EFFECTS OF FOREIGN DIRECT INVESTMENT AND TRADE ON LABOR PRODUCTIVITY GROWTH IN MYANMAR*

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Abstract

This study investigates the effect of inward foreign direct investment, and trade on economic growth in Myanmar over the period 1996-2022 including the covid-19 pandemic period. The study applied both long- and short-run effects of inward FDI and trade on labor productivity using Autoregressive Distributed Lag (ARDL) bound test and Error Correction (EC) model. To account for other labor productivity determinants, economic freedom index, inflation, and covid-19 dummy variables have been used. The empirical results imply that foreign direct investment impact is ambiguous in the short run, but it is beneficial in the long run. Capital goods import has a positive and statistically significant short run and long run impact on labor productivity in Myanmar. As expected, covid-19 pandemic negatively impacted the labor productivity in Myanmar. In this intuition, the GoM should emphasize more and attract skill intensive inward FDI and capital goods import which improve the labor productivity.

Keywords: ARDL, FDI, Labor Productivity, Trade, Economic Freedom, Internet, Inflation

Introduction

Due to globalization and digitalization of economies, some of developing countries in Asia now having a chance to participate more in global value chain. Through the process of inward FDI and promoting trade, labor productivity has been improved in some countries in ASEAN, but others are still under uncertain circumstances. The driving forces affecting different levels of labor productivity of ASEAN Member States has been changing depending on the types of inward FDI, and trade status of the host country. (ASEAN secretariat ,2021), labor productivity in ASEAN grew by 2.96 percent average annually over 1971-2018 and the overall per-worker labor productivity in ASEAN for 2018 is 24.27 (thousands of USD). Among ASEAN nations, Myanmar labor productivity is positioned with the second lowest rank with 8.07 thousand of USD (ASEAN secretariat,2021).

Since 2011, tremendous legal, economic, and social reforms have been taken place in Myanmar. The new FDI law has been enacted in 2012 and it has been merged with citizen investment law in 2016 to boost business environment. Furthermore, to promote export-led growth, National Export Strategy (NES) has been applied for the year 2015-2019. Meanwhile, Labor Organization Law, Social Security Law, Minimum Wage Law, and Employment, and Skill Development Law and have been serially enacted in 2011, 2012 and 2013, respectively (Min Zar Ni Lin,2020). As a result of the reforms, FDI has been redirected from natural resource-based sector to resource-based sector: big drop in oil and gas share in FDI from 50.8% in 2010/2011 to 6.38% in 2019/2020; significant higher manufacturing share in FDI from o.33% in 2010/2011 to 20% in 2019/2020. Garment export became prominent sector in export composition whereas lower capital import share rather than the intermediate goods import (CSO,2022). In the labor perspective, Myanmar experienced significant per-worker labor productivity growth from 2.61 in 1991-2000 to 4.77 in 2011-2018 (ASEAN secretariat,2021). It

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is observed that workers in informal have lower productivity than the formal sector such as export-oriented firms (Worlbank,2016).

The above discussed notion that FDI, trade and labor productivity are correlated, and this leads the motivation of this study. This paper aims to examine the effects of FDI and trade on labor productivity of Myanmar analyzing the data over 1996-2022 both in the short run and long run periods. The rest of the paper is structured as follows: literature reviews related to FDI, trade, inflation, and economic freedom on labor productivity, empirical materials, and methods, followed by the results of the analysis. The final section contributes the discussion and conclusion.

THEORETICAL FRAMEWORK AND PREVIOUS LITERATURE PERSPECTIVES

FDI and Labor Productivity

The FDI-trade-labor productivity nexus has been a considerable subject among the economic researchers and the resulting relationship vary depending on the development status of the host country. In the literature of the AK growth model of Frankel (1962) and Romer (1986), attracting inward FDI leads not only the host country's capital stock enhancement but also the productivity growth through the transfer of technology, transfer of knowledge, expertise, job creation and management skills advancement. The productivity model of Romer (1990) proposed that FDI in open economies induces economic and productivity growth having positive technological spillovers: capital deepening. On the other hand, FDI also leads negative impact in labor's wage inequality and skill differences of the host country (Alam et.al,2013).

Against this theoretical backdrop, there are few studies focused on the relationship between FDI and labor productivity. Boghean and State (2015) analyzed the relationship between FDI and labor productivity in the E.U. countries over the period of 1980-2009 and found a strong connection between them. Karentina (2019) also affirmed that FDI contributes positive spillover effects on Indonesian domestic firms' labor productivity over the period 2010 and 2014 and approved the positive long run impact but negative in the short-term period. On the contrary, Thuy (2007) found insignificant positive effect of FDI on labor productivity in Vietnam with the lager market stealing effect for 2000-2002 period.

Trade and Labor Productivity

In trade literature, trade per se do not affect the labor productivity but capital import embodied with technology leads narrowing the technological gap or skill gap between developing and developed countries. In other words, skill-capital complementary import increases the "stock of knowledge capital" which is likely to vary positively with the extent of contact between local economy and international counterparts (Grossman and Heplman,1990).

Roy (2009) analyzed the capital goods import impact on total factor productivity (TFP) using the sample of 77 countries for 1975-1995 period and provided the positive significant capital goods effect having the advantages of technological backwardness. Nyantakyi and Munemo (2015) also examined the effect of capital goods import on domestic firms' productivity in Ghana, Tanzania, and Kenya from 1991 to 2003. They found the same contribution to Roy (2009).

FDI, Trade and Labor Productivity

To examine the FDI-Trade-Labor Productivity nexus, Le, Duy and ngoc (2019) analyzed the effects of foreign direct investment on labor productivity over the period of 1986 to 2014 using

ARDL and the results affirmed that FDI has a positive long-run impact on labor productivity in the long-term. Asada (2020) also examined the impact of FDI and trade on labor productivity of Vietnam over the period of 1990-2017 using ARDL model. He found out the same contribution that FDI and trade impact is ambiguous in the short run, but it has significant positive contribution to labor productivity growth in the long run. At the same time, Vinh (2019) and Yasar, M., (2013) found out the positive effect of FDI on labor productivity both in the short run and long run. Hoang N., Quoc V.L., & Hoang N.B (2019) also provide strong FDI positive impact on labor productivity using ARDL model from 1986-2014 in the long run. The preceding literature shows varying effect of labor productivity in Vietnam.

In addition to the above influencing labor productivity factors, other researchers contribute economic freedom and inflation impact on labor productivity. Henri and Mveng (2023) analyzed economic freedom including legal structure, labor freedom and trade freedom has positive effect on productivity of African countries. Nissan and Niroomand (2008) found out that economic liberalization induces labor productivity growth. Eryilmaz and Bakir (2018), Clark (1982) and Dritsaki (2016) analyzed the relationship between inflation and labor productivity. Accordingly, they found out the negative relationship between inflation and labor productivity.

Based on the above previous theoretical and empirical literature, there are limited contribution to FDI, trade and labor productivity nexus in Myanmar. Therefore, the paper applied the variables of FDI, trade, economic freedom, and inflation as driving factors for labor productivity growth in Myanmar using the ARDL model approach.

Emprirical Methodology

Data Sources

In the analysis, the study applied the annual time series data for the period 1996-2022. The data have been collected and transformed from three main sources: ILO, Heritage Foundation and UNCTAD. The research variables and their definitions are reported in Table 1 below.

Table 1 Variable Definitions and Sources

Variables	Definition	Source	Expected sign
LP	Output per worker	ILOstat	+/-
FDI	Inward FDI per capita	UNCTAD	+/-
EX	Export of Goods and Services	UNCTAD	+
KIM	Capital Import	UNCTAD	+
INF	Inflation rate as an annual change of consumer price index	UNCTAD	+/-
EF	Economic Freedom Index	HF	+/-

Source: Author's Estimation

Model Specification and Methodology

Traditional cointegration methods, including residual-based Engle and Granger (1987) test and the maximum-likelihood-based Johansen (1991; 1995) tests, are some limitations, because these tests require the selected variables integrated in a same order. ARDL bound test approach (Pesaran et al., 2001; Pesaran & Shin, 1999) for cointegration is flexible for using a set of variables that are integrated in a mixed order. Moreover, the linear transformation of the ARDL model allows us to derive error correction model and analyze short-run dynamics between

variables. The study applies ARDL model due to its advantages. First, ARDL model can be used in small sample. Second, this approach is working when variables are in a mixed integration order. Third, the serial correlation and endogeneity problems are corrected by choosing appropriate lags. Finally, the ARDL model estimates short- and long-run relations at the same time.

The labor productivity annual value added per worker, calculated by real gross domestic product (GDP) by the number of workers. The purpose of the paper is to examine the effects of FDI and trade on labor productivity growth of Myanmar. Following the methodology of preceding literature related to this issue (Asada 2020; Eryilmaz and Bakir 2018; Clark ,1982; Dritsaki, 2016; numilaakso,2009; Najarzadeh et al,2014; Larionova and Varlamova,2020), the generalized ARDL model for examining the effect of financial innovation on economic growth of Mongolia is as following equation (1):

In equation (1), Where $\boldsymbol{\Delta}$ indicates first difference of variables, v_t is the error term, α_i (i = 1, 2, 3, 4, 5) are long-run coefficients, and h, l, m, n, o, and p are lags of ARDL model. The ARDL bound test for examining the cointegrated relation between variables conducted using F test with the null hypothesis of $\boldsymbol{\alpha_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0}$. The F test have two critical values: I (0) and I (1), which are obtained from Pesaran et al.,2001. The null hypothesis of this F test means there is no cointegration among variables in equation (1). If the F test value is less than the critical value corresponding to I (0), the variables are not cointegrated. If the F test value is greater than the critical value corresponding to I(1), there is a cointegrated association between variables. If the F test value falls within the region between I (0) and I (1), we could not make any inference about cointegration. Dummy variable is included in the estimation to account Covid – 19 pandemics. The dummy variable takes 1 in 2020,2021 and 2022, and it takes zero over the other years.

$$\begin{aligned}\Delta_1 \mathrm{L}P = \beta_0 &+ \sum_{k=1}^{h} \phi^k \Delta \mathrm{L}P_{t-k} + \sum_{k=1}^{l} \beta^k \Delta_1 FDI_{t-k} + \sum_{k=1}^{m} \beta^k \Delta_2 EX_{t-k} + \sum_{k=1}^{n} \beta^k \Delta_3 KIM_{t-k} \\ &+ \sum_{k=1}^{o} \beta_4^k \Delta INF_{t-k} \\ &+ \sum_{k=1}^{p} \beta^k \Delta_5 EF_{t-k} + \alpha_0 LP_{t-1} + \alpha_1 FDI_{t-1} + \alpha_2 EX_{t-1} + \alpha_3 KIM_{t-1} + \alpha_4 IFF_{t-1} \\ &+ \alpha_5 EF_{t-1} + v_t.\end{aligned} \tag{1}$$

Based on the equation (1), we can specify error correction model as follows:

$$\begin{aligned}\Delta_1 \mathrm{L}P = \beta_0 &+ \sum_{k=1}^{h} \phi^k \Delta \mathrm{L}P_{t-k} + \sum_{k=1}^{l} \beta^k \Delta FDI_{t-k_1} + \sum_{k=1}^{m} \beta^k \Delta EX_{t-k_2} + \sum_{k=1}^{n} \beta^k \Delta KIM_{t-k_3} \\ &+ \sum_{k=1}^{o} \beta^k \Delta_4 INF_{t-k} + \sum_{k=1}^{p} \beta^k \Delta_5 EF_{t-k} + \boldsymbol{\lambda ECT_{t-1}} + u_t.\end{aligned} \tag{2}$$

Where error correction term, $\boldsymbol{ECT_t}$, is expressed as follow:

$$ECT_t = LP_t - (\alpha'_1 FDI_t + \alpha'_2 EX_t + \alpha'_3 KIM_t + \alpha_4 INF_t + \alpha_5 EF_t). \tag{3}$$

It is expected the coefficient of **ECT** to be negative, statistically significant, and less than unit to explain the speed of adjustment towards the long-run equilibrium. To ascertain validity of the ARDL model, the diagnostic tests and stability tests were conducted.

EMPIRICAL RESULTS AND FINDINGS

Unit Root Test

To test for stationary of the data, the paper examined the integration order of the selected variables and reported the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) test results in Table 2. The variables are I (1), integration order of one, except government expenditure as percent of GDP and inflation, which are I (0) or stationary variables. It is ensured that the selected variables have an integration order less than two. The data features allow ARDL model is more appropriate than vector error correction model, because the explaining variables have mixed integration orders, I (1) or I (0), and there is not a variable with a integration order of two, I (2).

Table 2 Unit Root Test

	ADF Test Statistic		P-P Test Statistics	
Variables	**Level**	**First Difference**	**Level**	**First Difference**
LP	-4.992***	-2.828	-0.157	-3.410*
lnFDI	-1.965	-4.489***	-1.983	-4.489***
lnEX	-3.731**	-1.624	-4.897***	-4.172***
KIM	-1.695	-1.420	-1.383	-5.4589**

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

Lag Order

Lag order is initially set at three at maximum under the limited number of observations.An unrestricted vector autoregression model was estimated, and the optimal lag order is selected at two by Akaike Information Criterion (AIC), Hannan–Quinn information criterion (HQ) and other criteria as presented in Table 3 as follows.

Table3 Lag Order Selection Criteria

Lag	AIC	SC	HQ
0	11.88246	12.17499	11.96359
1	2.295201	4.342913	2.863150
2	−0.019722*	3.783171*	1.035039*

Source: Author's Estimation

The cointegrated relation between the research variables by estimating equation (1) on annual data over the period 1996-2022 has been tested. Before conducting ARDL bound test, the paper chooses appropriate ARDL model for selected data based on information criteria. Table 4 shows typical three information criteria result with their best five models. Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC) and Hannan-Quinin Information Criteria (HQ) are choosing ARDL (2,2,0,1,2,2) model.

Table 4 Lag Order Specification of the ARDL Model

Specification	AIC	BIC	HQ
(2,2,0,1,2,2)	-4.699221	-3.919141	-4.482860
(2,1,1,1,2,2)	-4.680452	-3.900372	-4.464091
(2,2,1,1,2,2)	-4.671019	-3.842183	-4.441135
(2,2,0,2,2,2)	-4.670832	-3.841997	-4.440948
(2,1,0,1,2,2)	-4.637209	-3.905883	-4.434370

Source: Authors' estimation

Bounds Test

Based on ARDL (2,2,0,1,2,2) model, the table 5 below reports ARDL bound test and report the result. Since the F statistic is greater than small sample critical value of I (1), there is a significant cointegrated relation between the selected variables. It is needed to further build long-run equilibrium model for these variables as the cointegrated relation is approved.

Table 5 ARDL Bounds Test Result

F Bounds Test Statistics	Significance Level	Bound Critical Values	
		I (0)	I (1)
F-Statistics:4.076021	10%	2.26	3.35
k: 5	5%	2.62	3.79
	1%	3.41	4.68

Source: Author's Estimation

Long Run and Short Run Relationship

In the long run, FDI, export, capital import and inflation have positive significant effect on labor productivity of Myanmar while economic freedom has negative significant impact. The long- run equation estimation result is exhibited in Table 6 below.

Table6 Long-run Relationship

Variables	Long-Run Coefficients	P-Value
lnFDI	0.3909**	0.0282
lnEX	0.5125***	0.0000
lnIM	0.3362***	0.0039
lnINF	0.0786***	0.0126
EFS	-0.0162**	0.0375
C	-3.4897***	0.0020

Note: *, ** and *** indicate significance level at 10% ,5% and 1% respectively.

The error correction model is estimated and exhibited in Table 7. The deviation from the long-run equilibrium is estimated from the result in Table 6. Alternatively, it can be specified as $ECT_t = lnLP_t - (0.3909*lnFDI_t + 0.5124*lnEX_t + 0.3362*lnKIM + 0.0786*lnINFL - 0.0162*EF)$. The short-run impact of FDI is ambiguous as in Asada (2020) while capital import has positive significant effect on labor productivity with the same contribution in Nyantakyi and Munemo (2015) and Roy (2009). Economic freedom in Myanmar has significant negative effect on labor productivity. Nevertheless, inflation impact on labor productivity is ambiguous. Furthermore, covid 19-pandemics have significant negative impact on labor productivity. ECT indicates that 41 percent of the deviation from long-run equilibrium in last year is corrected in this year.

Table 7 Error Correction Model

Variable	Coefficient	P-value
ΔlnLP(-1)	0.283264**	0.0252
ΔlnFDI	0.061119**	0.0194
ΔlnFDI(-1)	-0.043996*	0.0303
ΔlnKIM	0.085148***	0.0011
ΔlnlNF(-1)	0.001760	0.3862
Δln INF (-1)	-0.016549***	0.0005
ΔEF	-0.011617***	0.0003
ΔEF (-1)	-0.015699***	0.0001
DUMMY	-0.057740***	0.0029
ECTt	-0.411118***	0.0002

Source: Author's estimation. Dependent variable is labor productivity LP.

Diagnostic Tests

To check the reliability of the estimation result, a series of diagnostic tests were conducted, and their results are reported in Table 8. The results of diagnostic tests confirmed the acceptance ofthe null hypothesis of no autocorrelation, normally distributed residuals and homoskedasticity.

Table 8 Results of Diagnostic Tests

Type of Test	Result
Adjusted R-squared	0.9997
Breusch–Godfrey serial correlation LM test	Obs*R-squared 5.818844(Prob =0.0645)
Residual normality test	Jarque–Bera test:1.059314(Prob = 0.5888)
Residual heteroskedasticity test	Obs* R-squared 10.95432(Prob = 0.9069)

Source: Author's Estimation

Stability Test

The stability of the estimation is accessed by the cumulative sum (CUSUM) of the recursive residuals test and the CUSUM of squares of the recursive residuals test. The results of these two testsare displayed in Figure 1. Since test statistics of the CUSUM and the CUSUM of squares are within therange of 5% significance level, it is concluded that the estimated output of the ARDL model is stable.

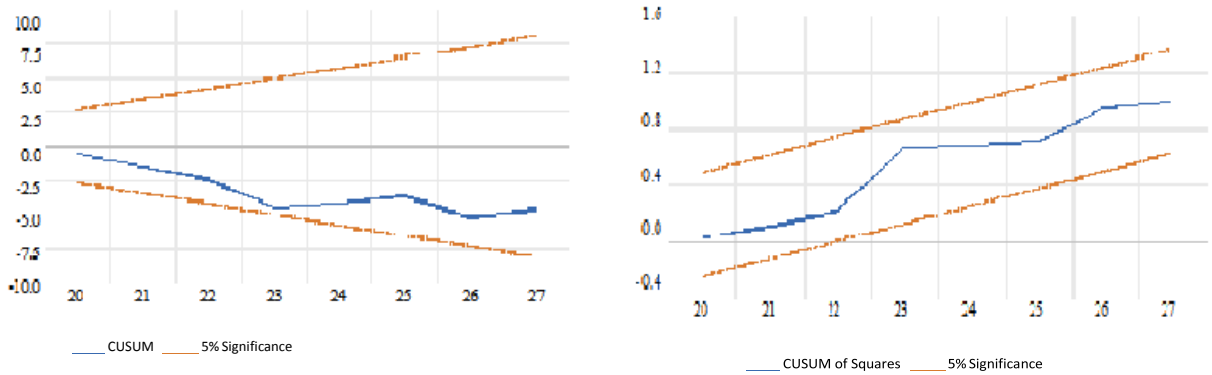

Figure 1 Results of Stability Test

Discussion

The empirical result of the previous section indicates varying results depending on the short-term and long-term period. In the long term, FDI is beneficial for Myanmar labor productivity but short-term impact of FDI on labor productivity is ambiguous. Capita import leads positive improvement in labor productivity both in the short-term and long term. Economic freedom index has limited impact on labor productivity. Based on the results, to absorb FDI spillovers not only in the short term but also in the long term, the GoM should attract more in FDI in skill-intensive sectors. To further support the labor productivity, the capital goods should be imported R&D intensive goods to Myanmar which can reduce the costs of production and boost the labor productivity.

Summary and Conclusion

Based on the solid theoretical and empirical foundations, the paper analyzed the impact of FDI, and Trade on labor productivity using ARDL model approach from 1996-2022 including the covid-19 pandemic period. The empirical results indicate FDI lead positive spillover effects only in the long-term period but not in the short-term. Import capital embodied with technology create positive significant impact on labor productivity in the short-term and long-term. These findings are compatible with the preceding literature (Asada,2020; Nyantakyi and Munemo ,2015; Roy,2009). Covid-19 pandemic have negative significant impact on labor productivity and economic freedom lead limited labor productivity.

The intuition behind why FDI have varying results on labor productivity depends on the type of FDI coming to Myanmar. Although FDI in Myanmar has been shifted from oil and gas sector to manufacturing sector, FDI share in manufacturing sector is still low in comparison with the power sector. Furthermore, FDI in manufacturing sector is mostly in garment sector which is not the skill intensive sector: garment export is rising from 4.27% in 2010-2011 to 26% in 2018-2019. It is also observed that employed person in manufacturing sector is still under 10%. The larger share of informal employment in Myanmar is still a challenging issue in Myanmar with 82.5% in 2017(Inter-Censal Survey,2019). During the covid-19 pandemics, labor in Myanmar has been experiencing with socio-economic and job crisis which further devastated the working conditions and economic system. The covid-19 economic impacted highest in manufacturing sector with 2.4 million workers with economic disruption (ILO,2020).

As for the policy implications, the GoM should attract skill intensive FDI and increase the capital goods import share rather than intermediated goods import. Due to the limitations in data availability, the study will contribute human capital, and R&D capital import effect on the labor productivity.

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