THE DETERMINANTS OF SERVICES SECTOR GROWTH:
A Cross Country Analysis

Javed IQBAL,* Muhammad SALAM** and Misbah NOSHEEN***

Abstract

Many developing countries do not have at all the comparative advantage for manufacturing the services sector which serves to be a potential avenue for economic transformation and economic growth. The exiting literature related to services sector focuses mainly on the advance economies. Less attention has been given to this sector though it is supposed to play a major role in economic growth of developing economies. The current study is a comparative analysis of selected developed and developing economies in order to identify the major determinants of service sector growth in these economies. For estimation purposes, the current study uses both the static, as well as the dynamic panel data estimation techniques. Findings of the study indicate that in both the developed and developing countries, GDP per capita and FDI play a significant role in growth of services sector, while trade openness tends to affect the growth, negatively. Productivity differential does not have any significant impact on growth of this sector in both samples of the countries. In case of developing economies, innovation has significant effect on service sector's growth in developing countries only. In order to check the sensitivity of results, this study examines the effect of these explanatory variables on service sector's growth by interaction with other variables; interestingly the results support and confirm them without interactive terms.

Key Words: Service Sector Growth, Panel Data Analysis, Innovations.
JEL Classification: C82, L80, L81, O41, O47, O57.

I. Introduction

A services sector has an important role in development process of an economy. The economy is considered as service based-economy if it has a relatively higher services share in total consumption, production and employment, as compared to manufacturing and agriculture sector. The service sector affects the economic growth directly through its increasing contribution to the output, employment and trade; and indirectly through productivity growth and creating linkages with other parts of the economy [see, Fisher (1935), Clark (1940), Fourastié (1949), Baumol (1967), (2001), Fuchs (1968),

* Assistant Professor, **MPhil Scholar, School of Economics, Quaid-i- Azam University Islamabad, ***Assistant Professor, Hazara University, Mansehra, Pakistan.

Xinshen Diao. et. al. Diao (2017)]. In service-based economies, services are not only used as final product but it also as an intermediate inputs which is used to link different economic activities and make the economy function smooth [Berlingieri (2014)]. The growing importance of services sector and its impact on different parts of the economy has made this sector, the main source of growth and job creator even in developing countries [Ghani and Connel (2014)]. The most frequent use of services as an interme- diate input in other parts of the economy have enhanced the overall efficiency, produc- tivity of the economy as it is witnessed from the OECD countries. Similarly, a slowdown of service sector's output has brought down the overall productivity of these economies from 4 to 2 per cents over the period 1995-2015 [Jones and Taesik (2008)]. The importance of services sector in global perspective is apparent from its rising con- tribution in output, employment and trade. The services sector constitute 68 per cent of the output, 39 per cent of employment and 20 per cent of trade of the total economy of the world. This sector is characterized as the fastest growing sector, not only in the world economy as a whole, but also in different economic groups separately. Services share in total GDP is 47 per cent in low, 53 per cent in middle and more than 70 per cent in high income countries [WDI Report (2014)]. The services export reached to US$ 4.7 trillion with a fastest growth rate of 7 per cent as compared to 2 per cent growth rate of the merchandise exports by 2014 which provided a great support to the world trade [WTO Statistics (2014)]. This sector has also proved to be attractive for foreign direct investment as it received US$ 1.3 trillion by the year 2014 [PUNCTAD (2014)].

The share of service sector in employment and GDP has been increasing during the last decade, which has grabbed the attention of economists around the world. Different studies have addressed the subject issue from different angles. For example, many stud- ies have addressed the subject matter in context to a single indicator as major variable of interest, i.e., some studies investigate either the impact of per capita GDP on service sector growth, [see, Meglio, et al. (2008), Nayyar (2009), Ajmer and Ahmad (2011) and Estrada, et al. (2013)], some studies investigated the impact of FDI on service sector growth [see, Adi, et al. (2014), Irum and Nishat (2009), Chakraborty and Nunnenkamp (2006) and Sen (2011)], whereas, some other studies examined the impact of GDP, pro- ductivity, trade openness or innovation on the service sector growth [see, Ramaswamy and Rowthorn (1993), Eichengreen and Gupta (2010), Faborda, et al. (2013), Sapprasert (2006), Singh and Kaur (2014) and Dodzin and Vamvakidis (1999)]. However, most of the aforementioned studies are related to advanced/developed countries. There are few cross country studies which looks into factors affecting the service sector growth such as, Wu (2007) who focuses on China and India; while Agostino, et al. (2006) used a panel of EU countries for investigating the determinants of service sector's growth. However, according to Russo and Schettkat (1999), as well as, Schettkat, andYocarini,. (2003). [thanks to the diverse nature of economic development of both the developed and developing countries], the role of factors affecting service sector growth may not be the same, rather it may affect service sector growth in both countries differently.

This study contributes to the existing literature in different ways, first, unlike many previous studies which used a single indicator as a variable of interest, it intends to investigate the impact of many factors to affect the service sector. Secondly, in light of the studies of Russo and Schettkat (1999) and Schettkat and Yocarini (2003) which predicts different impacts of these indicators on developed and developing economies, this study presents a comparative picture of factors affecting the service sector growth. This will help to identify factors which are important for economies, together with those which are important for developed or developing countries only. The current research study is organized as follows: The current research paper is organized as follows: Section II presents theoretical underpinnings while Section III presents empirical evidence based on literature review, Section IV focuses on the empirical model, selection of the sample and the time period of the data, the variable construction and the estimation procedure.This section also deals with endogeneity issue and its solution. Section V explains estimation of results, while the last section comes up with the conclusion and policy recommendations.

II. Theoretical Underpinnings

Fisher (1935) and Clark (1940) were the pioneers who developed a theoretical base for determinants of change in the whole structure of the economy. They were of the view that in the first phase of economic development, the sectoral share of agriculture in total output and the employment would fall; while the sectoral share of industry would rise. In the second phase, with further growth of economy, the sectoral share of industry in total output and employment would fall; while the sectoral share of services would began to rise. According to Fisher (1935) the sectoral structural transformation of an economy is due to some of the characteristics of services. It includes the relatively high income elasticity of services as compared to goods and the persistent use of services which are used not only as primary inputs but also as secondary inputs. Due to relatively higher income elasticity and more need of satisfying nature of services (as compared to goods), when income of people increases they will prefer to purchase more service as compared to goods. Similarly, services being used as intermediate, inputs connects different economic activities and complete the production process. The other sectors therefore, highly depend on service sectors for their growth and development [see also, Chenary and Syrquin (1975)]. Baumol (1967), they suggested that an increase in income is not an only factor behind the service sector's growth; in fact, the per worker productivity difference between manufacturing sector and service sector is also one of the main reasons. The low productivity of per worker in service sector make this sector to employ more labour which increase services output in nominal terms rather than in real terms. Besides, the factors suggested by Fisher (1935), Clark (1940) and Baumol (1967), there are some other factors that can affect the service sectors growth. These other factors are outsource of service activities by the manufacturing firms, demographic factors and the social and economic reforms. According to Schet-

tkat and Yocarini (2003) as an economy adopts more specialized patterns of production, each sub-task of production is carried out with specialized firms. As most of the manufacturing firms outsource their services or activities to be undertaken with specialised service firms it results in increasing demand for services. The demographic factors like population growth, rural urban migration and female participation in labour force, increase both the demand and supply of services [Sabolo (1975)]. The social and economic reforms such as good governance, trade openness and innovation, particularly in developing economies are also considered the main force behind the growth in services sector [Mehtha and Nambir (1985)].

III. Empirical Evidence

Different empirical studies have suggested different factors as determinants of growth in services sector. Income per capita, productivity difference, innovations, FDI and trade openness are the most common factors suggested by different empirical studies as determinants of service sector's growth. A brief empirical literature, on each of them is presented here. Fisher (1935) and Clark (1940) established the hypothesis which highlights the factors responsible for service sector's growth. The contribution of these two great researchers was given the name of Clark-Fisher theory or Clark-Fisher hypothesis. According to this theory, income per capita is the key determinant for raising share of services in total output and employment. This hypothesis has been empirically tested by a number of empirical researchers. The empirical study of Schettkat and Yocarini (2003) suggested that income per capita is the main factor that affects the service sector growth. As income per capita increases, the consumer's final demand tends to shifts from goods to services. The countries with relatively higher per capita income have experienced higher share of services in output and employment. The same results have also been confirmed by [Meglio, et al (2008), Nayyar (2009), Ajmer and Ahmad (2011) and Estrada, et al. (2013)]. Summers (1985) suggested that though income per capita has significantly positive effect on service sector's growth but this is a nominal income effect rather than a real income effect. Mahadevan and Kalirajan (2002), empirically examined that how much is the higher income elasticity of services. They found that in fact services have positive income elasticity but it is not that much higher as it was suggested by the previous empirical studies.

The hypothesis about the lower per worker productivity in services sector presented by Baumol (1967) has also been empirically tested by number of researchers. Ramaswamy and Rowthorn (1993) found that services sector is less productive as compared to the manufacturing sector. Hence, there occurs a productivity gap between these two sectors. To cover the productivity gap, service sector hires additional labour with higher wage. This increase in wages is reflected in the price of final service that causes service value added to grow in nominal terms rather than in real terms. Similar results were also confirmed by Kim (2006). However, Eichen-

green and Gupta (2010) suggested that these are only a few sub-sectors which are less productive while the services sector, as a whole, is not so much lagged behind the manufacturing sector with respect to per worker productivity. Similar results were suggested by [Maroto-Sanchez (2010), Fernandes, et al (2005), Tripplet and Bosworth (2003) and Jack, et al (2002)]. Furthermore, Griliches (1992) and (1994) suggested that due to conceptual problems related to the definition and measurement of per worker productivity, the services sector has mistakenly been considered as less productive. But now, as most of the measurement errors related to the definition and measurement of productivity have been solved, so the services sector, no longer is seem to be less productive.

Estrada, et al. (2013) suggested that innovations do not have only a positive effect on output and employment but it also have a significantly positive effect on labour productivity in both the service and manufacturing sectors. Sapprasert (2006) found that if technological and non-technological innovations are collectively employed to services firms, it will have a significant role to enhance performance of these firms. Licht, et al. (1999) suggested that innovative firms perform better than the non-innovative firms. Innovations play an important role for both the demand side as well as the supply side of services. On one hand, it improves the quality of services while on other hand it introduces new modes of services provision.

Different studies have empirically examined the effect of FDI on service sector's growth and their results are also different. Adi, et al. (2014) found the two way causality between FDI inflow and the service sector's growth. They found that FDI plays a supportive role to development of services sector by providing financial as well as technical assistance, but once this sector grows, it also enhances the FDI inflow from abroad. They suggest that FDI inflow in service sectors will increase productivity of services. Similarly, when this sector becomes more productive, it will be able to attract more FDI from abroad. Irum and Nishat (2009) also found a significantly positive effect of FDI on service sector growth. However, Chakraborty and Nunnenkamp (2006) suggest that though foreign direct investment inflow obviously have positive effect on service sector's growth, the effect is not significant. Furthermore, some of the empirical studies like, Sen (2011) suggest a one way causation from service sector's growth towards FDI rather than from FDI towards its growth. FDI may have either positive or negative effect on service sector's growth, as it depends on direction of the flow of FDI towards different sectors. Amal and Hijzen (2008) suggests that when major share of FDI is directed towards services sector, it has a significant positive effect on its growth. However, when major share of FDI is directed towards manufacturing sector it has negative effect on services sector's growth.

There are several studies which have pointed out the positive effect of trade openness for service sector's growth. Singh and Kaur (2014) suggest a significantly positive effect of trade openness on service sector's growth. They suggest that in case of more free trade, the services share in total trade increases. However, findings of

Dodzin and Vamvakidis (1999) are different; as they suggest that an attempt for more open trade by reducing some of the trade barriers mostly increase trade in goods, rather than trade in services. The positive or negative effect of trade openness for service sector's growth depends on income level of the trading partner. Khoury and Savvides (2006) found that if trading partner is a country with higher level of per capita income then in case of freer trade, services share in total trade will rise; but when trading partners is a country with low level of per capita income they will increase the commodity share in the total trade by reducing services share in total trade.

IV. Empirical Model

The current study follows the empirical model developed by Inman (1985) with some modifications.

$$SER = \beta_1\,GDPP + \beta_2\,PDIF + \beta_3\,z \qquad (1)$$

where SER represents services value added growth which is determined by GDP per capita annual growth (GDPP), per worker productivity difference between manufacturing sector and services sector (PDIF), and of the sum exogenous demand shocks (z). In Equation (1), the other possible independent variables such as Innovation, FDI net inflow is inserted. Trade openness through vector of exogenous demand shocks (z) checks whether these factors significantly determine the growth in services sector or not.

$$SER = \beta_0 + \beta_1\,GDPP_{it} + \beta_2\,PDIF_{it} + \beta_3\,INN_{it} + \beta_4\,FDI_{it} + \beta_5\,TOP_{it} + e_{it} \qquad (2)$$

Equation (2) represents a panel data model for determinants of service sector's growth in a sample of selected countries; where i in the subscript represents ith cross sections and t in the subscript represents t^{th} time periods. The current study also include an additional terms through which the explanatory variables affect the service sector's growth in interaction with these factors.

$$SER = \beta_0 + \beta_1\,GDPP_{it} + \beta_2\,PDIF_{it} + \beta_3\,INN_{it} + \beta_4\,FDI_{it} + \beta_5\,TOP_{it} +$$
$$C_1\,PDIF*GDPP + C_2\,INN*FDI + C_3\,FDI*HC + C_4\,TOP*GDPP + e_{it} \qquad (3)$$

Equation (3) include the additional terms, i.e., PDIF*GDPP which shows the effect of productivity difference on service sector's growth in interaction with GDP per capita growth. INN*FDI is the effect of innovations of the sector's growth in interaction with FDI inflow. FDI*HC is the effect of FDI inflow on growth of sectors in interaction with Human Capital. Finally, TOP*GDP is the effect of trade openness on service sector's growth in interaction with GDP per capita.

1. Selection of Sample and the Time Period

The current study uses a panel data set for a sample of 14 countries, which is further divided into two groups. A sample of seven developed countries (France, Germany, Italy, Japan, UK, US and Russia) belongs to a group of industrialised eight countries (G8); and the other sample of seven developing countries (Bangladesh, Egypt, Indonesia, Iran, Malaysia, Pakistan and Turkey) belongs to a group of developing eight countries (D8). The data period (1990 to 2014) covers 25 years; the source of which is the World Bank database (2016). The selection of these two specific samples of countries is based on the fact that they have an economic and social interaction which is necessary element to determine the factors affecting service sector's growth in these countries. Furthermore, the selection of seven countries from each group is due to data availability of different variables for these countries. One country from each group (Canada and Nigeria from developed and developing countries, respectively) has been dropped due to lack of data availability on different variables for these two countries. Similarly, the selection of data over 1990-2014 is because (only for this specific period) the data is available for all the variables included in the model.

2. Variables Construction

The current study estimate Equations (2) and (3). Equation (2) uses services value added annual growth as a dependent variable, while GDP per capita growth, productivity difference between manufacturing and services sector, innovations, foreign direct investment and trade openness are as an explanatory variables. Equation (3) is a different variant of Equation (2) which also uses services the value added annual growth as a dependent variable; while the explanatory variables mentioned above (this equation) uses some additional explanatory variables, i.e., PDIF*GDPP, INN*FDI, FDI*HC and TOP*GDPP.

Most of the variables like services value added annual growth, GDP per capita growth, innovation, foreign direct investment and trade openness have been directly taken from the World Bank Database (2016); while productivity difference between manufacturing and services sector was constructed by subtracting the per worker productivity in service sector from the per worker productivity in manufacturing sector. Furthermore, the additional explanatory variables included in Equation (3) i.e., PDIF*GDPP, INN*FDI, FDI*HC and TOP*GDPP have been constructed by multiplying each of the two terms. For example, the variable PDIF*GDPP is obtained by multiplication of productivity difference between manufacturing sector and services sector and GDP per capita annual growth rate, and so on (see, Appendix).

3. *Estimation Procedure*

The estimation procedure includes the use of both the static panel data estimation technique, and the dynamic panel estimation technique. The Static Panel Data estimation technique includes the Pooled OLS model, Random Effect model and the Fixed Effect model, while the dynamic panel data estimation technique includes only the Difference GMM. The Pooled OLS model is based on the assumption that there is neither any significant cross section effect nor any significant temporal effect indicating that all intercept coefficients are same. The random effect model keeps a common intercept for all cross sections and follows the assumption of random unobserved individual component. However; the fixed effect model allows intercept for each cross section to be significantly different.

4. *Endogeneity Issue and its Solution*

The economic theory suggests a reverse causality from service sector's growth towards FDI and GDP per capita, as well. In case of endogeneity issue, the use of static panel data estimation techniques will lead towards biased estimation. The appropriate choice is the use of instrumental variable technique, i.e., Difference GMM estimator. The difference GMM estimation technique presented by Arellano and Bond (1991) treat the issue of endogeneity as well as heteroscedasticity. It eliminates the time invariant country specific effect by taking first difference of the level equation and then using this first difference of level equation, as an instrument. The use of first difference of level equation as an instrument is considered weak instrument. Blundell and Bond (1998) therefore, provided the System GMM as an extended version of Difference GMM that once take the level equation as an instrument for lag equation and then taking lag equation as an instrument for level equation also. This is beyond the scope of this study and if the instruments are valid then difference GMM is better option and there is no need to move further for System GMM. The instruments are considered to be valid if it has correlation with endogenous variables Cov $(z, x) \neq 0$, but there is no correlation with error term Cov $(z, u) = 0$. The selection of valid instruments is necessary to obtained more consistent and efficient estimation with instrumental variable technique (GMM).

5. *Estimation Results*

Table 1 contains the results obtained for combined sample of selected developed and developing countries. The current study estimate Equation (2) with static panel data estimation technique, i.e., Pooled OLS model, Random Effect model and Fixed effect model. The Brush-Pagan Lagrangian Multiplier test has been used to choose between the Pooled OLS and Random effect model; while the selection between ran-

dom effect model and fixed effect model is based on Hausman model specification test. The Breusch-Pagan LM test failed to reject the null hypothesis of no random effects for the combined sample of selected developed and developing countries and suggests, pooling the data and estimating the model with Pooled OLS estimation technique. The Hausman specification test could not reject the null hypothesis and preferred fixed effect model over random effect model. Although, the results obtained with

TABLE 1

Results for a Combined Sample of Developed and Developing Economies

Independent Variables	Static Estimation			Dynamic Estimation
	Pooled OLS	RE	FE	Diff-GMM
SER$_{t-1}$				-0.0644
				(0.230)
GDPP	0.5925	0.5271	0.4571	0.7894
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
PDIF	2.1800	8.5700	2.0000	-5.9511
	(0.960)	(0.985)	(0.651)	(0.425)
INN	-2.3000	-3.6400	-3.8900	0.00002
	(0.106)	(0.082)	(0.383)	(0.056)*
FDI	-04510	0.0364	0.0932	-0.1229
	(0.672)	(0.735)	(0.385)	(0.602)
TOP	1.4719	0.3989	-6.1089	-3.4619
	(0.005)***	(0.588)	(0.000)***	(0.641)
Observations	336	336	336	308
R^2	0.31	0.30	0.02	
B-P LM test	0.00			
p-value	(1.0000)			
Hausman test		21.9		
p-value		(0.0005)		
Instruments				47
AR2 test				-1.02
p-value				(0.306)
Sargan test				56.49
p-value				(0.054)

Values in parenthesis are P-values.
***, **, * represents significance at 1%, 5% and 10% respectively.
Source: Authors' own calculations.

Pooled OLS, Random effect and fixed effect models are almost according to the theory but still the model needs to be estimated with Dynamic panel data estimation technique, i.e., Difference GMM which can improve the treat issue of endogeneity and provide more accurate results. When Equation (1) is estimated for combined sample of selected (developed and developing) countries with Difference GMM, then out of five, only two explanatory variables (GDP per capita and innovations) appear with significant coefficients at 1 per cent and 10 per cent, respectively. The positive sign of these two coefficients indicate that each of them have increasing effect on service sector growth.

Although, the other factors like productivity difference, FDI net inflow and trade openness also matter for the growth of services sector but currently each of them could not show a significant effect. The insignificant effect of these variables may be due to the reason to combine the data of two different samples of developed and developing countries, thus they may suffer from aggregation bias. To know the real nature of the effect of these factors on service sector's growth, it is necessary to analyse the whole sample into two separate groups, i.e., a sample of selected developed countries and a sample of selected developing countries.

Tables 2 and 3 shows the results obtained for selected developed countries and the selected developing countries, respectively. For each of the two samples regression for Equation (2) with Difference GMM estimator is estimated. The results show certain improvement for each of the two samples. In case of developed countries, out of five explanatory variables, three variables (GDP per capita, FDI and trade openness) shows significant effect; while in case of developing countries, four out of five variables (GDP per capita, FDI, innovations and trade openness) shows significant effect on service sector's growth.

The coefficient of GDP per capita has appeared significant with positive sign in case of both samples of the selected, developed and developing countries. It indicates that services in these countries are considered more comfortable and satisfying as compared to goods, hence, when income per capita increases in these countries, the public tends to increase their demands further for services as compared to goods. The coefficient magnitude of GDP per capita in a sample of selected developing countries (0.76) is greater than the coefficient's magnitude of GDP per capita in selected developed countries (0.60). It indicates that income elasticity of services is higher in selected developing countries as compared to the selected developed countries. These results are in accordance with Estrada, et al. (2013) and reports significant positive effect of GDP per capita on service sector's growth.

Productivity difference between manufacturing sector and services sector could no more show any significant effect on service sector's growth in both the selected, developed and developing countries. The insignificant effect of productivity difference suggests that services sector has never been less productive as compared to the manufacturing sector. In fact, there were some errors related to the definition and measurement of productivity which has shown the services sector less productive

as compared to the manufacturing sector Maroto-Sanchez (2010). Although, there are few categories of services that lagged behind in productivity when compared to manufacturing sector; but services sector as a whole does not have the productivity related issues Eichengreen and Gupta (2010). Furthermore, due to technological advancement and introduction of new modes of production, the per worker productivity in services sector has been increased and the productivity difference between man-

TABLE 2

Results for Selected Developed Economies

Independent Variables	Static Estimation			Dynamic Estimation
	Pooled OLS	RE	FE	Diff-GMM
SER_{t-1}				0.0062811
GDPP	0.7708793	0.7708793	0.7677959	0.60684
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
PDIF	-0.0006287	-0.0006287	-0.0014522	0.007428
	(0.402)	(0.401)	(0.527)	(0.280)
INN	0.0210341	0.0210341	0.2747879	0.4745105
	(0.859)	(0.859)	(0.476)	(0.512)
FDI	0.2428669	0.2428669	0.1388773	0.2619307
	(0.002)***	(0.002)***	(0.128)	(0.037)**
TOP	-3.24761	-3.24761	-4.163366	-9.476171
	(0.001)***	(0.001)***	(0.028)**	(0.000)***
Observations	175	175	175	161
R^2	0.6910	0.6910	0.6643	
B-P LM test	0.00			
p-value	(1.0000)			
Hausman test		5.63		
p-value		(0.3440)		
Instruments				27
AR2 test				1.21
p-value				(0.226)
Sargan test				66.56
p-value				(0.13)

Values in parenthesis are P-values.
***, **, * represents significance at 1%, 5% and 10% respectively.
Source: Authors' own calculations.

ufacturing and services sector has been narrowed in the last two decades [Tripplet and Bosworth (2003)]. Although, innovations could not show any significant effect on services sector growth in case of developed countries but its effect is significant in case of selected developing countries. These results are in line with Wang (2013) who suggest that after World War II the role of innovation have increased in developing countries which have smaller size market; while its role has decreased in de-

TABLE 3

Results for Selected Developing Economies

Independent Variables	Static Estimation			Dynamic Estimation
	Pooled OLS	RE	FE	Diff-GMM
SER_{t-1}				-0.1221
				(0.144)
GDPP	0.8109	0.8109	0.7694	0.7687
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
PDIF	0.00008	0.00008	0.00009	0.0002
	(0.796)	(0.796)	(0.762)	(0.554)
INN	0.5650	0.5650	1.1078	0.8672
	(0.004)***	(0.003)***	(0.000)***	(0.081)*
FDI	0.2032	0.2032	0.2000	0.3142
	(0.092)*	(0.090)*	(0.088)*	(0.026)**
TOP	0.2386	0.2386	-7.8824	-7.5496
	(0.618)	(0.617)	(0.000)***	(0.056)**
Observations	175	175	175	161
R^2	0.6177	0.6190	0.1173	
B-P LM test	0			
p- value	(1.0000)			
Hausman test		21.9		
P- value		(0.0005)***		
Instruments				47
AR2 test				0.90
p-value				(0.368)
Sargan test				51.44
p-value				(0.127)

Values in parenthesis are P-values.
***, **, * represents significance at 1%, 5% and 10% respectively.
Source: Authors' own calculations.

veloped countries with large size market. The main reason behind insignificant effect of innovation on service sector's growth in case of developed countries is that development of new technology involves high expenses and uncertainties. To have more cost effective innovations, the technologically advanced countries sought innovation opportunities off-shore in developing countries Mannig, et al. (2012). Hence, the role of Innovation is more important in developing countries rather than in developed countries.

The coefficient of FDI for both the selected developed and developing countries have appeared significant with positive sign that indicates its supportive role for services sector in both the sample of selected developed and developing countries. FDI inflow brings modern technology, which improve human capital in the host country and introduce new modes of services provision. For developed countries, foreign direct investment is a source of financial inflow while for developing countries it is also a complete package of technology transfer, skills and technical knowhow. FDI inflow provides relatively greater support to the developing countries. However, this is also obvious from the coefficient magnitude of FDI in a sample of selected developing countries (0.31) which is greater than the coefficient magnitude, in a sample of selected developed countries (0.26). The supportive role of FDI for service sector's growth was also suggested by Jain, et al. (2015). The coefficient of trade openness has appeared significant with negative sign in case of both the sample of selected developed and developing countries. It indicates that as these countries experience high degree of trade openness it increases foreign demand for their goods rather than the services. Hence, both these groups of countries needs to maintain degree of trade openness at such a threshold level that could increase trade in goods without decreasing trade in services. The coefficient magnitude of trade openness is relatively greater in case of selected developed countries (-9.4) when compared to the coefficient magnitude in case of these countries (-7.4); therefore, it is obvious that services trade in selected developed countries is more sensitive to the degree of trade openness as compared to the selected developing countries. Results of this study are in accordance with Dodzin and Vamvakidis (1999).

While moving towards Equation (3) the results change slightly in respect to signs and significance. Table 4 contains the results obtained by estimating that includes the interaction terms as well. The results obtained for combined sample of developed and developing countries shows that explanatory variable do not have any significant effect on services sector growth in interaction with other variables. The coefficient of PDIF*GDP, INN*FDI, FDI*HC and TOP*GDP, are insignificant; while moving towards the selected developed and developing countries separately, showing results show some improvement. The effect of productivity difference in interaction with GDP per capita growth (PDIF*GDPP) has no significant effect on service sector growth in a sample of selected developed countries, and also in a sample of the selected developing countries. The effect of innovation on service sector's growth in interaction with

FDI has found a significant positive role in case of both the selected developed and developing countries. It indicates that when services sector become more innovative it can easily attract foreign direct investment. The effect of FDI in interaction with Human Capital has found significant encouraging in case of both the selected developed and developing countries. The positive effect of FDI in interaction with human capital suggest that as innovations increases, it improves the human capital by providing new skills and technical know-how which causes the growth of services sector.

TABLE 4

Results for Interaction

Independent Variables	Estimation Results based on GMM		
	Combined	Developed	Developing
SER_{t-1}	-0.04390	0.2289874	-0.02208
	(0.452)	(0.104)	(0.678)
GDPP	-0.55742	-0.38408	0.57037
	(0.376)	(0.075)*	(0.000)***
PDIF	0.00014	0.00059	9.02000
	(0.429)	(0.932)	(0.647)
INN	2.08847	-3.15227	1.65546
	(0.045)**	(0.134)	0.099*
FDI	2.84428	-19.06457	6.89490
	(0.012)**	(0.003)***	(0.001)***
TOP	-5.90729	6.484798	-8.70583
	(0.497)	(0.010**)	(0.000)***
PDIF*GDP	-0.00003	-0.00033	-2.03000
	(0.369)	(0.392)	(0.642)
INN*FDI	-0.06412	0.73335	0.82739
	(0.778)	(0.004)***	(0.001)***
FDI*HC	-0.02124	0.1115578	-0.00248
	(0.293)	(0.060)*	(0.869)
TOP*GDPP	0.82844	0.738815	0.15751
	(0.139)	(0.012)**	(0.005)***
Observations	308	154	155
Instruments	24	68	46
AR2 test	-1.21	0.53	-1.33
p-value	(0.226)	(0.590)	(0.185)
Sargan test	17.34	97.35	55.20
p-value	(0.239)	(0.001)	(0.021)

Values in parenthesis are P-values.
***, **, * represents significance at 1%, 5% and 10% respectively.
Source: Authors' own calculations

Although, the effect of innovations without interaction term was insignificant for services sector growth in a sample of selected developed countries but using innovation with interaction term this effect has become significant. Similarly, the coefficient of trade openness in interaction with GDP per capita (TOP*GDPP) is significant positive. The sign of coefficient has changed from negative to positive in Equation (3) when it was used without interaction of GDP per capita in Equation (2). The positive sign of TOP*GDPP indicate that as the degree of trade openness increases, it increases the trade in services, which further has positive effect on income per capita and then on services sector growth in case of both the selected developed and the selected developing countries.

V. Conclusion

On basis of the empirical results, the current study concludes that GDP per capita, FDI and trade openness are some of the possible factors which affect the growth of services sector in selected developed countries. In case of selected developing countries these factors are GDP per capita, FDI, Innovations and trade openness. Innovations have significant effect on services sector growth, only in case of selected developing countries while the productivity gap between manufacturing and services sector has no significant effect on its growth, in both the selected developed and developing countries. GDP per capita, FDI net inflow and innovations have positive effect while trade openness has negative effect on the growth of services sector. The current study also examines the effect of these variables in interaction with other variables. Through these interactive variables, the explanatory variables affect the services sector growth. In case of selected developed countries innovations in interaction with FDI. While FDI in interaction with human capital and trade openness in interaction with GDP per capita have shown significant positive effect on the service sectors growth. However, in case of selected developing countries only two variables (innovation in interaction with FDI and trade openness in interaction with GDP per capita) have shown significant positive effect on service sector growth. Furthermore, the productivity difference in interaction with GDP per capita (PDIF*GDPP) was insignificant in both the sample of selected developed and developing countries.

When explanatory variables are used in interaction with other variables, the results of this study change slightly with respect to signs and significance of different variables. The innovations, which was significant only in case of selected developing countries (when it was used without interaction with FDI) had significant positive effect on service sector growth in interaction with FDI (INN*FDI) in both samples of the selected developed countries as well as in the sample of selected developing countries. The coefficient of FDI in interaction with human capital was insignificant in case of the sample of selected developing countries; however it was significant when it was used without interaction with human capital.

1. *Policy Implications*

The FDI has significant positive effect on service sector growth in both the selected developed and developing countries. FDI inflow can enhance the process of human capital development, labour efficiency by providing latest skills and technical know-how, as well as it also creates new jobs. FDI is a source of financial and technology transfer to the recipient countries which have a spill over effect on growth and development of economy. As a whole developing countries need to focus on measures that are helpful to attract FDI from abroad, particularly, in sectors which are more knowledge intensive and require high technology and research and development.

Furthermore, empirical results of this study indicate that despite the relatively higher share of services in output and employment, the productivity of this sector is still behind the manufacturing sector. The relatively lower productivity of services sector is due to relatively less innovative activities practiced in this sector. The service sector remained deprived of innovations practices because of the traditional view which considers the service sector, mostly as not innovative. However, the reality is not so, although the innovations in services may have the some hurdles, services activities are of more heterogeneous nature where some of the services categories are not innovative but most of the services categories are knowledge intensive which can be made more productive by services innovation. The service sector can perform an important role particularly in developing countries whose structure of output and employment has been shifted from agricultural and industrial goods to the production of knowledge intensive services. The productivity of this sector can be enhanced by product innovations (introducing new goods or services), process innovations (introducing new production techniques) and marketing innovations (the implementation of new marketing strategy of goods and services). The innovations in services can be promoted through technology development and introducing new ideas of production. Hence, there is a need to give proper attention to innovations in services by designing appropriate innovation framework that focus mainly on innovations in knowledge intensive service sectors.

Bibliography

Agostino, A.D., R. Serafini and M.W. Warmedinger, 2006, Sectoral explanations of employment in Europe: The role of services, European Central Bank, Working paper series, 625: 4-22.

Adi, A.A., Wunuji and E. Adimani, 2014, Effect of foreign direct investment on China economic growth: A Granger causality approach, Journal of Economics and Finance, 2(4).

Ajmer, M., and U. Ahmed, 2011, Services sector reforms in Pakistan-impacts and implications, European Journal of Scientific Research, 65(3): 329-341.

Arnal, E., and A. Hijzen, 2008, The impact of foreign direct investment on wages and working conditions, OECD conference centre, Paris: France, http://www.oecd.org/els: 23-24 June.

Arellano, M., and S. Bond, 1991, Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, Review of Economic Studies, 58: 277–297.

Baumol, W.J., 1967, Macroeconomics of unbalanced growth: The anatomy of urban crisis, American Economic Review, 57: 415-426.

Baumol W.J., 2001, Paradox of the services: Exploding costs, persistent demand, in: T. Ten Raa and R. Schettkat, (eds.), The growth of service industries: The paradox of exploding costs and persistent demand, Edward Elgar.

Berlingieri, G., 2014, Outsourcing and the rise in services, LSE Centre for Economic Performance, Discussion paper, 1199.

Blundell, R.W., and S.R. Bond, 1998, Initial conditions and moment restrictions in dynamic panel data models, Journal of Econometrics, 87: 115-143.

Breusch, T.S., and A.R. Pagan, 1980, The lagrange multiplier test and its applications to model specification in econometrics, Review of Economic Studies, Blackwell Publishing, 47(1): 239-53.

Chenery, H.B., and M. Syrquin, 1975, Patterns of development, 1950-1970, London: Oxford University Press for the World Bank.

Clark, C., 1940, The conditions of economic progress, McMillan and Co., London.

Chakraborty, C., and P. Nunnemkamp, 2006, Economic reforms, foreign direct investment and its economic effects in India, Kiel working paper 1272.

Diao, X., M. McMillan and D. Rodrik, 2017, The recent growth boom in developing economies: A structural change perspective, Working paper 23132, Cambridge, M.A. NBER.

Dodzin, S., and A. Vamvakidis, 1999, Trade and industrialization in developing agricultural economies, IMF working paper series, wp/99/145.

Du, J., and Y. Temouri, 2015, High-growth firms and productivity: Evidence from the United Kingdom, Small Business Economics, 44(1): 123-143.

Eichengreen, B., and P. Gupta, 2010, Two waves of services growth, 14968, Cambridge, MA: National Bureau of Economic Research.

ElKhoury, A.C., and A. Savvides, 2006, Openness in services trade and economic growth, Economics Letters, 92(2): 277-283.

Estrada, G., Y. Acharya, A. Batten and P. Bramble, 2013, The service sector in lower-income in Asian economies, ADB Economics, W.P. series, 34.

Fernandes, A.M., Isgut and E. Alberto, 2005, Learning-by-Doing, Learning-by-exporting, and productivity: Evidence from Colombia, Policy Research working paper series 3544, The World Bank.

Fisher, A.G.B., 1935, The clash of progress and security, London: Macmillan.

Fourastié, J., 1949, Le Grand Espoir du XXe siècle. Paris: Presses Universitaires de France, Reprinted as 'Moderne Techniek en Economische Ontwikkeling, 1965, Amsterdam: Het Spectrum.

Fuchs, V.R., 1968, The service economy, New York and London: Colombia University Press.

Ghani, S.E., and S.D. O'Connell, 2014, Can service be a growth escalator in low-income countries? Policy Research working paper 6971.

Griliches, Z., 1994, Productivity, R&D and the data constraint, American Economic Review, 84(1): 1-23.

Griliches, Z., 1992, Output measurement in the service sectors, Studies in income and wealth, 56, Chicago: University of Chicago Press and National Bureau of Economic Research.

Hollis, C., and S. Moises, 1975, Patterns of development, 1957–1970, Oxford: Oxford University Press.

Inman, R.P., 1985, Managing the service economy: Prospects and problems, Cambridge University Press.

Irum, S., and M. Nishat, 2009, Sector level analysis of FDI-growth nexus: A case study of Pakistan, The Pakistan Development Review, 48(4): 87-882.

Jack, E., Triplett and B.P. Bosworth, 2002, Productivity in the U.S. services sector, Brookings Institution Press, Washington, D.C.

Jain, D., K.S. Nair and V. Jain, 2015, Factors affecting GDP, manufacturing, services, industry: An Indian perspective. Annual Research Journal of Symbiosis Centre for Management Studies, Pune, 3: 4, 38-56.

Jain, S., and T.N. Ninan, 2010, Servicing India's GDP growth, in: Acharya, Shankar and Rakesh Mohan, (eds.), India's economy: Performance and challenges - Essays in honour of Montek Singh Ahluwalia, New Delhi: Oxford University Press.

Jones, Randall S., and Taesik Yoon, 2008, Enhancing the productivity of the service sector in Japan, Economics working paper 651, OECD.

Tripplet, E.T., and B.P. Bosworth, 2003, Productivity measurement issues in services industries, Baumol's disease has been cured, FRBNY Economic Policy Review.

Kim, K., 2006, The shift to the service economy: Causes and effects, Institute for Monetary and Economic Research, The Bank of Korea.

Khoury, A.C., and A. Savvides, 2006, Openness in services trade and economic growth, Economics Letters, 92(2): 277-283.

Licht, G., G, Ebling, N, Janz and H. Niggeman, 1999, Innovation in the service sector - Selected facts and some policy conclusions, Center for European Economic Research, Mannheim: Germany, December.

Mahadevan, R. and K.P. Kalirajan, 2002, How income elastic is the consumers demand for services in Singapore? International Economic Journal, 16(1): 95-104.

Manning, S., J. Sydow, and A. Windeler, 2012, Securing access to lower-cost talent globally: The dynamics of active embedding and field structuration, Regional Studies, 46: 1201-218.

Maroto-Sanchez, P., 2010, Growth and productivity in the services sector, The state of art, http://www.iaes.es/iuaessp/publications.htm.

Meglio, G.D., Stare and A. Jaklic, 2008, Explaining d\services growth in the enlarged EU., The contribution of public and private services to European growth and welfare and the role of public-private innovation networks, EU, FP7.

Nayyar, G., 2009, The demand for services in India: A mirror image of Engel's law for food? University of Oxford, Department of Economics, Discussion paper series.

Panchmukhi, V.R., Nambiar and R. Mehta, 1986, Structural change and economic growth in developing countries, VIII World Economic Congress of the International Economic Association, Theme 4, December.

Ramaswamy, R., and R.E. Rowthorn, 1993, Centralized bargaining, efficiency wages and flexibility, IMF working paper 93/25.

Russo, G. and R. Schettkat 1999, Are structural economic dynamics a myth? Changing industrial structure in the final product concept.in economia and lavoro, 3-4:.173–188.

Sabolo, Yves, 1975, The service industries, Geneva: ILO.

Sapprasert, K., 2006, The impact of ICT on growth of the service industry, Centre for Technology, Innovation and Culture (TIK), University of Oslo.

Schettkat, R., and L. Yocarini, 2003, The shift to services: A review of the literature, IZA discussion paper 964.

Sen, C., 2011, FDI in the service sector - Propagator of growth for India? Journal of Theoretical and Applied Economics, 18: 6(559): 141-156.

Singh, M., and K. Kaur, 2014, India's services sector and its determinants: An empirical investigation, Journal of Economics and Development Studies, 2(2):385-406.

Summers, R., 1985, Services in the international economy, Managing the service economy: Prospects and problems, Cambridge, Mass: Cambridge University Press,: 27– 48.

Tripplet, E.T., and B.P. Bosworth, 2003, Productivity measurement issues in services industries, Baumol's disease has been cured, FRBNY Economic Policy Review.

UNCTAD, 2014, Conference on global importance of services, Geneva.

Wang, C., 2013, The long-run effect of innovations on economic growth, School of Economics, UNSW, Sydney 2052, Australia.

World Trade Organization, International Trade Statistics, 2014.

Xinshen Diao, Margaret McMillan and Dani Rodrik, 2017, The recent growth boom in developing economies: A structural change perspective, NBER working papers 23132, National Bureau of Economic Research, Inc.

APPENDIX

Variables included and their Expected Signs
Dependent Variable: Services Value Added Annual Growth (SER)

S.No.	Variable's Name	Notations	Construction of Variable	Expected Sign
01	GDP per capita	(GDPP)	GDP/ total population (annual growth)	Positive
02	Productivity gap between manufacturing sector and services sector	(PDIF)	(Per worker productivity in Manufacturing sector) – (Per worker productivity in services sector)	Positive
03	Innovations	(INN)	Patents applications filed from abroad + patents applications filed from inside the country	Positive
04	Foreign Direct Investment inflow	(FDI)	Foreign Direct Investment Inflow % of GDP	Positive/ Negative
05	Trade Openness	(TOP)	$\dfrac{total\ exports\ +\ total\ imports}{GDP}$	Positive/ Negative
06	Productivity gap between manufacturing sector and services sector in interaction with GDP per capita.	PDIF*GDPP	Productivity difference between manufacturing sector and services sector multiplied by GDP per capita annual growth.	Positive
07	Innovations in interaction with Foreign Direct Investment	INN*FDI	Total number of patents applications filed multiplied by foreign direct investment net inflow % of GDP.	Positive/ Negative
08	Foreign Direct Investment in interaction with Human Capital	FDI*HC	Foreign direct investment net inflow % of GDP multiplied by net enrolment rate secondary % (both male and female).	Positive Negative
09	Trade Openness in interaction with GDP per capita	TOP*GDPP	Trade openness multiplied by GDP per capita annual growth	Positive/ Negative

Source: World Bank Development Database (2016).