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The Determinants of Services Sector Growth: A Comparative Analysis of Selected Developed and Developing Economies

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This study empirically examines the possible factors that determine the services sector growth, both in selected developed and developing economies. For estimation purpose, the study employs the static as well as the dynamic panel data estimation technique with panel data over the period 1990-2014. The results suggest that GDP per capita, FDI net inflow, trade openness and innovations are the common factors that significantly affect the services sector growth both in developed and in developing economies. However, the productivity gap is the only factor that does not have any significant impact on services sector growth, both in developed and developing economies, which indicates that the Baumol's cost disease has been cured.

Keywords: Services Sector Growth, Panel Data Analysis, Innovations

1. INTRODUCTION

Pioneering work on economic growth points to close association between the variations in the services share and the sectoral composition of the GDP [Fisher (1935); Clark (1940); Fourastié (1949); Baumol (1967, 2001); Fuchs (1968); Hollis and Moises (1975); Kuznets (1966, 1971); Rostow (1971) and Baumol, *et al.* (1989)]. Over the last decade, because of its increasing share in GDP as well as in employment, services sector has attracted the attention of economists around the world. A number of studies have addressed the subject issue from many aspects over different time periods. Many studies foresee that in the years ahead, the services sector will be considered as an engine of economic growth [Young (1995)]. This is justified by the fact that there exists a well-established positive association between the increasing share of GDP, employment and per capita income as well [Fuchs (1981)]. Many studies show that developed countries tend to have a high share of services than that of developing countries. Similarly, it is also evident that as per

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capita income rises, the share of services in GDP rises [Eichengreen and Gupta (2009); Ghani (2010) and ADB (2007)]. It entails a broader role for the services sector in terms of growth, for economies in the future. Moreover, though the share of services sector has grown both in relative as well as in absolute terms, yet the existing internal and external barriers to imports and FDI prevent the services sector from fulfilling its potential. Despite the recent advances, services sector has not been given the due attention by researchers; it has been under-estimated by policy-makers and has been inadequately exploited by many entrepreneurs. The traditional perception of services as unproductive still prevails in the mind of a common man.

The importance of services sector in global perspective is apparent from its rising contribution in output, employment and trade. Services sector constitutes 68 per cent of the world's total output, 39 percent of the world's total employment and 20 percent of the world's total trade. Services sector is characterised as the fastest growing sector, not only in the world's economy as a whole but also in different economic groups. Services share in total GDP is 47 percent in low income countries, 53 percent in middle income countries and more than 70 percent in high income countries [WDI Report (2014)]. The General Agreement on Trade in services [GATS (1999)] was the mainstay for the impetus towards liberalisation of trade and investment in services in the last decade. The services exports reached to \$4.7 trillion with a fastest growth rate of 7 percent, compared to 2 percent growth rate of the merchandise exports by 2014. The continuously increasing share of services exports has provided some support to the world trade [WTO Statistics (2014)]. Moreover, the trend of foreign direct investment is in favour of services sector, as this sector received foreign direct investment of \$1.3 trillion in 2014 [UNCTAD (2014)]. The trend in growing contribution of services sector to the economy in terms of output and employment, in comparison with other sectors, is still underway in both developed and developing economies. In the last two decades almost all the developed countries have experienced an increase in the growth rate of services sector; however, developing countries have not been benefitted from the same situation. There are some developing countries that have experienced even negative growth rate. Most of the developed economies such as France, Germany, Italy, Japan, Russia, UK and USA have shown an average increase of 7 percent and 2.9 percent for services share to GDP during 1991-2001 and 2001-2011 respectively. As far as the developing economies are concerned, it shows a different picture of services sector performance, as compared to the developed economies. Here, the services share to GDP has increased in case of Bangladesh, Pakistan, Malaysia and Turkey with average rate of 4 percent and 3.7 percent during the period 1991-2001 and 2001-2011 respectively. While in case of Egypt, Indonesia and Iran, the services share to GDP have fallen by an average of 1 percent and 3 percent during 1991-2001 and 2001-2011 respectively [WDI Statistics (2014-15)]. An overview of the selected developed and developing countries is shown in the Table below, which indicates clearly that the share of value added is high in developed countries than that of developing countries. Hence, a separate analysis on determinants of services sector growth both for developed and developing countries is important.

Services Value-added as % of GDP					
Country	Y2000	Y2014	Country	Y2000	Y2014
Bangladesh	52.9	56.3	France	74.3	78.7
Egypt, Arab Rep.	50.1	49.9	Germany	68.0	69.0
Indonesia	38.5	42.3	Italy	70.0	74.3
Malaysia	43.1	51.2	Russian Federation	55.6	63.7
Iran, Islamic Rep.	50.3	52.4	United Kingdom	72.0	78.4
Turkey	57.4	64.9	United States	75.7	78.0

Source: Uncomtrade data.

The current research paper is organised as follows: section 2 presents a brief theoretical background while section 3 presents a brief explanation of literature review; section 4 focuses on the theoretical and empirical model as well as data collection, variable construction and estimation procedure. Section 5 indicates model estimation and results interpretation, while the last section presents conclusion and policy recommendations.

2. SERVICES SECTOR GROWTH: A THEORETICAL PERSPECTIVES

Fisher (1935) and Clark (1940), working independently of each other, concluded that the well-known three sector hypothesis identified different factors behind services sector employment and output growth. First they point to the fact that employment will shift from agriculture to manufacturing and from manufacturing to services as long as the economies grow and develop. Second factor that Clark identified to be the driving factor behind the services sector employment and output growth is the tendency of tastes and preferences (demand) to shift towards services due to increase in income. Demand shifts towards services sector, as the demand for manufacturing gets saturated over the course of time that is supposed to make the labour in manufacturing sector move towards the services sector. Third factor that lies behind employment shift and growth of services sector is the differences in productivity between manufacturing and services sector. Clark further justified his argument of employment shift to services sector by the fact that though manufacturing sector is characterised as more productive sector, it is subject to stagnating demand. On the other hand, the service sector which is identified as a low productive sector, yet it is the sector of rising demand. Clark's assumption and propositions were based on empirical data of employment as well as aggregated output and expenditure.

Fourastié (1949), taking forward the argument of shift in demand as well as low productivity rate, while using empirical data, advocated that the 21st century would be the century of services sector employment and growth. In 1966, William J. Baumol and William G. Bowen in their book on the cost disease hypothesis; proposed that income and jobs will increase in sectors which are characterised by low productivity. The rationale for increase in jobs and salaries, despite of no increase in productivity, is seemingly against the classical economics which predicts a close association between rising incomes and high labour productivity. However, Baumol explains if workers are not paid high incomes in low productivity sectors, they will shift towards other sectors where incomes and salaries are high. To keep workers from quitting the existing jobs,

firms in low productivity sectors will pay workers high incomes and salaries, in case of two sectors manufacturing and services sector. Compared to manufacturing sector, services sector is assumed to have low productivity, hence to keep workers moving from services sectors, they will be paid high wages in order to retain them. Hence, this difference in productivity is assumed to cause services sector to grow. To summarise, Baumol presumes that in high income countries, the employment share is high in services sector, combined with low productivity growth. This share of employment tends to grow further with rising income. The Baumol theoretical analysis differs mainly from that of the “classics” by the fact that Baumol assumes that the share of services and goods in real output is constant over time and same across the countries, as implied by his reference to the cross-country study of Summers (1985). In other words, *Baumol* explains the expansion of services sector employment by productivity differential, rising income, as well as by the constant share of services in real output. The basis for rejection of Clark’s conjecture of increasing share of services in final expenditure was based on the fact that this share has been almost similar both in developed as well as in developing countries. Klodt (2000) also supported the Baumol presumption of constancy of services share in real output, by using data of FR Germany over the period 1907 to 1990. Klodt concluded that the share of services in real output remained almost the same over the said time period. However in 1985, Baumol himself withdrew from his previous findings and concluded that not all activities in the services are stagnant. Though there are many other factors behind the expansion of services sector growth, the two factors i.e., increasing income and the difference in productivity growth between manufacturing and services sector have been the focus of many theoretical and empirical arguments.

3. EMPIRICAL EVIDENCE

Different studies highlight different indicators as determinants of services sector growth. Many studies consider an increase in income per capita as key determinant for the rising share of services in total output and employment. As income per capita rises, the consumer’s final demand shifts from goods to services, because services are considered as more luxurious, more income elastic and more need satisfying than goods [Fisher (1935) and Clark (1940); Bhattacharya and Mitra (1990); Gordan and Gupta (2003); Schettkat and Yocarini (2003); Meglio, *et al.* (2008); Nayyar (2009); Ajmer and Ahmad (2011) and Estrada, *et al.* (2013)]. However, some studies show that though an increase in income per capita shifts the consumer’s final demand from goods to services, due to higher income elasticity of services, nevertheless the income elasticity is not so high as exaggerated by the previous empirical studies [Summers (1985); Mahadevan and Kalirajan (2002)]. Many studies in the literature indicate that the gap between manufacturing sector and services sector plays a crucial role in determining services sector growth. These studies show that a less productive services sector requires more labour to cover the total productivity gap. If more labour is employed in services sector, it causes output in services sector to grow in nominal terms rather than in real terms [Ramaswamy and Rowthorn (1993) and Kim (2006)]. However, according to Jack, *et al.* (2002) and Fernandes, *et al.* (2005) because of industrialisation and trade liberalisation induced technological improvement, the services sector productivity has increased while the productivity gap between manufacturing sector and services sector has reduced. The

services sector is now capable of catching up with the manufacturing sector in terms of productivity; hence there is no more significant effect of the productivity gap on services sector growth. Many recent studies have identified an increase in FDI inflow as a contributing factor in services growth. The economy that succeeds in attracting foreign direct investment inflow, will be able to put the economic resources to better use, and will cause productivity and output in services sector to grow [Khaliq and Noy (2007); Irum and Nishat (2009); Chakraborty and Nunnenkamp (2006); Adi, *et al.* (2014)]. However, Sen (2011) suggests that there is one way causality from economic growth towards FDI inflow that is, when economy grows it will be able to attract more FDI from abroad. Recently many studies have pointed out that increase in innovations not only has a positive effect on output and employment but it also has a significantly positive effect on labour productivity in both sectors—services and manufacturing. [Licht, *et al.* (1999); Sapprasert (2006)]. Many studies point to the fact that liberalisation and reforms as well as reduction in trade barriers have contributed to the growth of the services sector [Chanda (2002); Dodzin and Vamvakidis (1999); Gordan and Gupta (2003); Jain and Ninan (2010); Singh and Kaur (2014)]. However, Khoury and Savvides (2006) argue that if foreign consumers have low level of income, they will demand for goods rather than services even if trade barriers are reduced. On the other hand, if foreign consumers have high level of income their demand preferences will shift towards the domestic services, which are considered more luxurious rather than normal goods.

Apart from the above studies, many other studies point to multiple factors as determinants of services sector growth. For example, Acharya and Patel (2015) indicate services sector as one which has the fastest growth and is an important factor that contributes to GDP in India. The study indicates that economic growth, trade and foreign direct investment (FDI) inflows are the main contributing factors in services sector growth in India. In another study related to India, Singh and Kaur (2014) highlight that rapid urbanisation, expansion of the public sector and an increase in demand for intermediate and final consumer services, domestic investments and openness are considered major determinants for services sector growth. Similarly, Madeira, *et al.* (2014), attributes to increasing investment in acquiring machinery, research and development, more access to new knowledge and increase in marketing activities as the contributing factors to services sector growth.

The empirical literature reviewed so far indicates that a majority of the existing studies on services sector growth, whether theoretical or descriptive, have examined the experience of a single country or a sample of few countries, like Gordon and Gupta (2003); Singh and Kaur (2014); Jain, *et al.* (2015); Acharya and Patel (2015) have focused on India, similarly, Wu (2007), has focused on India and China, whereas Agostino, *et al.* (2006) has focused on EU countries. However, according to Russo and Schettkat (1999) and also Schettkat (2003), because of diverse development structure of developed and developing countries, the role of the factors such as trade liberalisation, FDI, innovation and difference in productivity may not be the same in developed as well as in developing countries. Hence, it is of key importance to come up with a study that may present a comparative picture for the growth of services sector in both developed as well as developing world. The present study, therefore, is an attempt to study the role of different factors on services sector growth, both in developed and developing countries.

4.1. Empirical Model

Baumol (1967, 1985) presented his well-known ‘‘Cost Disease Hypothesis’’. According to this hypothesis, services share in output and employment rises due to per worker’s productivity gap between manufacturing sector and services sector. Services sector rested far behind manufacturing sector in per worker’s productivity. To cover the total productivity gap between manufacturing and services sectors, more labour is employed in services sector which causes services share in total output to rise in nominal terms rather than in real terms. Fuch (1980) and Inman (1985) moved the discussion further to factors affecting services sector growth towards the exogenous demand shocks. They empirically suggested that the exogenous demand shocks, such as rural urban migration and female participation in labour force are the main factors behind the rising share of services in output and employment. The current study follows the empirical model developed by Inman (1985). According to Inman (1985), under the prevailing Assumptions¹, output in each of services firm and manufacturing firm is the function of labour employed in that sector only.

$$y_s = f(l_s) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

$$y_m = f(l_m) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

Where y_s represents the growth rate of output in services sector while y_m indicates the growth rate of output in manufacturing sector. l_s and l_m indicate labour supply both in services sector and manufacturing sector respectively.

The demand for services per labour is the function of relative price of services, wages and exogenous demand shocks.

$$q_s/l_s = c (p_s/p_m)^b w^\alpha e^z \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

Where q_s represents per worker’s demand for services, p_s and p_m are prices of services and manufacturing goods respectively. α and b represent income elasticity of services and price elasticity of services respectively. While z represents the rate of change in demand for services due to exogenous demand shocks.

Services share in total employment is the function of price elasticity of services, demand function of services and the growth rate of labour productivity in services sector.

$$l_s/l = (1/b) (q_s/l) e^{-\rho_{st}} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

Here l_s/l represents share of services employment in total employment, the term in the first bracket represents inverse of price elasticity for services, the term in the second bracket is the demand function for services while the last term $-\rho_{st}$ indicates per worker productivity growth rate in services sector.

From profit maximisation condition of competitive market, we can derive relative prices and wages. The equilibrium prices are determined by the ratio of income elasticity and price elasticity (α/b) and the difference between per worker productivity in manufacturing sector and services sector ($\rho_m - \rho_s$). While equilibrium wages are the

¹Labour is the only factor of production. All of the markets in the economy that is labour market, goods market and services market are competitive.

function of price of manufacturing good and marginal productivity of labour in manufacturing sector. i.e.

$$\text{Equilibrium Prices: } p_s/p_m = (\alpha/b)e^{(\rho_m - \rho_s)t} \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

$$\text{Equilibrium Wages: } w = \alpha e^{\rho_m t} = p_m m p_m \quad \dots \quad \dots \quad \dots \quad \dots \quad (6)$$

Now putting Equations (5) and (6) into Equation (3) and then substituting the resulting equation into Equation (4) and differentiating with respect to time, we get Equation (7)

$$l_s = (\alpha - 1)\rho_m + (\rho_m - \rho_s)(1 + b) + z \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$

Equation (7) is the main equation² which shows that the employment share in services l_s is determined by three factors i.e., income $(\alpha - 1)\rho_m$, productivity difference between manufacturing and services sectors $(\rho_m - \rho_s)(1 + b)$ and exogenous demand shocks z as well.

Following Inman (1985) we assume that the determinants of services' value added annual growth are the same as that of employment share in services l_s , so we modify the Equation (7) for services' value added annual growth, instead of employment share in services l_s and get Equation (8).

$$y_s = (\alpha - 1)\rho_m + (\rho_m - \rho_s)(1 + b) + z \quad \dots \quad \dots \quad \dots \quad \dots \quad (8)$$

The Equation (8) can also be written in simple notation form, i.e.

$$SER = \beta_1 GDPP + \beta_2 PDIF + \beta_3 z \quad \dots \quad \dots \quad \dots \quad \dots \quad (8a)$$

SER represents services value added growth which is determined by GDP per capita annual growth (GDPP), per worker productivity difference in two sectors (PDIF) and sum of the exogenous demand shocks (z).

Now in Equation (8)-a, we will insert the other possible variables i.e., Innovation, FDI net inflow and trade openness at a time. Through vector of exogenous demand shocks (z), we can check that whether these factors significantly determine growth in services sector or not.

$$SER = \beta_0 + \beta_1 GDPP + \beta_2 PDIF + \beta_3 INN + \beta_4 FDI + \beta_5 TOP + e_t \quad \dots \quad (8b)$$

Where $GDPP$, $PDIF$, INN , FDI and TOP indicate GDP Per Capita, productivity difference (productivity gap), innovation, foreign direct investment and trade openness respectively.

$$SER_{it} = \beta_0 + \beta_1 GDPP_{it} + \beta_2 PDIF_{it} + \beta_3 INN_{it} + \beta_4 FDI_{it} + \beta_5 TOP_{it} + e_{it} \quad \dots \quad (8c)$$

Equation (8)-c is a panel representation of Equation (8)-b as here i in the subscript represents i^{th} cross sections and t in the subscript represents t^{th} time periods. To make the dynamic panel, (8)-c can be written as follows:

$$SER_{it} = SER_{it-1} + \beta_{1it} + \beta_2 GDPP_{it} + \beta_3 PDIF_{it} + \beta_4 INN_{it} + \beta_5 FDI_{it} + \beta_6 TOP_{it} + e_{it} \quad (8d)$$

²The equation provided by Inman (1985) to empirically examine the determinants of growth in employment or output in services sector.

Data and Variables

The current study uses annual growth of services value added as a dependent variable, while GDP per capita growth, innovations, foreign direct investment, productivity difference (productivity gap) and trade openness as an explanatory variables. Data on all of these variables comes from World Bank Development Indicators (2015) for the period 1990-2014.

For comparative analysis of developed and developing economies, the current study has selected seven countries, each from developed as well as developing economies. The sample of selected developed economies includes Italy, Germany, France, Japan, Russia, USA and UK, while the sample of selected developing economies includes Pakistan, Bangladesh, Turkey, Egypt, Iran, Indonesia and Malaysia. Based on the availability of data, few countries have been dropped from the list. Construction of variables is shown in the appendix.

4.2. Estimation Procedure

First, the Equation (8c) is estimated with the static panel data estimation technique that is Pooled OLS model, Random Effect model and Fixed Effect model. Pooled OLS is based on the assumption that there is neither any significant cross section effect nor any notable temporal effect, indicating that all intercept coefficients are the same. Although, the Pooled OLS has simplicity in use but using this model solely may disfigure the picture of the true relationship between the dependent and independent variables. Hence, we move towards Random Effect model and Fixed Effect model as well. The random effect model keeps a common intercept for all the cross sections and follows the assumption of the random unobserved individual components. However; Fixed Effect model allows intercept for each cross section to be significantly different, Gujarati (2003).

Since the economic theory suggests a reverse causality from services sector growth to FDI net inflow, and also a reverse causality from services sector growth towards income per capita. Furthermore, it may be possible that the current study has not considered all the determinants of services sector growth and some of the variables have been omitted which create the omitted variable bias. When the problem of reverse causality and omitted variable bias occur, they both lead to the issue of endogeneity. In case of endogeneity issue, the use of static panel data estimation techniques will lead us towards biased estimation. Hence the results obtained with the static panel data estimation technique cannot be considered for results interpretation, as they are meant to check the robustness of the results only. For the results interpretation, only the dynamic panel data estimation technique shall be considered.

Hence, Equation (8d), the dynamic version of (8c) is appropriate to be estimated with instrumental variable technique that is GMM estimator. The GMM estimation technique presented by Arellano and Bond (1991) is used to examine the effect of lag dependent variable and to treat the issue of endogeneity as well as heteroscedasticity. The selection of valid instruments is necessary to obtain more consistent and efficient estimation result with instrumental variable technique (GMM). The instruments are considered to be valid if it is having correlation with endogenous variables $Cov(z, x) \neq 0$

but no correlation with error term $Cov(z, u) = 0$. The current study has used the lags as well as lags of the difference of explanatory variables as the instruments. The validity of instruments has been checked with the Sargen test.

4.3. Data and Variables

The current study uses annual growth of services value, added as a dependent variable, while GDP per capita growth, innovations, foreign direct investment, productivity difference (productivity gap) and trade openness as explanatory variables. Data on all of these variables comes from World Bank Development Indicators (2015), for the period 1990-2014. The current study uses two separate samples of selected developed and selected developing economies. The sample of selected developed economies includes Italy, Germany, France, Japan, Russia, USA and UK while the sample of selected developing economies includes Pakistan, Bangladesh, Turkey, Egypt, Iran, Indonesia and Malaysia.

4.4. Estimation Results

The current study begins to estimate Equation (8c) with static panel data estimation models, which are Pooled OLS, Random Effect and Fixed Effect models. We have used Brush-Pagan Lagrangian Multiplier test to choose between Pooled OLS and Random Effect model. While the selection between Random 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 in both selected developed and developing economies and suggests pooling the data and estimating the model with Pooled OLS estimation technique. The Hausman specification test could not reject the null hypothesis in case of selected developed economies; however, it rejected it in case of selected developing economies. The Hausman specification test in case of selected developed economies prefer random effect over fixed effect model while in case of selected developing economies it prefers fixed effect over random effect model. As the Breusch-Pagan and Hausman model specification tests do not suggest the same estimation technique for both selected developed and developing economies, so it is better to estimate the Equation (8)-c with all the three static panel data estimation techniques that are, Pooled OLS, random effect model and fixed effect model. The results obtained from Pooled OLS, Random effect and Fixed effect models are nearly the same and are presented in Tables (4.2) and (4.3) for selected developed and developing economies respectively. Though the results obtained with static panel data estimation techniques are according to the theory but as the current model faces the endogeneity issue and we are also interested to see the lag dependent variable's effect; therefore, the current study will mainly focus on the results obtained with the Dynamic panel data estimation technique, that is Difference GMM, which can better explain the current model. The empirical results obtained with Difference GMM are presented in Table 4.2 and Table 4.3 for selected developed and developing economies respectively.

Table 4.2

Results for Selected Developed Economies

Independent Variables	Static Estimation			Dynamic Estimation
	Pooled OLS	RE	FE	Diff- GMM
SER _{t-1}				.0062811 (0.949)
GDP	.7708793 (0.000)***	.7708793 (0.000)***	.7677959 (0.000)***	.60684 (0.000)***
PDIF	-.0006287 (0.402)	-.0006287 (0.401)	-.0014522 (0.527)	.007428 (0.280)
INN	.0210341 (0.859)	.0210341 (0.859)	.2747879 (0.476)	.4745105 (0.512)
FDI	.2428669 (0.002)***	.2428669 (0.002)***	.1388773 (0.128)	.2619307 (0.037)**
TOP	-3.24761 (0.001)***	-3.24761 (0.001)***	-4.163366 (0.028)**	-9.476171 (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 P-value		5.63 (0.3440)		
Instruments				27
AR2 test				1.21
p-value				(0.226)
Sargan test				66.56
p-value				(0.13)

Values in the parenthesis are P-values.

***, **, *Represents significance at 1 percent, 5 percent and 10 percent respectively.

The coefficient of GDP Per Capita, estimated with Difference GMM, shows a significant positive effect of increase in income on the services value added annual percentage growth, in both selected developed and developing economies. Since more need satisfying characteristics of services as compared to goods, an increase in GDP per capita will increase consumers' final demand for services rather than goods. The results are in the same lines with other empirical studies, which are Falvey and Gemmel (1996), Moustafa (2002), Nayyar (2009) and Estrada, *et al.* (2013).

The coefficient of productivity difference estimated with Difference GMM has appeared insignificant in case of both samples of selected developed and developing economies. The current study could not find any significant effect of the productivity difference between the manufacturing sector and the services sector, on the growth of services sector. The results indicate that due to technological advancements in advanced countries and the transfer of some of this technology to the developing countries, the services sector productivity has now been raised and the productivity difference between manufacturing sector and services sector has been reduced. Hence, the Baumol's cost

disease has been cured. These results are in the same line with the findings of Meglio, *et al* (2008). However, the current results are against the empirical results obtained by Jack, *et al.* (2002) and Frenandes, *et al.* (2005). The insignificant effect of productivity difference indicates that the services sector does not lag much behind the rest in productivity, Maroto-Sanchez (2010). Only a small category of services has a cost-disease problem leading to low productivity, while the rest of the services sector has shown higher productivity growth, Eichengreen and Gupta (2010). Although, services sector productivity fell after the great slowdown of 1973 but due to advancement in information technology and the increased use of intermediate inputs particularly in fastest growing services industry has over all increased the labour productivity in services sector in the last decade Tripplet and Bosworth (2003). Earlier studies which suggest that the services sector that lagged in respect of productivity were due to conceptual problems, related to the measurement of productivity, which might have made the services sector seem less productive in the past, Griliches (1992, 1994).

The coefficient of FDI net inflow, estimated with Difference GMM, has appeared with significant positive effect on services sector growth in the case of both selected developed and developing economies. The results confirm that an increase in FDI net inflow creates job opportunities by putting the unused resources to use, increase an income per capita and demand for services value added. The previously observed studies Alfaro (2003), Tondl and Fornero (2008), Sirari and Bohra (2011), Singh, *et al.* (2010) and Dixit and Sharma (2014) have suggested the same results. However, the empirical studies of Aykut and Sayek (2004) and Chakraborty and Nunnenkamp (2006) have suggested negative effect of FDI net inflow on services sector growth.

The coefficient of innovation estimated with Difference GMM has appeared with a significant positive effect in case of selected developing economies; however, the coefficient of innovation has appeared insignificant in case of selected developed economies. Results show that as the services firm becomes more innovative, it creates more job opportunities for skilled labour, improves the quality of services, increase income and increase demand for services. These results are in line with Lee, *et al.* (2004), Lopes and Dodinho (2005), Sapprasert (2006), Jaw, *et al.* (2010) and Mitra (2011). The insignificant effect of innovations on services sector growth, in case of selected developed economies could be due to the fact that in post-World War II period, the role of Innovation in economic growth had increased for small economies while decreased for larger economies, Wang (2013). Similarly, the inventions today are only the diffusion of great inventions in the past which does not have any significant effect on growth and standard of living, as they had in the past, Gordon (2012). Furthermore, developing 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, which in fact added up to the innovations of developing countries more than the developed countries, Mannig, *et al.* (2012). Another reason for the diminishing role of innovations in developed countries is that, as innovations are associated with negative monopoly rents, the monopoly rent is higher for large size economies and lower for small size economies. The high monopoly rents faced by large economies have decreased the role of innovations in these economies.

The coefficient of trade openness estimated with Difference GMM, for both selected developed and developing economies, has appeared with significant negative sign. Results suggest that as the degree of trade openness increases, foreign consumers will increase their demand for domestic goods rather than for services. The results are in accordance with previous empirical studies of Dodzin and Vamvakidis (1999) while against the empirical study of El Khoury and Savvides (2006), which suggest a significant positive effect of trade openness on the growth of services sector.

Table 4.3

Results of Selected Developing Economies

Independent Variables	Static Estimation			Dynamic Estimation
	Pooled OLS	RE	FE	Diff- GMM
SER _{t-1}				-.1221 (0.144)
GDPP	.8109663 (0.000)***	.8109663 (0.000)***	.7694365 (0.000)***	.76875 (0.000)***
PDIF	.0000855 (0.796)	.0000855 (0.796)	.0000963 (0.762)	.0002094 (0.554)
INN	.5650983 (0.004)***	.5650983 (0.003)***	1.107889 (0.000)***	.8672283 (0.081)*
FDI	.2032876 (0.092)*	.2032876 (0.090)*	.2000556 (0.088)*	.3142237 (0.026)**
TOP	.238635 (0.618)	.238635 (0.617)	-7.882495 (0.000)***	-7.549656 (0.056)**
Observations	175	175	175	161
R ²	0.6177	0.6190	0.1173	
B-P LM test	Chi ² =0.000			
P-value	(1.000)			
Hausman test P-value	Chi ² =21.93 (0.0005)***			
Instruments	47			
AR2 test	z = 0.90			
P-value	(0.368)			
Sargan test	chi2 = 51.44			
P-value	(0.127)			

Values in the parenthesis are P-values.

***, **, * represent significance at 1 percent, 5 percent and 10 percent respectively.

By comparing the empirical results obtained from the samples of both selected developed and developing economies, it is observed that in case of selected developed economies, the three explanatory variables i.e., GDP per capita (GDPP), FDI (FDI) and trade openness (TOP) have shown significant effects on services sector growth. However, the productivity gap between manufacturing and services sector, innovations and lagged dependent variables have not shown any significant effect on services sector growth. Similarly, in case of selected developing economies, four explanatory variables; that are,

GDP per capita (GDPP), FDI (FDI), innovations (INN) and trade openness (TOP) have shown significant effects on the services sector growth, however, the effect of productivity gap and lagged dependent variable are found insignificant in case of selected developing economies. The results obtained for both selected developed and developing economies are nearly same; the only difference is the effect of Innovations, which is significant in case of selected developing economies but insignificant in case of selected developed economies.

The diagnostic tests of Difference GMM are of great importance as they help to confirm the efficiency and stability of the model. The Arrelano—Bond AR₂ test accepts the null hypothesis of “no auto correlation of second order” in case of both selected developed and developing economies. Furthermore, the Sargan test for the validity of the over identifying restrictions, also accepts the null hypothesis of instrument validity, in case of the samples of both selected developed and developing economies.

5. CONCLUSION

On the basis of 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 economies. However, in case of selected developing economies 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 economies, while the productivity gap between manufacturing sector and services sector has no significant effect on the growth of services sector, in both selected developed and developing economies. Moreover, GDP Per Capita, FDI net inflow and Innovations having positive effects, while trade openness has negative effect on the growth of services sector.

The developing countries must focus on the attraction of FDI and promotion of innovations in most of the services sub sectors. FDI inflow will provide them technology, equip their labour with skills and bring new ideas from abroad; while focus on innovation will help them to improve the quality of their services. With more improved and sophisticated techniques of production, they will be able to attract more FDI. The degree of trade openness should be kept at such a level that can increase trade in services without reducing trade in goods. The developing countries can transfer excess labour from agricultural sector to the services sector, which has the potential to absorb the excess labour, without decrease in agricultural productivity. As far as the developed countries are concerned, they share some similarities and dissimilarities with the developing countries. They can attract FDI from abroad and can manage a suitable degree of trade openness but cannot shift the less expensive labour from agricultural sector to the services sector, as that will decrease productivity in agricultural sector. One thing that these developed countries must do is to determine the level of outsourcing their services. Although, the outsourcing provides them with the cost effective production techniques in the short run but in the long run it will be better for them to recover the role of innovations in these countries.

Appendix A1

Variables Included and Their Expected Signs

Dependent Variables: Services Value Added Annual Growth (SER)			
S. No.	Variables' Names	Data Used	Expected Sign
01	GDP per capita (GDPP)	GDP per capita growth (annual %)	Positive
02	Productivity gap between manufacturing sector and services sector (PDIF)	$\left(\frac{\text{annual real output in manufacturing sector as a whole}}{\text{total manufacturing employment}} \right) - \left(\frac{\text{annual real output in services sector as a whole}}{\text{total services employment annually}} \right)$	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 GDPs	Positive/ Negative
05	Trade Openness (TOP)	$\frac{\text{total exports} + \text{total imports}}{\text{GDP}}$	Positive/ Negative

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