

Determinants of Services Sector Growth in Pakistan

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Abstract

Services sector is one of the important sectors of the economy. It contributes more than half of the GDP and has substantial share in country's exports and employment. In this study we evaluated the factors affecting services sector output growth using annual data from 1975 to 2014 and ARDL method of estimation. Pakistan's break up in two wings in December, 1971 and availability of data on most of the variables after 1975 determined the choice of sample period. Results show foreign trade, government expenditures, market size and population growth are the relevant determinants of services sector output growth in long run. In short run, services sector growth is affected by foreign trade and personal remittances. Diagnostic tests show absence of serial correlation and parameter stability. Based on estimated results, it is recommended that relevant authorities should implement policies that increase services sector output growth if they intend to augment overall economic growth of the country.

Keywords: Services Sector, GDP per capita, ADF Test, ARDL method, LM test, CUSUM

Introduction

GDP is composed of three main sectors; agricultural sector, industrial sector and services sector. Services sector is one that accounts for more than fifty percent of GDP of Pakistan. The purpose of conducting this research is to identify factors affecting services sector growth in Pakistan.

Historical growth in services sector growth

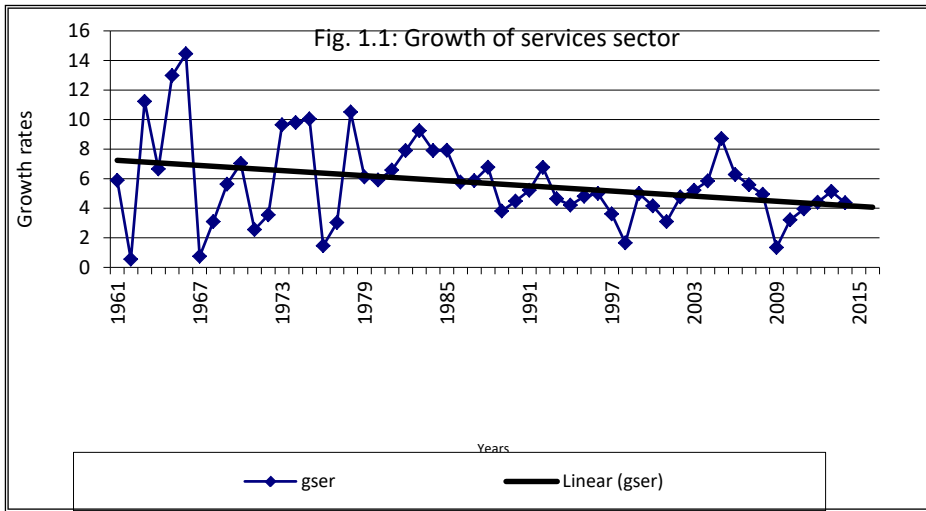


Figure 1.1 shows historical growth of service sector in Pakistan. From linear trend we conclude that services sector has grown over the time with decreasing trend.

Contribution of services sector in economic growth:

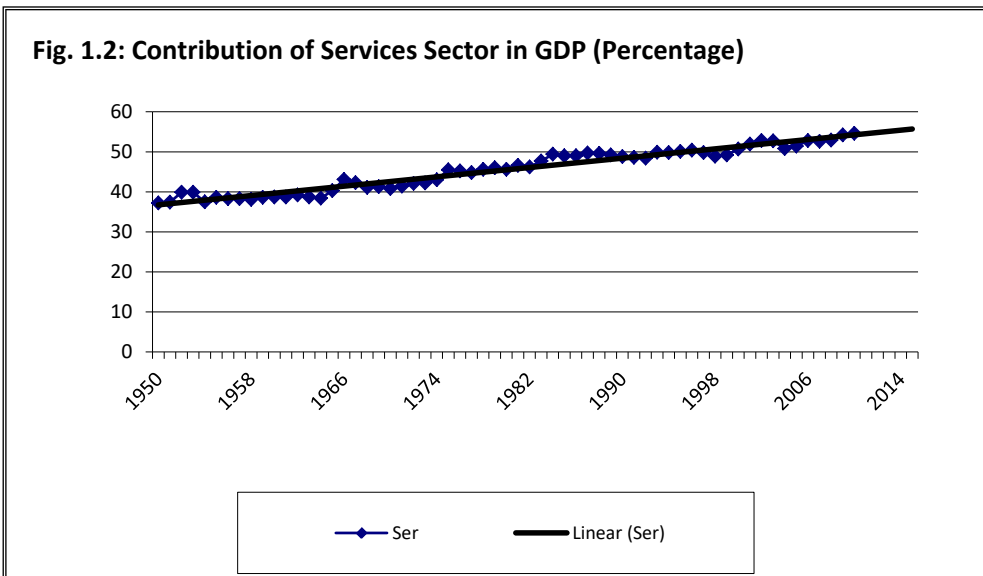


Figure 1.2 shows services sector contribution to overall economic growth in Pakistan. It is evident from the figure that services sector contribution to overall economic growth has increased over a time. This increase could be due to drop in agricultural sector contribution or overall increase in services and industrial sector output growth.

Based on sectoral contribution, we could say that Pakistan which heavily depended on agricultural sector till 1980 is now a services and industrial based economy. Services sector contributes 58.8 percent to economic growth (Economic Survey of Pakistan, 2014-2015) and any swing in services and industrial sector output growth has major effect on economic growth of the country.

Contribution of services sectors in exports

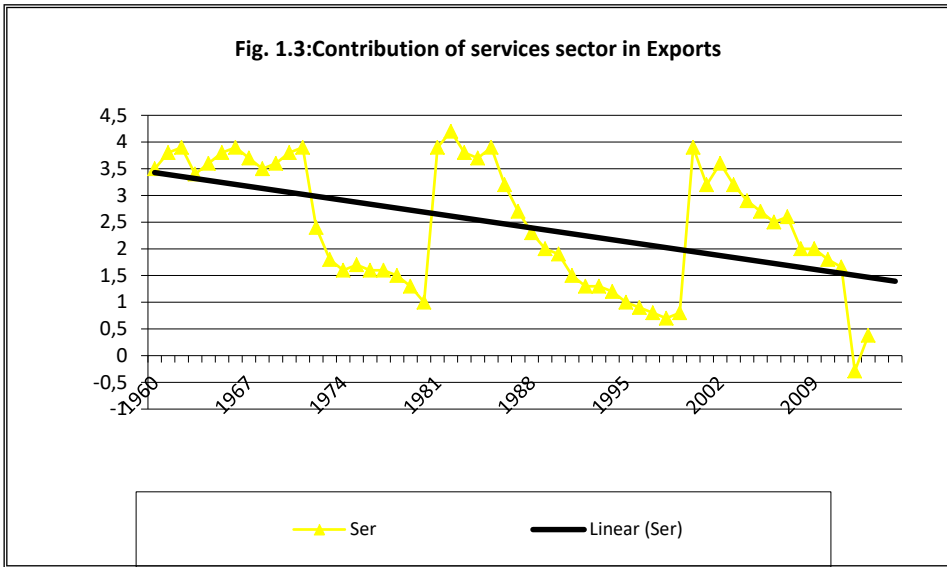


Figure 1.3 shows services sector contribution to total exports of the country. Both actual contribution and trend show that services sector contribution in overall exports of the country has decreased with the passage of time.

Employment contribution of services sector

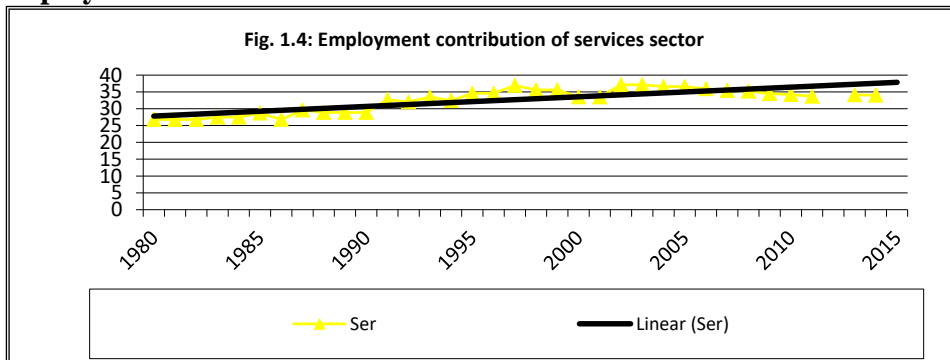


Figure 1.4 shows employment contribution of services sector in Pakistan. Both actual data and linear trend reveal increasing contribution of services sector in employment of the country over the time. Above mention facts reveal significant contribution of services sector in employment, exports and economic growth of the country. Therefore, any drop in services sector has significant effect on these macroeconomic indicators. It is therefore, important to find out the factors affecting services sector output growth and recommend the relevant authorities policies that augment services contribution to economic growth of the country.

Literature Review

Gross domestic product is simply sum of contribution made by agricultural, industry and services sector of the country. Services sector contributed 58.8 percent to overall economic growth of the country during fiscal year 2014-15. This sector can further be divided into five sub sectors namely transport storage and communication, wholesale and retail trade, finance and insurance, public administration and defense, ownership of dwellings and community services. Since services sector has major contribution in economic growth therefore, it is important to discuss in detail the factors affecting its output level.

Gordon and Gupta (2003) focused on factors affecting Indian services sector output growth for the period 1952 to 2000. Simple ordinary least square results show that commodity producing sector, foreign trade, exports growth and trade liberalization have significant effect on services sector output growth in India. Agostino et al. (2006) evaluated services sector role in employment of European countries using panel data from 1970 to 2003.²⁹ Results obtained from Generalized Least Square method proposed by Wu (1999) show that per capita income, private consumption and productivity are the main determinants of the US and European countries services sector contribution to employment.³⁰ In European countries, institutional framework also played an important role in services sector share in total employment. Wu (2005) used fixed and random effect model for finding out the relevant determinants of services sector output growth in China and India for the period 1978-2004. He found per capita income, foreign demand for services and urbanization has significant positive effect on services sector output growth both in China and India. Singh and Kaur (2014) applied vector autoregressive analysis (VAR)³¹ on annual data for

²⁹ Belgium, Germany, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Denmark, Sweden and United Kingdom.

³⁰ Generalized least squares can be used to perform linear regression when homoscedasticity assumption of classical linear regression model is violated

³¹ VAR can be used to find out long run relationship among the variables of interest.

period 2000-2013 and found GNP per capita, domestic investment, foreign trade and foreign direct investment are the relevant determinants of services sector contribution to Indian economic growth. Jain et al. (2015) applied ordinary least square methods for identifying the factors affecting services sector output growth in India for the period 2000 to 2012. Based on empirical findings they concluded that foreign direct investment, net foreign institutional equity investment and imports have positive impact on services sector growth while foreign institutional investment, debt and exports affected services sector negatively.

Above review of empirical literature shows women age, household size, tertiary education of women working in services sector, marital status, foreign direct investment, imports, foreign debt, exports, foreign trade, domestic investment, GNP per capita, urbanization, share of services exports in total export, private consumption, productivity, institutional framework, commodity producing sector are most often used determinants of services sector growth around the world.

Data

Annual data is taken from World Bank World Development Indicators, IMF IFS CD ROM and Statistical Bulletin of State Bank Reports for the period 1976-2014 is used. All variables are used in log form. Choice of sample period is based on structural break in the data due to country's disintegration in two parts in December, 1971. Also data on most of the variables is available after 1976. All variables were scaled by GDP and GDP itself is used in log level.

Table 3.1 Augmented Dickey Fuller Test

Variables	Levels		First Difference	
	Intercept	Intercept + Trend	Intercept	Intercept + Trend
y_t^s	-1.50	-3.05	-4.19 ^a	-4.27
$cdty_t$	-1.18	-3.16	-4.37 ^a	-4.45
fdi_t	-2.66 ^a	-3.13	-5.15 ^a	-5.20
frd_t	-3.01 ^a	-2.97	-7.45 ^a	-7.55
$gexp_t$	-1.44	-1.62	-5.28 ^a	-5.35
inf_t	-2.59	-2.55	-6.59 ^a	-6.50
msz_t	-2.12	-2.54	-4.56 ^a	-4.60
pop_t	-2.10	-5.12 ^a	-2.02	-2.10
$remt_t$	-1.49	-1.55	-5.58 ^a	-5.55
5 % critical values	-2.60	-3.19	-2.60	-3.19

Note: a shows significance of the variable at five percent significance level. y_t^s , $cdty_t$, fdi_t , frd_t , $gexp_t$, inf_t , $remt_t$, msz_t , pop_t and $remt_t$ refer to services sector output growth, value added as percent of GDP, commodity producing sector, a sum of agriculture and industry value added products as percent of GDP, Foreign direct investment, net inflows, trade, Gross national expenditure, inflation, consumer prices, market size proxied by GDP per capita, population, total and personal remittances, received respectively. All variables are in log form. 5% one sided critical values are taken from McKinnon (1996).

ARDL approach does not require checking integrating order of variables of interest.³² Even than we checked non stationarity of the variables to make sure none of them is $I(2)$ and there is mix of variables, that is some variables are stationary in level and some in first difference.³³ Table 4.1 shows all variables except foreign direct investment (fdi_t), foreign trade (frd_t) and population (pop_t) are stationary at first difference. Foreign direct investment (fdi_t), foreign trade (frd_t) and population (pop_t) are level stationary in at least one specification. Hence we conclude that none of the variables of interest is second difference stationary and some of the variables are level stationary in at least one specification. Based on this empirical finding, use of ARDL for evaluating the determinants of services sector output growth is justified.

Model Estimation

Augmented Solow growth model is used to identify the factors affecting services sector output growth. It explains functional relationship between labor and capital and output growth. It is simple and can further be augmented by including other variables affecting economic growth in the country Services sector output growth equation is given as:

$$y_t^s = \alpha + \phi_1 cdy_t + \phi_2 fdi_t + \phi_3 frd_t + \phi_4 gexp_t + \phi_5 inf_t + \phi_6 msz_t + \phi_7 pop_t + \phi_8 remt_t + \varepsilon_t$$

4.1

Equation (4.1) is service sector's output growth we are interested in estimating for Pakistan. The factors affecting services sector contribution (y_t^s) to overall economic growth included in 4.1 are commodity producing sector ($cdty_t$) a simple sum of agriculture and industrial sector value added,

³² Refer to Gilal et al. (2016) for preferring ARDL approach over other estimation procedures

³³ F.statistic given by Pesaran et al. (2001) and used for testing presence of long run relationship is not valid if some of the variables used in the analysis are second difference stationary (Oyakhilomen and Zibah).

net foreign direct investment (fdi_t), foreign trade ($ftrd_t$), total population (pop_t), gross national expenditure ($g exp_t$), inflation (inf_t), market size proxied by GDP per capita (msz_t) and personal remittances ($remt_t$).

Subscript t is used to denote time series data and ε_t is error term.

ARDL version of equation (4.1) is written as:

$$\Delta y_t^s = \alpha + \sum_{i=1}^p \varphi_{1i} \Delta y_{t-i}^s + \sum_{i=0}^p \varphi_{2i} \Delta cdy_{t-i} + \sum_{i=0}^p \varphi_{3i} \Delta fdi_{t-i} + \sum_{i=0}^p \varphi_{4i} \Delta ftrd_{t-i} + \sum_{i=0}^p \varphi_{5i} \Delta g exp_{t-i} + \sum_{i=0}^p \varphi_{6i} \Delta inf_{t-i} + \sum_{i=0}^p \varphi_{7i} \Delta msz_{t-i} + \sum_{i=0}^p \varphi_{8i} \Delta pop_{t-i} + \sum_{i=0}^p \varphi_{9i} \Delta remt_{t-i} + \varphi_{10} y_{t-1}^s + \varphi_{11} cdy_{t-1} + \varphi_{12} fdi_{t-1} + \varphi_{13} ftrd_{t-1} + \varphi_{14} g exp_{t-1} + \varphi_{15} inf_{t-1} + \varphi_{16} msz_{t-1} + \varphi_{17} pop_{t-1} + \varphi_{18} remt_{t-1} + \varepsilon_t \tag{4.2}$$

Δ represents first difference operator. $\varphi_{1i}, \varphi_{2i}, \varphi_{3i}, \varphi_{4i}, \varphi_{5i}, \varphi_{6i}, \varphi_{7i}, \varphi_{8i}$, and φ_{9i} are short run dynamics of the model and $\varphi_{10}, \varphi_{11}, \varphi_{12}, \varphi_{13}, \varphi_{14}, \varphi_{15}, \varphi_{16}, \varphi_{17}$ and φ_{18} indicate long run relationship.

The null hypothesis tested is:

$$H_0 : \varphi_{10} = \varphi_{11} = \varphi_{12} = \varphi_{13} = \varphi_{14} = \varphi_{15} = \varphi_{16} = \varphi_{17} = \varphi_{18} = 0$$

against the alternative hypothesis:

$$H_a : \varphi_{10} \neq \varphi_{11} \neq \varphi_{12} \neq \varphi_{13} \neq \varphi_{14} \neq \varphi_{15} \neq \varphi_{16} \neq \varphi_{17} \neq \varphi_{18} \neq 0$$

Table 4.1 Long run Relationship

Variables	Coefficient	T. Statistics
y_{t-1}^s	-0.28	-0.24
cdy_{t-1}	0.85	0.77
fdi_{t-1}	0.00	0.13
$ftrd_{t-1}$	-0.19	2.76 ^a
$g exp_{t-1}$	-0.09	-3.30 ^a
inf_{t-1}	-0.01	-0.94
msz_{t-1}	1.04	5.20 ^a
pop_{t-1}	-0.58	-3.39 ^a
$remt_{t-1}$	-0.00	-0.10
C	1.24	0.33

Note: *a* shows significance of the estimated parameter at 5 percent significance level.

Table 2 Short run estimates of

Variable	Coefficient	T Statistics
Δy_{t-1}^s	-0.76	-0.55
Δcdy_{t-1}	-1.07	-0.85
Δfdi_{t-1}	-0.00	-0.12
$\Delta fird_{t-1}$	0.13	3.12 ^a
$\Delta g \exp_{t-1}$	0.03	0.80
Δinf_{t-1}	0.01	1.30
Δmsz_{t-1}	-0.37	-1.56
Δpop_{t-1}	3.23	1.11
$\Delta remt_{t-1}$	0.02	1.87 ^b

Note: *a* and *b* shows significance of the estimated parameter at 5 and 10 percent significance level.

Table 4.1 shows gross national expenditure ($g \exp_{t-1}$), foreign trade ($fird_{t-1}$) and total population (pop_{t-1}) have negative and significant effect on services sector output growth (Δy_t^s) in long run. Market size (msz_{t-1}) estimate however, is positive and significant implying that increase in market size cause services sector output growth in long run. In short run, foreign trade appears to have significant positive effect on services industry in Pakistan. Similarly, personal remittances received by residents of the country have positive effect on services industry growth.

Table 4.3: Lower and Upper critical values:

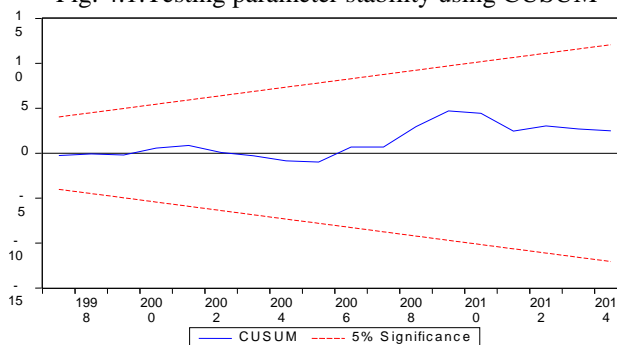
Critical Values	Pesaran et al. (2001)		Narayan (2004)	
	Lower bound value	Upper bound value	Lower bound value	Upper bound value
1 percent	2.79	4.10	3.46	5.05
5 percent	2.22	3.39	2.55	3.84
10 percent	1.95	3.06	2.16	3.30

Note: upper and lower critical bound values are taken from Pesaran et al. (1999, 2001).

Table 4.3 shows upper and lower bound critical values. Null of no cointegration will not be rejected if calculated Wald or F-statistic is less than lower bound critical values. There is inconclusive evidence about long run relationship if computed Wald or F-statistic falls between upper and lower bound critical values. However, null of no cointegration is rejected if calculated Wald test or F-statistic exceeds upper bound critical values. Value of calculated F-statistic is 7.47 which is greater than upper bound critical

values given by Pesaran et al. (2001) and Narayan (2004). The null of no cointegration is therefore, rejected because calculated F-statistic is far greater than critical upper bound values.

Fig. 4.1: Testing parameter stability using CUSUM



Diagnostic tests were applied to check the model fitness. Lagrange multiplier tests estimate is 0.93 with probability of 0.34. This estimate of LM test implies absence of serial correlation in the residuals. Further we used cumulative sum of recursive residuals test for testing stability of the estimated parameters. Figure 4.1 shows estimated recursive residuals does not cross their upper and lower critical values. This can be interpreted in terms of parameter stability and absence of any structural break in the data during the selected sample period.

Conclusion

Services sector is one of the key sectors that contributed 58.8 percent to economic growth of the country during the fiscal year 2014-2015. Anything that affects services sector output growth also impacts overall economic growth of the country. Given this background, this paper focused on the factors affecting services sector. Annual data from 1975 to 2014 and ARDL approach was used for estimating services sector growth equation. Choice of sample period was determined by the country disintegration in two wings in December 1971 and availability of data on most of the variables after 1975. Results show foreign trade, government expenditures, market size and population growth are major determinants of services sector output growth. In short run, services sector growth is influenced by foreign trade and personal remittances. Residual tests show absence of serial correlation and parameter stability. Based on estimated results, we recommend government should adopt services sector output growth oriented policies if it aims to augment economic growth of the country.

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