

Do Service Exports and Macroeconomic Factors affect Growth in Developing economies: A Robust Panel Data Analysis

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Abstract

The service sector has emerged as a key driver of economic growth in developing economies. There is a dearth of empirical studies on service sector in developing economies. This study analyses the impact of service exports along with other macroeconomic determinants in a cross-country perspective over the time period of 1990-2023. This study employs Fixed Effects with Driscoll-Kraay standard errors to ensure robustness and addresses the major concerns such as autocorrelation, heteroscedasticity and cross-sectional dependence. The results reveal that service exports and labour force contributes significantly and positively to economic growth while Trade Openness and FDI shows negative and insignificant impact on growth of developing economies respectively. The findings highlight the importance of macroeconomic factors in boosting sustainable growth in developing economies.

Keywords: Service Exports; Developing economies; Panel Data; Foreign Direct Investment; Trade Openness.

Introduction

Past few decades witnessed a shift from agriculture and manufacturing towards a rapidly growing services sector which contributes immensely to economic growth and employment generation in developing economies which in turn leads to sustainable economic growth. Unlike goods trade, Services trade is directly linked with technology, human skills and institutional development of any economy.

With the growing progress of international trade, Services trade is also growing profoundly in developing economies. Advancements in ICT and its benefits have got extended to many service areas such as Tourism, IT services, Finance and many other professional services which no longer require physical presence and can be delivered from any part of the country to some other country. Increasing services' trade generates employment, improves productivity, and help in transfer of knowledge which strengthens the capabilities of any nation.

Despite the growing importance of services trade, there is lack of empirical studies in comparison to merchandise trade. There are number of studies which have shown the impact of international trade on economic growth but the sector-wise impact on growth especially with respect to services is limited. Moreover, the studies undertaken have applied traditional econometric models which are not effective in addressing the major issues of macro level panel data such as cross-sectional dependence, autocorrelation and heteroscedasticity. Cross sectional data is susceptible to global economic shocks which needs to be addressed by the suitable econometric techniques.

Macroeconomic factors such as Foreign Direct Investment, Trade Openness, Labour Force influence both demand of services and the potential of economies to export them competitively. It is crucial to understand how these variables interact with services exports for coming up with effective development strategies especially in developing economies which are still lingering in traditional sectors.

To overcome this gap in the literature, this study examines the determinants of service sector growth with particular emphasis on the services exports along with the other macroeconomic factors which are essential for services led growth in developing economies. This study uses Fixed effects model along with Driscoll-Kraay standard errors to ensure robustness in presence of cross-sectional dependence, Autocorrelation and Heteroscedasticity. By addressing these issues of macro panel data, this study provides reliable empirical evidence on the drivers of services sector growth in Fast-Emerging developing economies for an extended time period of 2000-2023.

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Research Question and related Hypotheses

1. To assess how commercial service exports and other macroeconomic factors affect economic growth in developing economies.

Hypotheses

H01: Commercial Service Exports and other macroeconomic factors do not significantly affect economic growth in developing economies.

H0_{1(A)}: Commercial Service Exports do not positively and significantly affect the economic growth of developing economies.

H0_{1(B)}: The Labour force does not positively and significantly affect the economic growth of developing economies.

H0_{1(C)}: FDI do not positively and significantly affect the economic growth of developing economies.

H0_{1(D)}: Trade Openness do not positively and significantly affect the economic growth of developing economies.

The remainder of the paper is organised as follows. Section 2 reviews the literature regarding services sector growth and other macroeconomic factors. Section 3 outlines the data source, and the relevant methodology applied. Section 4 discusses the results and Interpretation. Finally, Section 5 discusses conclusion and policy implications of the study.

Literature Review

The role of services sector in driving economic growth in developing economies is trending especially in economies shifting away from primary and secondary sector dominance. It has been previously emphasised in a number of studies that industrialisation is the primary engine of economic growth, however, recent studies have shown that services alone can be sustainable source of economic growth.

Previous studies highlight that services contribute to growth through diffusion of knowledge, financial intermediation, communication services and acts as an input in the production process (Baumol, 1967; Eichengreen and Gupta, 2013; Banga and Goldar, 2007). With increasing globalisation and technological upgradation, many modern services such as IT, Finance, Business services have become highly tradable allowing developing economies to actively participate in global value chains.

Increasing liberalisation of services trade significantly enhances economic growth in developing economies by improving efficiency, competitiveness, and access to world markets (Hoekman and Mattoo, 2012). Ghani and Kharas (2010) highlight that services emerge as a major contributor in generating employment and value addition in developing economies surpassing industrial growth.

Multiple studies provide empirical evidence supporting export led growth hypothesis for services (Gabriele, 2003; Tiwari and Mutascu, 2011; Priyankara, 2018; Onose and Aras, 2021), confirming service exports boosts economic growth and helps in fostering long term sustainable development. Similarly Trade openness in services facilitates trade by technology transfer and innovation. These studies suggest that service exports act as a driving force in economic transformation.

The contribution of various macroeconomic variables to economic growth have been widely discussed in the literature. Eichengreen and Gupta, 2013 finds a positive association between service sector share in output and per capita Income. This study further highlights the two waves which leads to Increasing demand of both traditional and modern services. However, the second wave of demand for modern services occurs at a much lower income level since liberalisation. Further labour force is central to growth of any economy, labour force helps in

improving productivity and increases capability of any nation to adopt and create new technologies for improving performance (Alege and Ogundipe, 2013; Bergin and Kearney, 2004).

The role of FDI in influencing growth is unclear in the literature. Some studies find that FDI helps in the inflow of capital and knowhow (Ali & Li, 2018) whereas, others argue that FDI does not contribute to the growth of any economy due to repatriation of profits and lack of domestic collaboration (Rashid et al., 2023).

Trade Openness also impacts both positively and negatively growth process of any economy. If Trade openness is complemented with sound institutional management which helps to regulate and collaborate at the global level then it can contribute to the growth process by facilitating access to global market and increased competition (Yaghmaian&Ghorashi, 1995; Bhattacharyya et al., 2009).

Countries exposed to global economic shocks are prone to issues such as Autocorrelation, Heteroscedasticity, Cross-sectional dependence. To overcome such issues in macro panel data Driscoll and Kraay (1998) provides a robust covariance estimator suitable for Fixed effects model under such conditions which was further validated by Hoechle (2007) and Peterson (2008) to provide reliable outcomes.

Despite the growing body of literature empirical studies on services sector growth along with the application of FE-DK estimator which provides robust statistical inference related to macro panel data is almost invisible in the previous studies.

Data Source and Methodology

The data was taken from the world development indicators. The study utilises the balanced panel data of 30 developing economies selected on the basis of GDP growth rate 2021 as per the world population review report. The study covers a time period of 24 years from 2000 to 2023. The dependent variable is Gross domestic product, and the independent variables are Commercial service exports, Labour force, Foreign Direct Investment and Trade openness.

Econometric Model

To estimate the relationship between service sector and growth along with other macro-economic factors, the following baseline equation of OLS model is as under:

$$Y_{it} = \beta_1 + \beta X_{it} + \mu_{it}$$

The model specification in our case is as under

$$L_GDP_{it} = \beta_1 + \beta_2 L_SerExp_{it} + \beta_3 L_Lab_{it} + \beta_4 L_FDI_{it} + \beta_5 L_TO_{it} + \mu_{it}$$

After applying the within transformation of Fixed effects model, the resulting equation will become:

$$\begin{aligned} (L_GDP_{it} - \overline{L_GDP}_i) &= \beta_1(L_SerExp_{it} - \overline{L_SerExp}_i) + \beta_2(L_Lab_{it} - \overline{L_Lab}_i) + \beta_3(L_FDI_{it} - \overline{L_FDI}_i) \\ &+ \beta_4(L_TO_{it} - \overline{L_TO}_i) + (\epsilon_{it} - \overline{\epsilon}_i) \end{aligned}$$

Estimation Technique

Variables	Obs	Mean	std.dev	Min	Max
L_GDP	720	26.233	1.357	22.266	30.515
L_SerExp	720	23.307	1.274	19.314	26.639
L_Lab	720	16.851	1.517	13.151	20.476
L_FDI	720	-15.974	15.098	-26.169	25.683
L_TO	720	4.157	.505	3.045	5.395

*Table 5: Summary Diagnostics
Source: Scholar's computation from Stata*

Variables	(1)	(2)	(3)	(4)	(5)
(1) L_GDP	1.000				
(2) L_SerExp	0.787*	1.000			
	(0.000)				
(3) L_Lab	0.747*	0.469*	1.000		
	(0.000)	(0.000)			
(4) L_FDI	0.005	0.040	-0.095**	1.000	
	(0.887)	(0.284)	(0.011)		
(5) L_TO	-0.387*	0.025	-0.483*	0.099*	1.000
	(0.000)	(0.499)	(0.000)	(0.008)	

Table 6: Pairwise correlation

Source: Scholar's estimation from Stata

Note: (1) *,** denotes significance at 1% and 5% respectively.

Variables	OLS	FE	RE	FE(DK)
L_SerExp	.676 (.018)***	.815 (.019)***	.826 (.017)***	.815 (.049)***
L_Lab	.299 (.018)***	.449 (.071)***	.344 (.049)***	.449 (.169)***
L_FDI	.003 (.001)***	.000 (.000)	.000 (.000)	.000 (.000)
L_TO	-.658 (.047)***	-.600 (.050)***	-.610 (.049)***	-.600 (.081)***
Constant685	8.205 (.435)***	2.162 (1.032)**	3.718 (.765)***	2.162 (2.38)
Observations	720	0	720	720
R-square	0.84	0.84	0.84	0.84

Table 7: Regression Results

Source: Scholar's estimation from Stata, where ***, ** and * denote significance at 1%, 5% and 10%, respectively.

Note: Standard errors are in parentheses.

Test	Model Comparison	F-stat/Chi	p-value	Decision
F test	OLS vs FE model	118.74	0.000	FE model is appropriate
LM test	OLS vs RE model	5138.83	0.000	RE model is appropriate
Hausman	FE vs RE model	11.99	0.017	FE model is appropriate

Table 8: Model selection criteria tests

Tests	F/ Chi-squared stat	P-value	Decision
Pesaran CD test (Cross-sectional dependence test)	18.167	0.000	Presence of Cross-Sectional dependence
Modified Wald test for groupwise Heteroscedasticity	3230.89	0.000	Presence of Heteroscedasticity
Wooldridge test for autocorrelation	302.685	0.000	Presence of serial Correlation

Table 9: Diagnostic tests

Variables	VIF	1/VIF
L_SerExp	1.44	0.69
L_Lab	1.89	0.53
L_FDI	1.02	0.98
L_TO	1.46	0.68
Mean VIF	1.45	

Table 10: Variance Inflation Factor for Multicollinearity

Results after controlling for econometric assumptions

On the presumption of homogeneity across cross sections, the OLS regression is used to start the analysis; however, as our sample comprises 30 nations, this may not be true. To choose between the OLS and fixed effect models, we proceed with the F-test. The Null hypothesis of no individual-specific effects is rejected at 1% significance level, indicating presence of cross-sectional differences. It implies that the fixed effect model, rather than the ordinary least square model, is more suitable. Furthermore, to decide between the Random Effects (RE) model and a pooled Ordinary Least Squares (OLS) model, the Lagrange Multiplier test, often referred to as the Breusch-Pagan test for random effects, is employed. The null hypothesis of no random effects is rejected at the 1% significance level, showing that the random effects model is suitable for our study. Consequently, the Hausman test (1978) is conducted to determine the appropriate choice between the Fixed Effect model and the Random Effect model. The test evaluated whether the individual-specific effects are correlated with the regressors (explanatory variables). The null hypothesis is rejected at the 1% significance level, indicating that the fixed effects model is more suitable than the random effects model. This indicates that the random effects model is inconsistent in our investigation because of the correlation between individual-specific effects and regressors. Based on the tests above, it can be stated that the Fixed Effects model is suitable for our study.

The Pesaran CD test is utilized to identify cross-sectional dependence in panel data. The null hypothesis is rejected at the 1% significance level, showing that residuals are correlated across cross-sectional units. Moreover, in panel data, the error variance may vary across groups. The Modified Wald test is employed to evaluate groupwise heteroskedasticity across panels. This evaluates heteroskedasticity in the residuals of a fixed-effects model, determining whether the residuals exhibit constant variance (homoscedasticity) or varying variance (heteroscedasticity) across groups. The null hypothesis is rejected at the 1% significance level, suggesting heteroskedasticity across the groups. The Wooldridge test for autocorrelation is performed to assess first-order autocorrelation, specifically if the error term at time t is associated with the error term at time $t-1$. The null hypothesis is rejected at the 1% significance level, suggesting first-order autocorrelation in the residuals. This study uses the VIF test to assess multicollinearity. Multicollinearity arises when independent variables exhibit a high degree of correlation among themselves. The mean VIF for all variables in the model is less than 10 ($VIF < 10$), indicating no significant multicollinearity among the variables. Taking into consideration the results of our diagnostic tests, we are violating the key assumptions as our data has cross-sectional dependence, Heteroscedasticity and autocorrelation. To overcome these issues, we applied Driscoll-Kraay's (1998) fixed effects methodology to obtain robust standard errors. This method is suitable when $N > T$, and this method addresses these issues as highlighted by D. Hoechle (2007). The results presented in the Table show a positive impact of service exports (L_SerExp) on economic growth (L_GDP). A 1% increase in service exports is associated with a 0.82% increase in Economic growth at 0.01 level of significance. Notably, this coefficient is similar to the fixed effects Model selected by the Hausman test in our study but cannot address issues present in our dataset. Similarly, the coefficient of Labour force (L_Lab) is positive and much higher than fixed (.071), random effect (.049) models. A 1% increase in the Labour force increases economic growth by 0.17% in the D-K FE model. The impact of FDI on economic growth is almost negligible (.000) across all the models and is also insignificant. Likewise, the coefficient of Trade openness is almost similar across all models at the 0.01 level of significance. A 1% increase in Trade openness decreases economic growth by almost -.6% across all models. The application of the Driscoll-Kraay model is appropriate, it confirms the reliability of coefficients estimated by addressing all three issues of Heteroscedasticity, cross-sectional dependence and autocorrelation, which is present in our data.

Conclusion

This study employed multiple econometric techniques to get robust empirical results in a panel of 30 developing economies over the time period of 2000-2023. The findings of the study reveals that

service exports play a significant role in promoting economic growth by generating employment, foreign exchange earnings and fostering innovation. In the same vein, labour force demonstrates a significant and positive relationship with economic growth highlighting the critical role of workforce expansion in the delivery and consumption of majority of services. On the contrary FDI has negative and insignificant impact across all the models suggesting structural and institutional barriers across developing countries. Furthermore, Trade openness is found to have a negative and significant effect on economic growth, implying developing countries lack competitiveness to face global competition and liberal trade regimes. There is a need of promotion of more digital services, skill development and facilitating policies which strengthen services trade by targeted investment which encourages technology transfer, and collaboration between foreign firms and domestic industries. Improving regulatory efficiency and supporting domestic industries by investment in research and development, Innovations can maximise the benefits of global economic integration and services trade.

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