Contribution of Private Sector Investment in Large-Scale Manufacturing Sector of Pakistan

Gulzar Ali [1], Zhaohua Li[2] and Shah Muhammad Kamran[3]

Abstract

This study has tried to determine the contribution of private sector investment in large-scale manufacturing sector of Pakistan using time-series data for the period of 1981-2010. The OLS technique is used for the regression analysis and the results shows that private sector investment plays a significant role in manufacturing sector of Pakistan. All the variables have true expected sign showing significant affect on manufacturing sector in Pakistan. The study recommends that the government should create a sufficient demand by increasing domestic purchasing power, by export expansion, by import substitutions through assets redistribution. But all these policies may be difficult to implement in that, they have other impacts on the domestic economy. Export expansion and import substitution may be quite desirable for increasing demand. Government should take into consideration not only the conditions in domestic economy but also the international economy and finally the assets redistribution may be difficult politically.
Key Words: private investment, Large-scale Manufacturing Sector of Pakistan, investment model & OLS Technique.

1. Introduction and Importance of the Study

Investment plays an important role in economic growth of a country as it raises the productive capacity of the economy, affects the employment level and promotes technical progress through embodiment of new techniques. Investment is considered as a key factor in determining the level and fluctuation in national income and overall economic activity in a country. When expenditure on goods and services falls during a recession, much of the decline is usually due to a drop in investment spending. Of course, the return to capital is lower in recession and higher during booms. Consequently, all the countries particularly the developing countries, desire such an economy in which investment increases smoothly over time. Thus, investment plays a dual role; affecting short-run output through its impact on aggregate demand and influencing long-run growth through the impact of capital formation on potential output and aggregate supply (Herzer 2011).

Investment is a major component of the national income of the industrialized countries, typically it comprises between ten to twenty-five percent of national income, although there are significant variations across countries and across time (Atkinson et al 1998). Therefore, it is very important to explore the determinants of real physical capital formation in any economy and especially in a developing economy like Pakistan. Proper understanding of the factor determining is also essential to design effective policies to get the

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[1] *PhD Scholar, School of Economics, Huazhong University of Science & Technology, China.*
E-mail: gulzaricup@yahoo.com
[2] *Professor, School of Economics, Huazhong University of Science & Technology, China.*
E-mail: zhaouali@hust.edu.cn
[3] *PhD Scholar, School of Economics, Huazhong University of Science & Technology, China.*
E-mail: kamrankhan81@yahoo.com

desired rate of capital formation. The overall level of investment depends on the investment demand by the firms and households, the funds available for investment, and the amount of investment goods supplied (produced or improved). Simply, the three elements essential to understanding investment are: the demand for the output produced by the new investment i.e. revenues, the interest rates and taxes that influence the costs of the investment, and (business) expectations about the state of the economy (Fatima, 2011).

Liking many developing countries Pakistan too were facing several economic problems like poverty, unemployment, budget deficit, deficit financing, low economic growth, inflation etc from several decades. It's aiming to achieve steady state level in the economy and have momentum in socio-economic development. For this purpose the government of Pakistan had taken many steps to grab the attention of investor in different sector of the economy.

In this paper our main focus is on the investment of private sector in large scale manufacturing sector of Pakistan. In the early era's after the independence of Pakistan, the economy were mainly in the hand of private sector while the public sector has run only four sectors of the economy out of twenty-seven economic sector, that's is, hydroelectric power, railway, communication and arms and ammunition sectors. In 1960's the economy was more dominated by the private sector due to privatizing of the some government institutions. In 1970's the Prime Minister of Pakistan Zulfiqar Ali Bhutto adopted the nationalization policy and all the institution were handed to the government having very limited role of private sector. In 1980's again the policy of mixed economic system were introduced in the country and from 1990's to 2000, again the private sector have dominant sector over the public sector investment.

1.2 Objectives of the Study

The objective of the present study is to find out the contribution and effect of private sector investment on manufacturing sector of Pakistan.

2. Review of Literature

Investment over the years has been the only consistent variable contributing to the economic growth of nations. The role of capital stock in boosting the development in countries like Korea, China, Malaysia and many others, proves the premises adopted by the investment theorists. Empirical economics has come very close in identifying the broad determinants that play the major role in the entire process of providing the optimal impetus to the economy. Due to this fact we, also tried to find the role of investment and its contribution in Pakistan economy.

Jorgenson and Stephenson (1969) determined the private investment in manufacturing sector of the United States of America and found that only significant factor is the output. The major determinants which were tried in the model included change in output (taken on current prices), capital stock and the prices of capital service provision. The variable capital stock was included to capture the replacement investment. Researcher have tried to use seasonally adjusted quarterly data from 1948 (3rd quarter) to 1960 (4th quarter).

Pinell-Siles (1979) analyzed the private industrial investment behavior in India have found that a substantial deceleration in the rate of growth of fixed capital formation occurred due to lack of demand. The other most important variable was the tax rate, which also remained significant. The effectiveness of tax policy in stimulating private investment is found to depend critically on the form of overall packages. The conclusion emphasizes the need of reforming fiscal packages used to stimulate investment.

Hickman (1985) studied investment behavior of manufacturing sector in the United States of America. He used conventional variables such as the overall output, capital stock,

output prices and the prevalent wage rate. After observing a sample, ranges from 1949 to 1960, he compared alternative specifications and finally reduced his emphasis to a prototype of accelerator model.

Zaren (1991), attempts to identify the factors which had played significant role in determining private investment in manufacturing sector of Pakistan. Several models have been estimated by applying Ordinary Least Square (OLS) or AR (1) techniques using annual data for the period of 1962-1963 to 1988-1989. The first conclusion that the researcher had drawn was that, the naïve accelerator and flexible accelerator model of Junankar and the Neo-classical model of Jorgenson and Jorgenson-Stephenson are unable to explain the behavior of private and public investment in Pakistan.

3.   Data Analysis and Methodology
3.1.   Data Description
 The data used in this study are based on annual figures because quarterly data for most of the variables are not available from any source in case of Pakistan. The time period of the study data is from 1981 to 2010, because data prior to 1981 at constant price are unavailable. There is no direct source to complete data; therefore data are collected from Economic Surveys, Federal Bureau of Statistics, State Bank of Pakistan, Agriculture Development Bank of Pakistan (ZTBL), Cooperatives and Commercial Banks, International Financial Statistics (IFS), Pakistan Institute of Development Economics (PIDE), World Development Report (WDR), National Accounts of Pakistan and from different surveys and reports.

4.   Private Investment in Large-scale Manufacturing Sector
Manufacturing is defined as "the physical or chemical transformation of materials or components into new product". The investment is prepared on the basis of actual financial disbursement and sponsors on contributions. It is mostly done in textile and engineering sector.

The function of private investment in manufacturing (large-scale) sector is as follows:

$$I_{pm} = f(\Delta V_m, K_{m(-1)}, r_w, \Delta Dc_{pm}, I_{pk}, D_{ps}) \qquad 4.1$$

The corresponding regression/econometric equation of the above given function is given below:

$$I_{pmt} = \beta_0 + \beta_1 \Delta V_m + \beta_2 K_{m(-1)} + \beta_3 r_w + \beta_4 Dc_p + \beta_5 I_{pk} + \beta_6 D_{ps} + \varepsilon_{pmt} \qquad 4.2$$

Where

$$\beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \beta_4 > 0, \beta_5 < 0, \beta_6 > 0$$

Large-scale manufacturing sector is highly affected by government policies because of the incentives provided to this sector. A large number of variables were used to explore the determinants of capital formation in this sector. The variables in the estimated function selected for large-scale manufacturing sector are, the dependent variable is Private Investment in Large-Scale Manufacturing Sector(I_{pm}), and the dependent variables are Change in the Value-Added in Large-Scale Manufacturing Sector (ΔV_m), Lagged Capital Stock in Large-Scale Manufacturing Sector ($K_{m(-1)}$), Change in Domestic Credit available to Private Sector (ΔDc_p), Weighted Rate of Interest (r_w), Index of Price of Capital (I_{pk}) and dummy variable (D_{ps}) for the political stability and favorable condition for private investment in the country. The Investment Accelerator Model is estimated through Ordinary Least Square Method (OLS) and the results of Private Investment in Large-Scale Manufacturing Sector are given in table 4.1

Table: 4.1. Regression Results of Private Investment in Large-scale Manufacturing Sector as Dependent Variable

Variables	Coefficient	Std.Error	t-statistics	Prob.	
Constant	5462.214	0.213654	2.741855	0.0002	
ΔV_m	0.326542	0.641236	6.369852	0.0000	
$K_m(-1)$	0.063215	0.321455	5.639258	0.0000	
ΔD_{cp}	0.854712	0.987456	7.443139	0.0000	
I_{pk}	-0.066982	0.875209	-2.510930	0.0002	
r_w	-4512.907	0.654234	-2.647405	0.0002	
D_{ps}	8149.332	0.145566	4.210824	0.0000	
R-squared	0. 969039		Durbin-Watson stat		1.816245
Adjusted R-squared	0.951247		Prob (F-statistic)		0.000000

The results in the table 4.1 shows that 'Accelerator Model' quite significantly explains the investment behavior of Private Investment in Large-Scale Manufacturing Sector, as the value of R-squared is (0.96), whereas the value of Durban-Watson is (1.81) and the overall model is highly significant as the value of Prob(F-statistic) is (0.0000).

The coefficient of Change in Value-Added in Large-Scale Manufacturing Sector, Lagged Capital Stock in Large-Scale Manufacturing Sector, Change in Domestic Credit available to Private Sector and dummy variable for the political stability and favorable economic condition for private investment in Large-Scale Manufacturing Sector have positive signs and statistically significant, while that of Weighted Rate of Interest and Index of Price of Capital are negative and significant. The coefficient value of Change in the Value-Added in Large-Scale Manufacturing Sector, Lagged Capital Stock in Large-Scale Manufacturing Sector and Change in Domestic Credit available to Private Sector are (0.32), (0.06) and (0.85), which means that one percent increase in these variables will bring six (6), thirty-two (32) and eighty-five (85) percent increase in private investment in Large-Scale Manufacturing Sector. The results also suggest that the dummy variable included in the model to capture the effect of political environment and government policy in relation to state control of Manufacturing Sector of Pakistan has significant influence on private investment. Similarly, the result also shows that Weighted Rate of Interest and Index of Price of Capital are negative effect on private investment in Large-Scale Manufacturing Sector. These two variables can also be used as opportunity cost of capital. So, the key factors which seem to have a strong role in determining the private investment in this sector include the price level of capital goods, capital stock and the output level.

In time-series analysis there always remains a suspicion about spurious relationship. As this research is also based on time-series data, that is why before going to estimate the model, the data are tested by Granger and Newhold for auto-correlation. According to them, $R^2 > (d)$ is a good rule of thumb to suspect that the estimated regression is spurious or not? But the value of (d) is greater than the R-squared in this research study which shows that the data used did not show any sign of spurious relationship.

Table 4.1 (b): Unit Root results in log level form: ADF and correlogram Tests

Variables	Augmented Dickey Fuller	correlogram	Critical Value (ADF)	Critical Value (PP)
I_{pm}	-2.03	-1.89	-2.963	-2.963
ΔV_m	-2.53	-2.51	-2.963	-2.963
$K_{m(-1)}$	-1.03	-0.33	-2.963	-2.963
ΔD_{cp}	-2.50	-2.45	-2.963	-2.963
r_w	-0.44	-0.46	-2.971	-2.963
I_{pk}	-2.48	-2.21	-2.971	-2.963
D_{ps}	-2.45	- 1.87	-2.93	-1.87

Critical values selected at 0.05 %
Private Investment in Large-Scale Manufacturing Sector = (Ipm)
Value-Added in Large-Scale Manufacturing Sector = (ΔVm)
Lagged Capital Stock in Large-Scale Manufacturing Sector = (Km(-1))
Change in Domestic Credit available to Private Sector = (ΔDcp)
Weighted Rate of Interest = (rw)
Index of Price of Capital = (Ipk)   and
Dummy variable for the political stability and favorable condition for private investment = (Dps)

Most of the variables used in the model are stationary because they are real and at constant price. This has been confirmed via, unit root and correlogram test. Some of the variables were transformed into their first difference where they are stationary, while some variables are stationary at level.

The best estimate chosen on the basis of t-statistics and probability (F-statistics) of the parameters, which did not suffer from standard econometric problems such as auto-correlation, multicollinearity etc. and the estimated coefficient are statistically significant with true expected signs and economically plausible. Furthermore, an R-squared value indicates that the current specification of the individual equations explains more than (90) percent of variation.

The accelerator model developed from Keynesian Approach to investment (extension of Keynes work) is applied. All the econometric equation developed for behavioral equation is regressed through advance econometric software E-views (Econometric Views) and by applying the Ordinary Least Square Method (OLS).

7.2 Summary

The study has been an attempt to identify the factors, which affect fixed domestic capital investment significantly and which can be used as policy variables to get the desired results for capital formation, and in determining the investment behavior in Pakistan. Both models have been estimated by Ordinary Least Square (OLS) technique using annual data of the period 1981 to 2010.

The results reveal that demand is the most important determinant of investment activity, employing that the 'accelerator model' explains the investment behavior for each category quite significantly. The result shows that the level of output and costs are quite important in determining capital formation in any country.

In addition to these, a number of factors such as credit availability, profitability, government policies, capital stock held by the private manufacturing sector also have significant impact on domestic physical capital formation. While estimating various investment functions the level of political stability and favorable economic condition of a country and their possible effects towards government policies are also captured through

dummy variable. The result indicates that these qualitative factors are considered as the important determinant of private investment in manufacturing sectors. The private investment declined sharply during early 1970's and remained very low till early 1980's due to nationalization policy and the lack of confidence among business community resulting from uncertain political condition and unfavorable economic conditions. After this period, through the process of privatization the private investment regained some strength due to visible tendency towards political stability and inclination towards encouragement of private sector.

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