FDI and Employment in the Era of Digitalization: Evidence from Developing Economies

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Abstract: The paper empirically investigates the impact of FDI inflows on employment opportunities in developing countries, keeping the possible influences of digitalization in consideration. Trade and growth effects of FDI through various channels are well documented in existing theories and empirics. However, debates on the issue of the role of FDI on employment still exist and relevant particularly in developing nations receiving a chunk of FDI inflows nowadays. Conventionally, FDI inflows accelerate economic growth and thus improve the employment level by generating new employment directly in green field investment and creating indirect jobs through backward and forward linkages. On the contrary, inflows of FDI with non-labour intensive and advanced technologies may promote the jobless growth of the economy. In this context the process of digitalization can also fuels the FDI-employment linkage through spillover effects. The present study explores the dynamic employment effect of FDI inflow along with the parallel influence from digitalization in selected developing economies using data from World Bank, ILO over the period of 1990-2016 in a dynamic panel framework. Panel unit tests are employed to check the stochastic properties of the variables followed by the estimation of generalize method of moments as specified by Arellano and Bond (1991). Empirical findings imply that the effect of FDI inflows on employment is insignificant; however, both digitalization and trade negatively influence the level of employment in selected developing economies.

Keywords: FDI Inflow, Employment, Digitalization, Developing Countries, Dynamic Panel Model, GMM Estimation.

1. Introduction

Foreign direct investments (FDI) have several beneficial effects on the hosting nations. Through FDI money is transferred along with the transfer of financial and intangible assets, such as technologies, managerial efficiencies, improvement of skills and ability in marketing and so forth. All these transfers are playing more important role in the process of economic growth, and these overseas investments complement the domestic capital formation especially when the hosting nations are developing ones. The inflow of foreign capital in the

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form of FDI is also an important instrument to finance the deficit in current account of the host countries. Besides, FDI inflow has an important spillover effect on the hosting counties through the expansion of employment opportunities.

Traditionally, instead of explaining all of the intermediate beneficial effects only the final growth impact of FDI inflow in the hosting countries was emphasized. The explicit consideration of the intermediate beneficial impacts through which the FDI inflow enables the hosting nations to achieve better trajectory of economic growth is relatively modern. However, there is a consonance between the conventional and modern views on the spill-over effects of FDI flow on the employment opportunities. In fact, transfer of foreign capital leads to the job reallocation from developed to the developing countries. The reshaping of the economies during transition through the inflow of FDI changes the labor market to a significant extent. FDI enters into the target firms and industries in the form of capital and technology, which affect the labor requirement, and as a consequence the compositions of the labor force, employment, average productivity, wage levels, and wage inequality are also changed. Athukorala (2003) has shown that the social and distributional impacts of FDI inflow are usually favourable to the hosting developing nations. Introducing a new package of extremely productive resources into the economies of the hosting nations', inflow of foreign capital creates new jobs both in the sectors attracting FDI and the supporting domestic industries.

However, all of the capital inflows do not have identical consequences on the hosting nations. For instance FDI enters into the hosting counties in two forms. One is 'greenfield investment', and the other is known as 'brownfield investment' (Dunning, 2008; Dufaux, 2010). 'Greenfield investment' creates new production facilities in the hosting countries through the establishment of new plants (Qiu and Wang, 2011). Therefore, this type of investment will create more job opportunities, since every newly established plant employs workers. On the contrary, 'brownfield investment' is used for the purpose of "cross-border mergers and acquisitions" (Qiu and Wang, 2011). As the 'brownfield investment' is not associated with the establishment of new company or plant, it may raise unemployment instead. The rise in productivity through the application of improved technology, advanced equipments and sophisticated management is the main reason behind the decline in employment opportunity or the rise in unemployment through the reduction in the demand for workers. In spite of this rise in unemployment, through 'brownfield investment', there is a possibility of rise in the hiring of more workers, since the companies may expand their production plants when they are merged with the foreign firms. Moreover, FDI inflow may

also have a crowding-out effect. Through FDI inflow multinational corporations are entering into the hosting countries, which foreign capital corporations share the market of the hosting nations, which raises the competitive pressure on the domestic firms. Since a considerable number of domestic firms are not adequately organized to cope up with the competition from the foreign multinational enterprises, these domestic firms will lose and discontinue production, which raises the unemployed workforce. If the host nation is developing one then the chance of this loss of employment opportunities is greater. Therefore, the final impact of FDI inflow on the employment opportunity depends on the relative strength of two opposite forces, one is job creation and other is job destruction (Dunning, 2008).

Along with the rise in FDI flow, in recent past, another important change can be noticed across the world in terms of the extensive use of Information and Communication Technology (ICT) and newly developed digital technologies, such as data analytics, artificial intelligence (AI), 3D printing, cloud computing, Internet of things (IoT) and robotics, combinedly we can designate this revolution as digitalization. All of these activities combinedly or digitalization has been completely reshaping the labour market, landscape of business and the nature of work. Moreover, digitalization has been changing the characteristics and volumes of production, consumption and distribution. Thus digitalization has significant impact on the labour market, i.e., the quantity and quality of demand for labour as a considerable part of work can be executed mechanically or automatically, with the reduction in human involvement. The firms have now been operated more efficiently by utilizing earlier mentioned advanced technologies associated with digitalization.

Digitalization may generate new forms of employment, as all of the above technologies develop new, relatively more complicated and highly sophisticated goods and services. The new jobs created to produce these goods and services frequently need higher skills. However, often it can be observed that in the case of applying the aforementioned technologies can also generate more service-oriented low-skilled jobs. Thus, there is a reduction in the demand for low-skilled or blue collar, medium-skilled or pink collar and high-skilled or white collar workers. However, the proportionate decline in demand for low-skilled workers is greater than the proportionate decrease in demand for medium-skilled and high-skilled workers. Moreover, the uncertainty of the impact of automation through digitalization may create or destroy employment opportunities (Smith and Anderson, 2014). In spite of this, there is a possibility of the rise in employment opportunity as according to Moretti (2010) and Goos et al. (2015), every job that is created in the ultra-modern and high-tech industries will create an additional five jobs in the wider economy.

Apart from the earlier analysis of the effects of new technologies on employment, it can also be observed that the effects of the utilization of new technologies on existing employment are not unambiguous, as there are two opposite forces influencing demand for labour. On the one hand, the rise in the efficiency through the application of these new technologies reduces the demand for workers. On the other hand, the demand for goods and services will rise due to the reduction in the costs and prices through efficient technology. As a consequence, the demand for labour will rise. Therefore, the final impact on employment depends on the relative strength of these opposite forces.

Therefore, the final effects of both FDI inflow and digitalization on employment opportunities in the hosting economies are uncertain and indeterminate. Against this backdrop, the main objective of this study is to explore the impact of FDI inflows on the employment opportunities in the hosting developing nations by taking into account the possible influences of digitalization. We try to explore the dynamic employment effect of FDI along with the parallel influence of digitalization across some selected developing economies using data from UNCTAD, World Bank and ILO over the period of 1990-2016 in a dynamic panel framework.

The rest of the paper is organized as follows. The second section describes the related literature. Section three explains the recent trend of FDI inflow in the developing nations across the world. The fourth section describes the data source and methodology. Section five explains the results of regression and the sixth section concludes.

2. Related Literature

It is rather common place that foreign capital complements the domestic capital in the hosting countries. So, FDI is a stimulating factor for economic growth, and it also encourages the size and quality of employment in the hosting nations. If the hosting nation is developing one, then it is usually suffering from severe unemployment problem, and FDI is very important instrument to reduce unemployment in these countries. However, based upon the previous analysis FDI has also a crowding out effect which reduces employment opportunities in the host countries, and this crowding out effect is stronger if FDI flows from developed to developing countries, as in this case FDI is capital or technology intensive. Due to this ambiguous theoretical concept of the impact of FDI inflow on hosting nations' employment condition, till this date significant number of researchers and scholars has focused on this causal relationship.

Hymen (1960) has argued in favour of FDI inflow, as attracting foreign firms to relatively underdeveloped countries can provide a direct impact on employment and capital formation and which has indirect influences on the local firms through spillovers. In a study done by Ernst (2005), it has been found that the fast increase of FDI inflow since the last half of the 20th century across the Latin American countries has no significant influence on employment opportunities in these countries. The reason behind this insignificant influence of FDI inflow is the stronger crowding-out effect of FDI across the said countries. Actually FDI inflow in those countries leads to the disappearance of the middle-sized and small domestic enterprises; as a result mass unemployment was the certain outcome.

Henneberger and Ziegler (2006) have divided the inflow of foreign capital in the form of FDI into three categories, such as resource-seeking FDI, efficiency-seeking FDI, and market-seeking FDI. These scholars have scrutinized the consequences of FDI inflow on the condition of employment across the recipient countries based upon the comparison of the expenditures required for the mobility of the producers and users of FDI across the globe. If the FDI users are not mobile due to the high cost of mobility, then the third category or market-seeking FDI will be stronger than the former two types of FDI inflow, which will have unbiased or positive influence on the labor market of the domestic economy of the recipient nations. On the contrary, if users' mobility costs are low, then the resource-seeking FDI and efficiency-seeking FDI will be stronger than the third category of FDI, and there is a negative impact of the FDI inflow on the labour market of the hosting nations.

Craigwell (2006) has provided some outcomes which agree with the positive influence of FDI inflow on employment opportunities. According to his reports, there is a positive correlation ratio for employment and lagged values of FDI (as percentage of GDP). The study also argues that a large proportion of the Caribbean labour force, for example, is employed in FDI enterprises and the ratio of employment in FDI enterprises to total employment showed an inclining movement over a decade. The result goes further that in all Caribbean countries except Saint Kitts, Nevis, and Suriname, there was a positive relationship between employment and FDI.

Invoking a bounds-testing autoregressive distributed lag model and an autoregressive distributed lag error correction model and using data over the period from 1970 to 2007, Pinn, Ching, and Kogidbounds (2011) have found that due to the capital- or technology-intensive nature of projects developed on the basis of foreign capital in Malaysia, there is no cointegration relationship between FDI and employment.

According to Dufaux (2010), the effects of FDI on employment across the European countries are different at different stages of economic growth, which makes it difficult to assess the final outcome. He has further argued that at stage one, FDI inflow reduces employment through creative destruction, as at this stage any unproductive job disappears and new and more productive jobs are appearing later on. The capitalist process and the transition from a managed economy to a market economy generate a lot of competition. At the second stage to cope up with such competition and to earn greater profits foreign investors usually restructure their mode of production of the foreign investors should be restructured their production mode earlier than the process of restructuring of the mode of production by the domestic producers. In this context Mark and Engels (2002) have argued that more and more of existing workers lose their jobs through the excessive application of machineries and division of labour, and throughout this process foreign enterprises create a more productive workforce. The workers are going to be proscribed by the bourgeois class and supervisors, and industries are going to be completely dependent on machineries. In the ultimate stage usually heavy investment for labor-intensive technique creates more employment. According to the argument of Dufaux (2010), 'greenfield investment' by the foreign enterprises has direct and positive impact on employment opportunities, though the 'brownfield investment' has a negative impact on employment opportunities. Therefore, FDI is not a remedy for unemployment or there is no clear positive impact of FDI inflow on employment opportunities in the hosting nations through job creation.

Using ordinary least squares (OLS) method of regression Mpanju (2012) has investigated the impact of FDI inflow on employment in Tanzania. The results of this study reveal that there was a strong positive relationship between these two variables, i.e., increase in FDI inflow was associated with the rise in employment opportunities or employment. Using the data on almost 200 manufacturing firms in Mexico Nunnenkamp, Bremont and Waldkirch (2010) have evaluated the impact of FDI inflow on employment. The finding of this study reveals that FDI inflow had a significantly positive effect on the employment condition of the manufacturing industries, and it is true both for white collar and blue collar jobs.

According to Dunning (2012), FDI creates employment and improves the welfare of the hosting nations. If FDI is concentrated in the labour-intensive industries the increase in employment is significantly large. Moreover, through forward and backward linkages FDI inflow can raise the employment opportunities in the local firms. Therefore, the employment created through foreign capital inflow and foreign associates may be underestimating the total impact. The FDI inflow might have influences on employment through the spillover-effect to

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the domestic firms. Foreign firms which were facing obstacles in the production process in their home countries due to several reasons may demand higher labour standards and offer high wages than which are quite higher than the normal standard of labour and wages in the hosting nations. Pei and Van der Esch (2013) have asserted that usually FDI inflows in the hosting developing nations have positive influence on the growth of the economy, creation of jobs, and standard of living of the workers.

Findings of the study done by Karlsson, Nannan, Fredrik and Ping (2009) reveal that FDI is usually directly affecting the growth of employment in the firms owned by foreign enterprises due to the firm characteristics and higher rates of survival. Same effects were also recorded in domestic firms which were privately owned as well, and these effects from the domestic firms are actually the outcome of spillovers. The positive impact of FDI was also evident in the Irish economy. Barry and Bradley (2007) have also identified a positive relationship between employment and FDI in Hungary. According to the findings of this study, more than 80 per cent of net job creation of the corporate sector between 1993 and 2000 can be attributed to foreign companies. However, the authors also point out that between 2000 and 2002, employment in foreign firms decreased with the shift of FDI from low-value added sectors to medium-tech sectors.

A considerable number of studies in this sphere have been conducted by different scholars and researchers on China. In his study Sun (1996) found that FDI has significantly promoted economic growth by contributing to domestic capital formation, increasing exports, and creating new employment. There has been a noticeable creation of jobs not only in those sectors attracting FDI inflows but also in the supportive domestic industries. According to the arguments of Cai and Wang (2004) even though in China the proportion of employment in projects developed on the basis of foreign capital was insignificant enough, however, FDI inflow can insert substantial influence on the employment growth in this country. According to the analysis of Fu and Balasubramanyam (2005), there is a positive impact of export growth associated with the rise in FDI inflow on the employment opportunities in China. Applying a double logarithmic regression model and data on China economy from 1986-2002 Ding (2005) has found that capital formation through domestic fixed investment and FDI inflow both have positive influences on the condition of employment. He has argued that the positive influence of the domestic fixed investment on the creation of employment opportunity is bigger than that of FDI inflow. According to his argument, domestic fixed investment generates 25 per cent more employment opportunities than FDI. Moreover, FDI has a stronger major positive influence on the employment opportunities in the tertiary sector,

though in the secondary and primary sectors the influence of FDI is not apparent. Evaluating both of microeconomic and macroeconomic theory and using data from 1983 to 2002, Wang and Zhang (2005) have developed a simultaneous equation model of FDI and employment. The finding of their study reveals that the positive effect of FDI employment is direct, but the negative effect of FDI inflow on employment is indirect. They found that FDI had a direct positive effect on employment and a negative indirect effect on employment. Barry and Bradley (2007) have reported a positive relationship between employment and FDI inflow in China.

As per the previous analysis, the process of digitization is the way to convert the operations of the firm from manual to automatic. It means the industries are now capable of performing their business activities with high efficiency. The digital technologies like smart phones, online socializing and communication system, cloud computing, social media and others have completely transformed the traditional working system of the industries. Accordingly, the digitization has enhanced the employment conditions of the each business sector. The concept of online working has also introduced in the market after the invention of online technology. Now, people have opportunity to work from home on flexible hours (Heeks, 2013).

In the different industries, the use of advanced technology has become a priority to manage the employment system and policies. Now, employers and employees are capable to make better coordination with each other. It has observed that the use of digital technology has increased the moral of workers towards their work responsibility. Since, the proper mechanism of feedback has emerged in the industries. Due to this situation, the management is able to keep simultaneously control over the performance of each employee. Furthermore, the mobile digitization applications have provided a chance for workers to acquire new information and knowledge according to their convenience. The learning process of the employees has become constant and flexible. Consequently, the human productivity in the industries has achieved 40 per cent boost which is effective for the final outcomes of the companies (Coreynen, Matthyssens and Van Bockhave, 2017).

According to the previous survey, the 50 per cent job opportunities are related to the information technology. In the OECD countries, 5 per cent to 6 per cent employment opportunities are based on the advance communication and technological processes (Borowiecki and Navarrete, 2017). Another study has presented that all industrial sectors i.e. primary, secondary and tertiary have become depended on technological systems. The organizations in these sectors have faced the major change in the attitude of employees.

Especially, in tertiary and primary the employees have gained improvement in their daily activates. Due to this fact, the employees in these industries are willing to task risk or challenges. The more jobs have created in the industries, which has supported to improve the economic conditions of the world (Coreynen, Matthyssens and Van Bockhave, 2017).

3. Recent Trends in FDI inflows in Developing Nations

FDI flows across the world exhibited a steady trend later on globalization till the year before global crisis in 2008. In 2007, in the developing countries across the globe, FDI inflows reached the highest level ever ($0.5 trillion) after 21 per cent increase over 2006. The least developed countries (LDCs) attracted $13 billion worth of FDI in 2007, which was also a record high (UNCTAD, 2008). At the same time, developing countries continued to gain in importance as the sources of FDI, with outflows rising to a new record level of $0.25 trillion, mainly as a result of outward expansion by Asian Transnational Corporations.

After its decline for two to three years from global crisis in 2008, total FDI flows in the world again rose moderately to $1.24 trillion in 2010, but were still 15 per cent below their pre-crisis average. This was, in contrast to global industrial output and trade, which were back to pre-crisis levels. UNCTAD estimated that global FDI will recover to its pre-crisis level in 2011, increasing to $1.4 to 1.6 trillion, and approach its 2007 peak in 2013. In 2013, FDI flows to developed countries increased by 9 per cent to $566 billion, leaving them at 39 per cent of global flows, while those to developing economies reached a new high of $778 billion, or 54 per cent of the total. Outward FDI from the developing economies also reached record high, with most of their investment directed towards other countries in the South (UNCTAD, 2013). In contrast, FDI inflows to developed countries continued to decline. Some of the poorest regions continued to see declines in FDI flows. FDI flows to Africa, least developed countries, landlocked developing countries and Small Island developing States all fell, as the FDI flows to South Asia. At the same time, major emerging regions, such as East and South-East Asia and Latin America experienced strong growth in FDI inflows.

Recovery in FDI flows was strong in 2015. In this year, global FDI flows jumped by 38 per cent to $1.76 trillion their highest level since the global economic and financial crisis of 2008 (UNCTAD, 2016). Developing economies saw their FDI inflows reached a new high of $765 billion, 9 per cent higher than in 2014. In developing Asia, FDI inflows surpassed half a trillion dollars, remained the largest FDI recipient region in the world.

Based upon the aforementioned figures reported in different 'World Investment Reports' it could be perceived that there has been a steady improvement in global FDI flows into developed and developing nations later on globalization, and its steady growth is uninterrupted even with some short run down fall. Another important observation from the World Investment Reports (2008, 2013 and 2016) is that the developing nations have attracted a major proportion of global FDI flows during recent years later on global economic and financial crisis. Moreover, UNCTAD (2017) reveals that during last two decades that there has been a tremendous digitalization across the developing nations.

The tremendous rise in FDI inflow across the developing nations during post globalization period especially after the global economic and financial crisis may have raised the employment opportunities in these nations. However, as the impact of FDI inflow on employment across the developing nations depends on several other factors explained in the earlier sections, we cannot conclude on the final impact. For this reason, in this study we focus on this issue and examine the impact of FDI inflow on employment condition across the developing nations by taking into account the impact of digitalization on employment.

4. Data and Methodology

The present study uses secondary data collected from various sources over the period of 1990-2016. The annual data on FDI inflow (FDI) for selected developing countries are collected from World Development Indicators (WDI) published by World Bank (2017). International Labour Organization (ILO) (2017) data base provides the country wise labour employment (EMP) data. The digitalization (DIG) is measured by spending on information and communication technology (ICT) and the data on that is composed from World Telecommunication Indicators (WTI) database of International Telecommunication Union. The data on gross domestic capital formation (DCF), international trade measured by export and import (TRD) and economic output measured by gross domestic product (GDP) are also collected from WDI to control them in regression analyses due to having their possible influences in level of employment in countries.

We select thirty one developing countries across the world namely Argentina, Bahrain, Bangladesh, Botswana, Brazil, Chile, China, Colombia, Egypt, India, Indonesia, Jordan, Kuwait, Malaysia, Mauritius, Mexico, Morocco, Nigeria, Oman, Pakistan, Peru, Philippines, Poland, Saudi Arabia, South Africa, Sri Lanka, Sudan, Thailand, Tunisia, Turkey and Venezuela. The selected countries are considered as developing countries because these are

not in 'High Income' groups according to the World Bank (2017) classifications of countries based on their income levels. The selection process of countries also keeps the issues in consideration that all regions over the globe are presented in the study and the selected nations are significant in terms of FDI inflows to them and the digitalization process.

The basic objective of the study is to empirically examine the dynamic impact of FDI inflow on the level of employment in developing nations across the world, keeping the influence of digitalization in the process into account. In this regard we carry out the testing of the following basic null hypothesis on a panel framework of selected developing countries over the period of last two and half decades:

- *FDI inflow and digitalization do not promote the employment level.*

The generalized method of moments (GMM) estimator is employed in dynamic panel data framework for controlling the endogeneity. The panel data models are more efficient to control the heterogeneity at the individual level with the availability of more information. We employ the Levin, Lin and Chu (LLC) (2002) and Im, Pesaran and Shin (IPS) (2003) panel unit root tests to check stochastic properties of variables. Augmented Dickey-Fuller (ADF) specification of panel unit root test is given in equation (1):

$$\Delta y_{it} = \rho y_{i,t-1} + \sum_{j=1}^{p_i} \eta_{ij} \Delta y_{i,t-j} + X'_{it}\delta + \varepsilon_{it} \qquad (1)$$

In equation (1), Δy_{it} represents the dependent variable and $\Delta y_{i,t-j}$ and X_{it} are the independent regressor. First we estimate the regression equation of Δy_{it} on $\Delta y_{i,t-j}$ and X_{it} and the process is to be continued. LLC (2002) test permits intercepts with residual variances; dynamic trends and order of autocorrelation; however, it needs the auto-generated time series with common sample size and autocorrelation coefficient (ρ). The lag order, varying across individuals, is selected on the basis of t-statistics of η_{ij} by permitting the utmost lag. The estimate of ρ can be obtained after estimating the regression of Δy_{it} on $\Delta y_{i,t-j}$ and X_{it}. The common ρ criterion is the main weakness of the LLC (2002) test. But the IPS test considers the different ρ for all cross section units under heterogeneous panel.

Arellano and Bond (1991) proposed GMM technique is the widely used estimator for fixed effect dynamic panel models, where, first we eliminate the fixed effects using first differences of the variables and then estimate the instrumental variables of the differenced equation. Sargan test ensures the validity of the instruments. The one period lag dynamic panel model can be presented as follows in equation (2):

$$y_{it} = \alpha_i + \theta_t + \beta y_{i,t-1} + x_{it}'\eta + \varepsilon_{it} \qquad (2)$$

In equation (2), y_{it} = regressand, α_i = fixed effect, θ_t = time dummy, x_{it} represents (k-1)×1 exogenous variables' vector and $\varepsilon_{it} \sim N~(0, \sigma^2)$ denotes random disturbance. Hausman (1978) test suggests the fixed effect model as more suitable than the random effect model. In order to eliminate unobservable individual specific effects, we represent equation (2) in differenced:

$$\Delta y_{it} = \Delta\theta_t + \beta\Delta y_{i,t-1} + \Delta x_{it}\eta + \Delta\varepsilon_{it} \qquad (3)$$

The lagged difference of dependent variable in logarithmic form is correlated with the difference of error term. To remove this kind of endogeneity in equation (3), instrumental-variables with lag as suggested by moment condition are to be used. The differenced components of endogenous explanatory variables should also be treated cautiously. The GMM estimation also involves the instruments specification, weighting matrix choosing and estimator determination. Based on the above mentioned method specified for panel data, first we verify the stochastic properties of the panel variables (FDI, EMP, DIG, DCF, TRD and GDP) considered in this study and then the impacts of FDI and DIG on EMP are explored considering DCF, TRD and GDP as control instruments and using the Arellano and Bond (1991) refereed GMM estimation technique.

5. Empirical Results

In the dynamic panel structure to estimate the impacts of FDI inflow and digitalization on the level of employment, we perform the panel unit root tests developed by LLC (2002) and IPS (2003). Panel unit root test statistics are calculated for all underlying panel variables for selected developing countries. The lag lengths are selected by following minimum Akaike (1969) information criterion (AIC) rule to estimate the test statistics. Both individual effects and linear trends as exogenous variables are incorporated in the estimated equations. Table 1 reports the results of panel unit root tests of the variables. We fail to reject the null hypothesis that the series contain unit roots at level both in terms of LLC (2002) and IPS (2003) tests. However, both panel unit root tests imply that first differences of variables are stationary. No period specific effects are observed by incorporating time dummies for the periods.

Table 1: Results of Panel Unit Root Tests

Series	LLC (2002)		IPS (2003)	
	Level	First Difference	Level	First Difference
FDI	1.71	-6.31*	-1.69	-6.37*
EMP	-1.19	-5.93*	-1.27	-5.99*
DIG	1.22	6.11*	1.32	6.24*
DCF	-1.99	-5.82*	-1.87	-5.90*

TRD	-1.84	-6.05*	-1.90	-6.13*
GDP	-1.09	-5.99*	-1.16	-6.01*

Source: Own estimation of authors using WDI, ILO and WTI databases
* represents significance at 5% level

We employ the first-differenced GMM estimate developed by Arellano and Bond (1991) to control the unobserved heterogeneities involved in the estimated relationships. First we consider EMP as the focussed dependent variable, whereas FDI and DIG behave as key independent variables in the dynamic panel regression equation. DCF, TRD and GDP are incorporated as the control variables. The presence of lagged dependent variable in the estimated equation as the exogenous regressor captures the actual dynamism. Table 2 shows the estimated coefficients of the dynamic panel regression equation estimating the impacts of FDI and DIG on EMP.

Table 2: Results of GMM Estimation of the Impact of FDI and DIG on EMP

Dependent Variable: ΔEMP (1, it)			
Method: Panel Generalized Method of Moments			
Total Balanced Panel Observations: 806			
Variable	Coefficient	t-Statistics	Probability
ΔEMP (1, it-1)	0.13**	11.67	0.0000
ΔFDI (it)	0.04	2.41	0.1322
ΔDIG (it)	-0.08*	10.26	0.0001
ΔDCF (it)	0.03	2.71	0.1176
ΔTRD (it)	-0.06*	9.33	0.0113
ΔGDP (it)	-0.11	1.99	0.1826
J-Statistics	16.49 (0.0000)	Instrument Rank	18

Source: Own estimation of authors using WDI, ILO and WTI databases
**, * represent significance at 1% and 5% level respectively

The lower portion of Table 2 displays additional information about the specification of the estimated dynamic panel model using GMM technique. Since the J-statistic represents the Sargan statistic and the instrument rank is found to be greater than the number of estimated coefficients, it might be used to construct the Sargan test of over identifying restrictions. The J-statistic reported by the estimated panel equation differs from the same report from an ordinary regression equation. The table 2 presents the estimated coefficients of dynamic panel equation exploring the impacts of FDI and DIG on EMP, where DCF, TRD and GDP are considered as the control instruments. Our findings reveal that the impact of FDI on EMP is insignificant at their first-differenced forms in selected developing countries. However, it is noteworthy that DIG and TRD are significant factors influencing EMP in negative sense. Finally, it should be mentioned here that the present study does not observe any significant impact of DCF and GDP on EMP in those developing economies.

6. Conclusion and Discussion

In the earlier discussion we have mentioned that the FDI inflow in the hosting nations' employment opportunities may be increased and/or decreased, and similar effects of digitalization have also been described. Therefore, the final outcome of these two variables of interest on the employment opportunities is indeterminate. During recent past there has been a significant improvement in the FDI inflow in the developing nations especially later on the global economic and financial crisis in 2008. Along with this, during last two decades there has been a remarkable change happening through digitalization irrespective the positions of the countries on the growth path across the world. Based upon the traditional and modern views, employment opportunities in the developing nations should have been increased across the developing nations. Both these events may have raised or reduced the employment opportunities in the developing countries based upon the strength of employment rising and reducing forces generated by FDI inflow and digitalization. In this study we examine the relative strength of these forces, and investigate whether FDI inflow and digitalization have significant positive influences on employment condition across the developing nations or not. We have employed a dynamic panel data model, where we have included FDI inflow and digitalization as two regressors along with domestic capital formation (DCF), international trade measured by export and import (TRD), and gross domestic product (GDP).

According to the findings of the unit root tests all of the variables of interest are integrated of order one (I(1)), so at their level form the series of the variables have unit root or non-stationary. However, all of the variables of interest are stationary at their first difference form. Therefore, in case of GGM estimation for dynamic panel model the change in employment in the current period is regressed on the change in employment in the last period, and change in FDI inflow, change in digitalization or DIG, change in DCF, change in TRD, and change in GDP in the current period. In other words, the first difference of employment in the current period is regressed on the first difference of employment of the previous period, and first difference of FDI inflow, DIG, DCF, TRD, and GDP in the current period. Findings of this study reveal that change in FDI inflow has no significant impact on the change in employment opportunities across the developing nations of the world. Change in digitalization has significant but negative impact on employment opportunities across the selected developing countries. Moreover, other independent variable taken in the dynamic panel regression, i.e., change in DCF, TRD, and GDP do not have any significant influence on the change in employment in the selected developing countries.

As the change FDI inflow cannot significantly influence the change in employment opportunities, we can conclude that FDI inflow cannot raise employment opportunities across the developing nations. Our results corroborate the findings of the study done by Ndikumana and Verick (2008). This finding reveals that whatever other benefits may accrue from FDI it should not be expected to create employment opportunity in any developing nation. FDI inflow may generate employment in the hosting nations if it is supplemented by some other policies of employment creation. The result of this study also substantiates the finding of the study done by Galina and Xu (2016), where these scholars have argued that while FDI enters into a nation the low-skilled workers may experience adverse effects. If the hosting nation is developing one then this adverse effect is greater. Moreover, through the FDI inflow the domestic firms may face competitive pressure which may leads to the loss of employment of the existing low-skilled workers even with the improvement of the labour condition in the hosting nations.

The new forms of technologies through digitalization have been producing complicated and sophisticated products and services. It also creates new forms of employment, which requires high-skilled and efficient workers. Through digitalization major section of workers in the developing nations has lost their jobs as they are low-skilled. The technological improvement has also reduced the labour-capital ratio through the increase in machineries in the production plants. As a consequence, in the developing nations employment opportunities have declined during the period of digitalization.

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