is to achieve sustainable economic growth in the long run. However, these policies correct the imbalances and introduce stabilization measures in the case of overheating economy in the short run. Therefore, demand management policies provide incentives to expand private sector in the recession and contract it during booms. In specific context of private investment, the policies aim at reducing the uncertainties to achieve a smooth sustainable path of investment by restoring investors' confidence. Fiscal and monetary policies provide tools for managing the demand in the economy. In the long run, fiscal policy can impact the aggregate supply through labor-leisure choices, technology, and productivity, in addition to managing aggregate demand in the short run. Monetary policy, however, may have no impact in the long run as it only caters for the short run fluctuations in the aggregate demand. However, the spillovers of managing fluctuation in key macroeconomic variables lead to long run stability of the economy. Interest rate setting in the monetary policy has an impact on private investment directly. The infrastructure development activities presented in the fiscal policy improve investor confidence and private investment in the economy.

In the case of a developing country like Pakistan, revenues of the governments are less than the expenditures thus leading to higher fiscal deficits, which are often financed by borrowing from the banking system. Choudhary (2016) mentions that higher deficits lead to higher borrowing, leaving limited resources for the private sector. Therefore, higher deficits also lead to the crowding out of the private sector investment. On the other hand, higher development spending improves the social and physical infrastructure in the country that improves the rate of return on private capital; therefore, it also leads the private investors carrying out enhanced activity in the markets. This phenomenon is considered as "crowding in" of the private sector. Apart from the policy variables, cost of capital and profitability in the economy are also considered to bear an impact on private investment.

The estimations begin with quantifying the impact of real development spending, real interest rates, real GDP and price of capital goods on o real private investment in agriculture sector of Pakistan. External, policy, and impact assessed explanatory variables are used in the estimation procedure. International oil prices and remittances are categorized as instrumental variables whereas real development expenditures, and real interest rates are policy variables. Finally, the impacted variables such as price of capital goods, real GDP, and real private investment are incorporated. Simple OLS estimates may not be absolved from the issue of endogeneity in the explanatory variables, therefore,

2SLS, LIML, and GMM estimates are estimated. The real private investment functions of agriculture sector are assessed by considering these procedures.

The estimations show that real private investment in agriculture sector is augmented by increase in real developmental expenditure and real GDP of agriculture sector. On the other hand, increasing real interest rates and capital goods prices hinder real private investment. The regression results indicate that a 10 percent increase in real development spending improves the real private investment in this sector by 0.09 to 0.31 percent. The role of accelerator is most important in the agriculture sector as 10 percent increase in real value addition improves the investment by 14 to 28 percent. Similarly, the real private investment seems responsive to the real lending rates as 100 bps increase in the real rates contracts the private investment by 0.5 to 1.1 percent.

After discussing the introduction in the first section, stylized facts are presented in the second section. Theoretical and methodological frameworks are discussed in the third section. The fourth section discusses data sources, variable construction, and unit root tests while the subsequent section discusses findings of the results, and section 6 concludes the paper.

2. STYLIZED FACTS

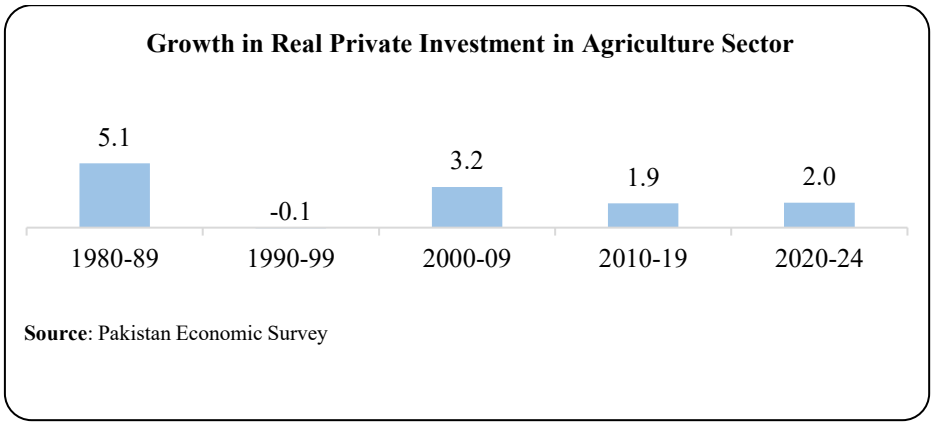
Private investment is considered the engine for economic growth and job creation. In Pakistan, private investment has been in a dismal state, remaining lower than neighboring countries for decades, resulting into a lower potential growth of the economy. This low investment relative to aggregate income in Pakistan can be attributed to lower savings rate in the country, macroeconomic instability, lack of fiscal discipline, and underdeveloped financial markets (Waheed and Ghumman, 2019).

Considering that GFCF, capital accumulation indicator, may contribute to economic growth by generating economies of scale, technology spillovers, and improvement in the external sector imbalances by developing trade competitiveness, it becomes necessary for a consumption-oriented economy like Pakistan to concentrate its resources towards investment, especially in agriculture sector. Nevertheless, the disparity between private investments made in Pakistan and its peer countries remains wide.

Figure 1 presents the dismal performance of capital accumulation in the agriculture sector of Pakistan. The annual average growth of each decade indicates the declining capital accumulation in this sector. Further, Figure 2 highlights the important role of cost of capital. The nominal growth in private credit absorption is relatively high, however, the growth in real terms becomes negligible due to higher cost of capital.

Considering the above considerations, it is essential to analyze the causes of low private investment in sector of Pakistan, with special reference to economic policies. The objective of the paper is to find out the factors responsible for “crowding out” and “crowding in” of private investment in agriculture sector. The higher deficits of fiscal sector- when government acts as dominant borrower- absorb private savings, leaving the private sector to compete for the remaining pool of supply of funds (Choudhary, 2016). However, developmental spending by the government improves the rate of return of investment, hence, “crowding in” private investment. A rise in oil prices is a negative supply shock and contracts investment from the accelerator side. (Rodriguez, 2005). However, increasing oil prices can also attract private investment because private investors may introduce new technologies for energy saving (Henriques, 2008). Most of the capital goods are imported in the case of Pakistan; therefore, the price of capital goods abroad and exchange rate become important determinants of investment. (See Collins, 2001; Serven, 2003). To put things into perspective, we provide stylized facts for Pakistan.

Figure 1: Growth in Real Private investment in Agriculture Sector



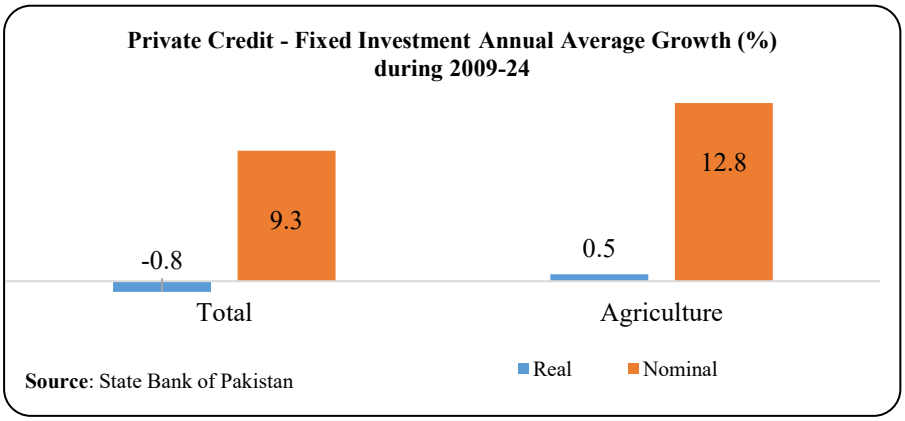
3. THEORETICAL AND METHODOLOGICAL FRAMEWORK

Synthesis from the literature (Serven (2003); Acosta & Loza (2004) Pereira and Roca-Sagales (2001) Hyder 2001; Hyder & Ahmed 2004; Looney 1994 1995) leads towards the specification of the investment function as follows.

$$I_t^r = f(DE_t^r, r_t^r, ID_t, GDP_t^r, Z_t) \quad (1)$$

I_t^r is the real private investment, DE_t^r is the real development expenditures, r_t^r is the real interest rates, GDP_t^r is the real GDP, ID_t is the deflator of private investment that can be considered as price of capital goods, and Z_t is the vector of exogenous variables. We consider a Cobb Douglas functional form for the investment functions.

Figure 2. Private Credit- Fixed Investment Annual Average Growth (%)



$$I_t^r = A(DE_t^r)^{\beta_1} \left(e^{r_t^r}\right)^{\beta_2} (ID_t)^{\beta_3} \ (GDP_t^r)^{\beta_4} \ (Z_t)^{\Gamma} \ (v_t), \quad (2)$$

Taking logs of the Eq. 2 provides the log linear specification of the investment function as follows,

$$Ln(I_t^r) = \alpha + \beta_1 Ln(DE_t^r) + \ \beta_2 \ (r_t^r) + \ \beta_3 \ Ln(ID_t) + \beta_4 Ln \ (GDP_t^r) + \Gamma Ln(Z_t) + \mu_t \quad (3)$$

Where $Ln(A) = \alpha$, and $Ln(v_t) = \mu_t$

We start by estimating Equation 3 by using simple OLS method. OLS method may lead to biased estimates due to the presence of endogeneity arising from reversing causality in the explanatory variables. Although development expenditures are exogenously determined in the budgetary proposals, this variable may cause reverse causality due to demand for development activity in a region where private firms are already operative in a specific region. In this regard, we use gross foreign borrowing as an instrument of development spending. Gross foreign borrowing in exogenous in nature and provide fiscal space for the development spendings. In addition, the lag of development spending is also considered as instrument of development spending. Higher demand for investment may have an impact on the interest rate setting in the monetary policy that may lead to the issue of endogeneity due to interest rates. Global oil prices, lag of real interest rates and inflow of remittances are used as instrumental variable for monetary stance. Remittances and global oil prices are external and global variables that can be considered as exogenous. Investment deflator, price of capital, is also an endogenous covariate. Unit value of import of transport and machinery is an external sector variable that is purely exogenous is considered as an instrument of Investment deflator. Further, real GDP may result in biased estimates due to issue of endogeneity,. To address the issue of endogeneity of the real GDP, the lags of real GDP and global oil prices are used its instruments. Therefore, we apply instrumental variable techniques with appropriate instruments that explain the explanatory variables and are orthogonal to the residuals. We apply 2SLS, LIML and GMM techniques by considering lag of explanatory variables, unit value index of machinery and transport, global oil prices, gross foreign borrowing and workers remittances as instruments. The variety of techniques are applied so that the robustness of the results can be checked. The robust estimates of the investment functions yield coefficients, which can be interpreted as the anticipated impacts of the explanatory variables upon the real private investment. Instrumental variable estimates can produce exaggerated results if instruments are weak, meaning they poorly predict the endogenous explanatory variable. To address this, we use the Cragg-Donald F-statistic test to check for weak instruments. A low value indicates weakness, leading to biased estimates such as overstated effects

4. DATA SOURCES AND VARIABLE CONSTRUCTIONS

The section presents the sources of data, variable construction and unit root properties of the variables used for estimation purposes. The Dubai Fateh prices of crude oil quoted in dollar per barrel are retrieved from Haver analytics. Workers remittances, gross foreign borrowing, unit value of import of transport and machinery, development expenditures, interest rate on advances, nominal GDP of agriculture sector at current prices, real GDP of agriculture sector at constant prices, nominal gross fixed capital formation in agriculture sector at current prices, real gross fixed capital formation in agriculture sector at constant prices, consumer price index, import price index, gross fixed capital formation of general government at current prices and gross fixed capital formation of general government at constant prices are collected from the various issues of Pakistan Economic Survey. The data of the nominal rupees dollar exchange rate and real effective exchange rate is collected from the various issues of Annual Report of State Bank of Pakistan.

Real private investment is the real gross fixed capital formation at constant prices of 2005-06. The price of investment goods, which is investment deflator, is the ratio of nominal gross fixed capital formation at current prices to real gross fixed capital formation at constant prices. Real GDP is the gross domestic product at factor cost at constant prices of 2005-06. Real private investment, real GDP, and investment deflator are computed for agriculture sector. Development expenditures are in nominal terms; therefore, we convert these into real by deflating with the index derived from the ratio of gross fixed capital formation of general government at current prices to gross fixed capital formation of general government at constant prices. Real interest rates are calculated by subtracting the

one-year ahead average inflation in consumer prices from the interest rate on advances. Remittances are collected in dollar terms and converted into rupees term by multiplying with exchange rate. The real remittances are computed by deflating the remittances in rupees term by the import price index.

The unit root tests are applied to all the variables to confirm the order of integration of the variables concerned, which are presented in Table 1. Most of the variables are integrated of order one, which implies that the data is non-stationary in log levels except real lending rates.

Table 1: Unit root tests

Variables	Log-Level			Log-differences		
	ADF	ADF-GLS	PP	ADF	ADF-GLS	PP
Real private investment	-3.57 (0.04)	-2.10 (030)	-6.07 (0.00)	-7.29 (0.00)	-7.37 (0.00)	-7.23 (0.00)
Real development expenditures	-1.77 (0.70)	-1.76 (0.67)	-1.75 (0.71)	-6.88 (0.00)	-6.96 (0.00)	-6.88 (0.00)
Real interest rates	-4.27 (0.01)	-2.67 (0.26)	-4.26 (0.01)	-7.61 (0.00)	-7.67 (0.00)	-7.65 (0.00)
Investment deflator	-3.90 (0.02)	-3.39 (0.03)	-3.61 (0.04)	-7.11 (0.00)	-7.15 (0.00)	-7.15 (0.00)
Real effective exchange rate	-1.15 (0.92)	-1.14 (0.90)	-1.55 (0.80)	-5.22 (0.00)	-3.65 (0.00)	-5.30 (0.00)
Real GDP	-1.52 (0.80)	-1.77 (0.65)	-1.33 (0.87)	-8.16 (0.00)	-8.25 (0.00)	-8.32 (0.00)
Real Remittances	-2.61 (0.28)	-1.84 (0.56)	-2.64 (0.28)	-5.55 (0.00)	-5.06 (0.00)	-5.59 (0.00)
Global oil prices	-3.67 (0.03)	-2.02 (0.35)	-3.74 (0.30)	-6.83 (0.00)	-3.73 (0.10)	-6.94 (0.00)
Unit value index of import of machinery and transport	-0.88 (0.925)	-1.26 (0.75)	-0.92 (0.95)	-5.99 (0.00)	-5.82 (0.00)	-5.94 (0.00)

5. RESULTS

This section presents the impact of factors contributing to real private investment in agriculture sector of Pakistan. It starts with the OLS estimation of the total private investment function (Equation 3) of agriculture sector. In the absence of endogeneity and omitted variable bias, OLS yields unbiased estimates. However, we cannot ignore the issue of endogeneity in estimating the private investment function. Any change in the explanatory variables may induce reverse causality, therefore, leading towards the issue of endogeneity in the estimations of real private investment functions. To handle the issue of endogeneity, the investment functions are estimated with 2SLS, LIML and GMM. The reason for estimating with diversified techniques is to ensure robustness of the estimates. Further, GMM provides estimates that are more efficient.

The real private investment in agriculture is enhanced by real developmental expenditures as well as real value added of the agriculture sector (Table 2). However, the price of capital goods in agriculture sector and real interest rates have a detrimental effect on the same. Real private investment in the agriculture sector is relatively more buoyant to the changes in real development spending. A 10 percent increase in real development spending improves the real private investment in this sector by 0.09 to 0.31 percent. The role of accelerator is most important in the agriculture sector as 10 percent increase in real value addition improves the investment by 14 to 28 percent. Similarly, the real private investment seems responsive to the real lending rates as 100 bps increase in the real rates

contracts the private investment by 0.5 to 1.1 percent. Diagnostic tests presented in Table 2 confirm the validity and relevance of the instrumental variables. The *J statistics* confirm the validity of the instrumental variables and Cragg-Donald F-statistics rejects the weak instrument problem and confirms that the instrumental variables are relevant. Further, test statistics indicate the stationarity of residuals, nonexistence of serial correlation and ARCH. Through a diverse set of estimation techniques, it is found that the developmental expenditures from the fiscal side indeed crowd in private investment whereas increased interest rates crowd it out in agriculture sector of Pakistan. Interestingly though the crowding in effect of large public developmental expenditures outweighs the crowding out effect of interest rate hikes. These findings are intended to contribute to the vast literature that already exists on the crucial issue of private investment, especially for countries such as Pakistan.

Table 2: Results of the Private Investment Function

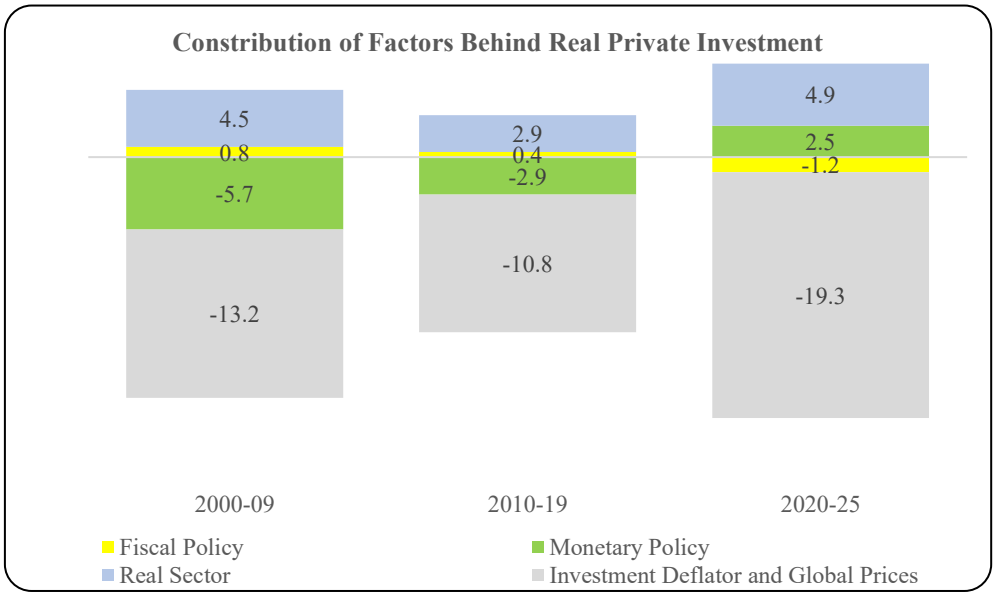
Variables	OLS	2SLS	LIML	GMM
	0.147	0.100	0.038	0.13

Figure 3.Constribution of Factors Behind Real Private Investment

Real Development Expenditures	-0.027 0.40	0.308 (2.73)	0.125 (2.78)	0.09 (2.31)
Real Interest rates	-0.005 (1.98)	-0.007 (0.03)	-0.005 (-2.58)	-0.011 (3.02)
Investment Deflator	-1.247 (7.09)	-1.336 (2.92)	-0.96 (-5.21)	-1.21 (8.67)
Real GDP	0.210 (0.44)	2.017 (2.10)	2.842 (1.70)	1.43 (1.74)
$\bar{R}^2$	0.74	0.44	0.35	0.42
Durbin-Watson	1.43	1.99	1.93	2.05
Q_{t-1}	4.6	0.20	0.235	0.08
Q_{t-1}^2	0.41	0.60	1.40	0.015
J-statistic	-	0.54	2.50	3.82
Probability of J-statistic	-	0.99	0.65	0.80
Cragg-Donald F-statistics	-	0.16	0.98	0.62

Dependent Variable: Real Private Investment in agriculture sector,
Sample: Annual Data from 1973 to 2025, Observations =50,
Instrument specification: Lag of real development expenditures, Real TB rate, Unit value index of import of transport and machinery, lag of real GDP, Gross foreign borrowing, international oil prices, lag of real effective exchange rate, lag of investment deflator of agriculture, inflow of remittances.
t-statistics are reported in parenthesis
*, ***, *** indicate significance at 1%, 5% and 10%, respectively.

Figure 3 presents the contribution of the determinants of real private investment by using the Equation 3 estimated by using the GMM.



The contributions explain the reasons behind low private investment in this sector. The cost of capital measured by investment deflator is significantly dragging the investment in the agriculture sector of Pakistan. The net impact of fiscal, development outlays, and monetary policy, real lending rates, have been reducing the private investment during 2000-2019, however, the net impact of economic policies is improving the private investment in this sector after 2020. The accelerator is mainly driving private investment in agriculture sector. The increasing value addition in the agriculture sector consistently keeping the private investment high in this sector.

6. CONCLUSION

The role of factors influencing real private investment in agriculture sector are quantified by estimating the investment function by OLS. The 2SLS, LIML, and GMM techniques are considered to address the potential endogeneity and ensure robustness. The findings confirm that real development spending and value added in agriculture sector significantly increase real private investment, while higher prices of capital goods and real interest rates reduce it. The accelerator impact is strong, as a 10% increase in agricultural value added enhances real investment by 14–28%. Fiscal development spending *crowds in* private investment, and its positive impact outweighs the crowding-out effect of higher interest rates. Diagnostic tests confirm the validity and relevance of the instrumental variables and the reliability of the estimates. Historic contributions computed using the GMM estimates indicates that high capital costs have constrained investment, while the combined impact of fiscal and monetary policies reduced private investment during 2000–2019 but began supporting it after 2020, with the accelerator effect remaining the primary driver of agricultural investment. The user cost of capital, as measured by the investment deflator, has significantly hindered investment growth. In contrast, agricultural value added has been a key driver of investment in that sector. Policy implications include reducing taxes on agricultural machinery purchases, providing farmer support, and implementing measures to boost agricultural growth momentum.

References

Acosta, P., & Loza, A. (2005). Short and Long Run Determinants of Private Investment in Argentina. Journal of Applied Economics, 8(2), 389-406. https://doi.org/10.1080/15140326.2005.12040634

Ahmed, I., & Qayyum, A. (2007). Do Public Expenditure and Macroeconomic Uncertainty Matter to Private Investment? Evidence from Pakistan. The Pakistan Development Review, 46(2), 145-161. https://www.jstor.org/stable/41260797

Ahmed, S. (2003). Sources of economic fluctuations in Latin America and implications for choice of exchange rate regimes. Journal of Development Economics, 72(1), 181-202. https://doi.org/10.1016/S0304-3878(03)00073-7

Ahmed, S., Ara, I., & Hyder, K. (2005). How external shocks and exchange rate depreciations affect Pakistan? Implications for choice of an exchange rate regime. SBP-Research Bulletin Volume 2, Number 1, 2006 https://www.sbp.org.pk/research/conf/Session_IV_ShaghilAraHyder.pdf

Al-Sadig, A. (2012). The effects of foreign direct investment on private domestic investment: evidence from developing countries. Empirical Economics, 44(3), 1267-1275. https://doi.org/10.1007/s00181-012-0569-1

Basu, A., Calamitsis, E. A., & Ghura, D. (2000). Promoting Growth in Sub-Saharan Africa: Learning What Works. Washington, DC: International Monetary Fund. https://www.imf.org/external/pubs/ft/issues/issues23/index.htm

Choudhary, M. A., Khan, S., Pasha, F., & Rehman, M. (2016). The dominant borrower syndrome. Applied Economics, 48(49), 4773-4782. https://doi.org/10.1080/00036846.2016.1164824

Easterly, W. (1999). The ghost of financing gap: testing the growth model used in the international financial institutions. Journal of Development Economics, 60(2), 423-438. https://doi.org/10.1016/S0304-3878(99)00047-4

Ghura, D., & Goodwin, B. (2000). Determinants of private investment: a cross-regional empirical investigation. Applied Economics, 32(14), 1819-1829. https://doi.org/10.1080/000368400425044

Henriques, I., & Sadorsky, P. (2008). Oil prices and the stock prices of alternative energy companies. Energy Economics, 30(3), 998-1010. https://doi.org/10.1016/j.eneco.2007.11.001

Jiménez-Rodríguez, R., & Sánchez, M. (2005). Oil price shocks and real GDP growth: empirical evidence for some OECD countries. Applied Economics, 37(2), 201-228. https://doi.org/10.1080/0003684042000281561

Kalim Hyder & Qazi Masood Ahmed, 2004. "Why Private Investment In Pakistan Has Collapsed And How It Can Be Restored," Lahore Journal of Economics, vol. 9(1), pages 107-125, Jan-June. https://lahoreschoolofeconomics.edu.pk/assets/uploads/lje/Volume9/05_Kalim_Hyder_and_Qazi_Masood_Ahmed.pdf

Kalim Hyder, 2001. "Crowding-out Hypothesis in a Vector Error Correction Framework: A Case Study of Pakistan," The Pakistan Development Review, vol. 40(4), pages 633-650. https://www.jstor.org/stable/41260355

Mallick, H., Mahalik, M.K. and Sahoo, M., (2018). Is crude oil price detrimental to domestic private investment for an emerging economy? The role of public sector investment and financial sector development in an era of globalization. Energy Economics, 69, pp.307-324. https://doi.org/10.1016/j.eneco.2017.12.008

Noman Saeed & Kalim Hyder & Asghar Ali, 2006. "The Impact of Public Investment on Private Investment: A Disaggregated Analysis," The Pakistan Development Review, vol. 45(4), pages 639-663. https://www.jstor.org/stable/41260643

Oshikoya, T. W. (1994). Macroeconomic Determinants of Domestic Private Investment in Africa: An Empirical Analysis. Economic Development and Cultural Change, 42(3), 573-596. https://doi.org/doi:10.1086/452103

Rizvi, S., & Naqvi, B. (2010). Asymmetric Behavior of Inflation Uncertainty and Friedman-Ball Hypothesis: Evidence from Pakistan. THE LAHORE JOURNAL OF ECONOMICS, 15(2), 1-33. https://doi.org/10.35536/lje.2010.v15.i2.a1

Rodrik, D. (1991). Policy uncertainty and private investment in developing countries. Journal of Development Economics, 36(2), 229-242. https://doi.org/10.1016/0304-3878(91)90034-s

Servén, L. (2003). Real-Exchange-Rate Uncertainty and Private Investment in LDCS. Review of Economics and Statistics, 85(1), 212-218. https://doi.org/10.1162/rest.2003.85.1.212

Sial, M. H., Awan, M. S., & Waqas, M. (2011). Role of institutional credit on Agricultural Production: A Time series analysis of Pakistan. *International Journal of Economics and Finance*, *3*(2). https://doi.org/10.5539/ijef.v3n2p126

Sial, M. H., Awan, M. S., & Waqas, M. (2011). Institutional credit and agricultural production nexus. Int. J. Bus. Soc. Sci., 2(13): 279-284

Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. The Quarterly Journal of Economics, 70(1), 65. https://doi.org/10.2307/1884513