

FOREIGN DIRECT INVESTMENT INFLOW, CAPITAL FORMATION AND EMPLOYMENT IN SOUTH AFRICA: A TIME SERIES ANALYSIS

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—Abstract —

Foreign Direct Investment inflow has been perceived to promote economic stability of the host country through various economic benefits accrued from it. Empirical evidence, however, presents mixed and unclear results. In South Africa, poverty, unemployment, the urgent need to add to existing infrastructures and develop new crucial infrastructures to meet the ever-increasing population have become a challenge. The study attempted a time series analysis to investigate the effect of foreign direct investment inflow on employment and capital formation in for a time period of 1980-2014. Consequently, two multivariate models were estimated and two econometric analyses, co-integration and causality were carried out. The finding from the study shows that while there is a long-run relationship among variables in the employment models, it was not so in the gross capital formation model. The effect of FDI inflow on employment in the employment model was found to be positive but insignificant. No form of causality was found between FDI inflow and employment and between FDI inflow and gross capital formation. This study concludes that strategic policies that would stimulate and stabilize and FDI inflow into the economy should be formulated.

Key Words: *Direct foreign investment, economic stability, investment*

JEL Classification: **G32, Z30**

1. INTRODUCTION

As an element of cross-border transfer and economic injection, foreign direct investment remain an indispensable requirement for economic growth, employment generation, capital accumulation financing, knowledge transfer, economic stability and poverty among developed and developing countries alike. Gaston and Soumaré (2012) pointed to a positive link between FDI and poverty reduction in Africa. As noted by Iamsiraroj and Ulubaşoğlu (2015), FDI becomes important and is highly needed, especially among developing countries that are unable to explore their natural resources due to poor human and physical capital, technological know-how and economic instability. By definition, according to the World Bank, FDI is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise resident in another economy. It entails direct investment equity flows in the reporting economy which comprises of equity capital, reinvested earnings and intra-company loans and other capital.

Official statistics from UNCTAD show that there has been an increase in FDI inflows globally. Between the years 1980 and 2014, FDI inflows were recorded to be about US\$ 52 million, US\$ 243 million, US\$ 1.2 million, US\$ 1.3 million and US\$ 1.35 in years 1980, 1990, 2000, 2010 and 2014, respectively. Freckleton et al. (2012) noted that due to the increase in FDI flows, scholars over the years have been motivated to investigate its determinants and impact on the economy. In South Africa, where poverty, unemployment and the urgent need to add to existing infrastructure and develop new crucial infrastructures to meet the ever increasing population and economic growth remain a challenge, the role of FDI seems to be imperative. However, the question remains whether FDI inflow can play such a role in South Africa or how relevant FDI inflow is in South Africa economic stability. In line with the above, the aim of the study is first to examine if a long-run relationship exists between FDI inflow and employment and between FDI inflow and capital formation. Secondly, it aims to explore causality relationship between employment and capital formation in relation to FDI inflow.

2. EMPLOYMENT, GCF AND FDI INFLOW TRENDS

Statistics from the South Africa Reserve Bank (2016) suggest that there has been no logical improvement in the South Africa unemployment rate. Between 1994 and 2015, average unemployment was the lowest at 20 percent (SARB, 2016). The average unemployment rate for the years 1999-2003, 2004-2008 and 2009-2014 was estimated to be 25.6, 23.18 and 24.88 percent. Specifically, it was 24.7

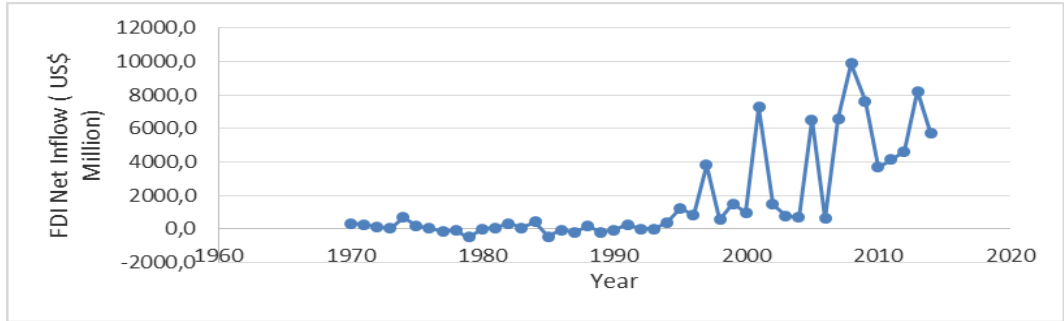
percent, 25.1 percent and 25.3 percent in the years 2013, 2014 and 2015, respectively (SARB, 2016). A similar report where the employment rate was reported is the World Bank, ILO statistics; this revealed that the average employment-population rate of 43.70 percent was highest in year 1994-1998. It is seen to have reduced to 38.96 percent in year 2009-2014 (WDI, 2016). Though the study does not intend to compare statistics reports from both SARB and the World Bank, the trends revealed from both reports are worrisome. These indicate that government policies toward employment generation have not been effective since 1994, and there could be silent factors that could be influencing the unemployment rate; this study, however, does not cover effectiveness of policies or determinants of unemployment.

Furthermore, the gross capital formation of South Africa shows an increasing trend; however the rate of this increase has not been sustained and is seen to be declining gradually. Information from the SARB (2016) revealed that the rate of increase of gross capital formation was highest at 32.1 percent in 1994. This figure has not been reached since then. The closest rates to this increase were observed in the years 1995, 2002, 2004, 2006 and 2006 where 22.9 percent, 20.3 percent, 20.2 percent, 23.6 percent and 23.9 percent rise was observed (SARB, 2016). The rate of the increase was reduced to 15 percent, 5.9 percent and 5.2 percent in years 2013, 2014 and 2015.

FDI inflow in South Africa cannot be divorced from the country's historical context. Statistics from the World Bank (2016), as presented in figure 2, show that South Africa's FDI net inflow has not experienced a sustained increase throughout the period of study. Although FDI inflows increased from US\$ 334 million in 1970 to US\$ 696 in 1974, a three year consistent decrease is observed between 1970 and 1973 in figure 2. From 1977 to 1990, there were records of foreign direct de-investment in the country. This was propelled by the unfavourable business environment caused by the apartheid system and resulting crises. This is observed from the years 1977 to 1980 and 1985 to 1990 in figure 1. However, between 1994 and 1998, FDI inflow grew by 46 percent. This was mainly attributed to privatization initiatives and re-investment. FDI inflow reached a record of US\$ 7.27, US\$ 9.89, US\$ 8.23, and US\$ 5.74 in the years 2001, 2008, 2013 and 2014, respectively. As earlier mentioned, FDI inflows have been positive since the beginning of a democratic South Africa, yet the inconsistently recorded trend needed to be reconsidered by concerned government institutions. An analysis of FDI in the BRIC economy by Nistor (2015) confirms

that South Africa recorded the lowest FDI inflows among the BRICS group of countries throughout the period considered in the study.

Figure 1: Trends in Foreign Direct Investment Inflow in South Africa



Source: World Bank, 2016

3. BRIEF RELEVANT EMPIRICAL REVIEW

The role of FDI in economic growth and development is undeniably imperative. Several studies (Imoudu, 2012, Omri and kahouli, 2014; Iamsiraroj and Ulubaşoğlu 2015; Pegkas 2015; Iamsiraroj 2016; Ndiaye and Xu 2016) have empirically examined this by looking at the causality and extent of effect between FDI and economic growth. These studies have reinforced findings on the positive impact of FDI on the economic growth of countries. However, the dynamic interaction between FDI and other macro-economic indicators could form a good analysis of the impact of FDI in an economy. Hence this study looked at the relationship between FDI inflow, employment and capital formation.

3.1 FDI and Employment Relationship

Relationship, in this context, is viewed from the perspective of positive or negative long-run effect of FDI on employment and respective causality. Inekwe (2013) examined the links between employment and foreign direct investment in the manufacturing and service sector of Nigeria between 1990 and 2009. Johansen's multivariate co-integration test and vector error correction methodology were employed in the analysis. The results of the study indicate that FDI in the manufacturing sector has a positive relationship with the employment rate while in the service sector, FDI has a negative relationship with the employment rate. A study carried out by Jude and Silaghi (2016) on 20 central and European countries established a negative effect of FDI on employment in the

short-run but not so in the long-run. This is because in the long-run, there is some integration between foreign and domestic companies which have increased local content in the production process. This finding was, however, only valid for EU member countries of the 20 Central and Eastern Europe countries considered.

Sarwar and Habib (2013) found similar results in Pakistan where FDI was found to have a positively significant effect on the employment level. Göçer et al. (2013) found that export and FDI inflows had a negative long run impact on the unemployment rate. Vacaflares (2011) examined the effect of foreign direct investment (FDI) on employment generation for a group of Latin American countries in the period 1980-2006 and found that FDI has a positive and significant effect on the employment generation in host countries, which is driven by its effect on the male labour force. Brincikova and Darmono (2014), in their study, did not confirm any statistically significant impact of FDI inflow on employment among the countries examined. Khatodia and Dhankar (2016) found a positive and significant effect of FDI on private employment in India; this was, however, not so for public employment. Liu and Lu (2011) show that outward FDI from China had a positive impact on China's employment growth, especially in secondary and tertiary industry but not in the primary industry. The effect is, however, much larger in the tertiary industry.

In terms of causality, Inekwe (2013) established a uni-directional causality from FDI in the service and manufacturing sectors to the employment rate in the country. Nyen and Cheong (2011) observed a long-run relationship among FDI inflows, employment in manufacturing and in services. Besides, the findings show that there is unidirectional causation that runs from employment in manufacturing and services to FDI inflows in the long run. Evidence of causality from FDI inflows to employment in manufacturing was confirmed; this suggests the presence of multinational companies has lower tendency to establish linkages with local industries. Yaylı and Değer (2012), Habib and Sarwar (2013) and Göçer et al. (2013) found Granger-causality running from FDI to unemployment among 27 developing countries, Pakistan and Turkey, respectively, indicated that FDI Granger causes employment. In the study carried out by Nyen and Tang (2011) in Singapore, it was found that there is a unidirectional causality that runs from employment in the manufacturing and services sector to FDI inflows in the long run, whereas in the short-run, evidence of causation was shown from FDI inflows to manufacturing employment only.

3.2 FDI and Gross Capital Formation Relationship

With respect to FDI and a capital formation relationship, Ugwuegbe et al. (2014) examined the impact of FDI on capital formation in Nigeria. From their study, a long-run relationship was found between the variables examined, namely, FDI and capital formation, as inclusive. In the short-run, FDI was found to be insignificant in affecting capital formation but not so in the long-run. A bi-directional causality between FDI and gross fixed capital formation (GFCF) was also established. Proxying domestic investment with gross fixed capital formation, Ullah et al. (2014) revealed the existence of a long-run relationship between domestic investments, foreign direct investment and economic growth in Pakistan and further confirmed a bi-directional causality between FDI and domestic investment using Toda-Yamamoto causality. Using a ‘growth model’ framework and simultaneous-equation models estimated by the generalized method of moments (GMM) during the period 1990–2010, the study of Omri and Kahouli (2014) found a statistically significant and positive effect of FDI on the domestic capital. Furthermore, the study concluded that there is a uni-directional causal relationship from foreign direct investment to domestic capital for the Middle East and North Africa regions. In India, a uni-directional causality was found between FDI inflow and gross domestic investment (Chakraborty and Mukherjee 2012). This is contrary to the finding of Ulla et al. (2014) and Ugwuegbe et al. (2014) in Pakistan and Nigeria, respectively. An overview of a review on existing literature by Omri and kahouli (2014) reveals that the impact of FDI on domestic capital was not fully researched.

The above has highlighted that the FDI-employment relationship is dynamic and differs between long-run and short-run and between types of employment. Findings show that FDI has had a positive effect on capital formation and employment creation. Although isolated and contrary findings were highlighted, most were on the affirmative. This paper identified other factors that could influence employment and capital formation which were not included in the brief literature reviewed. These are gross saving, inflation and manufacturing sector performance. These were included in each models put forward in order to counter methodological problems associated due to missing variables in bivariate analysis.

4. METHODOLOGY

Annual time series data on FDI, gross capital formation, employment, gross saving and inflation covering the period 1980–2014 were used in this study. Data on gross capital formation, gross saving, manufacturing volume and inflation were

obtained from the South Africa Reserve Bank Website. Data on employment and FDI stock inflow were obtained from Quantect easydata and the UNCTAD websites respectively. All variables were converted to the natural logarithm.

4.1 Model Specification

Firstly, the study modified Inekwe's (2013) model of investigating the effect of FDI inflow on employment. Inekwe (2013) used the following implicit model to estimate the relationship between FDI and employment:

$$Emp = f(FDS, FDM, LF, OP, TI)$$

Where: employment is a function of foreign direct investment in service sector (FDS), foreign direct investment in the manufacturing sector, labour force as percentage of population (LF), openness (OP), and total investment percentage of GDP (TI). Modifying Inekwe's (2103) model, this study came up with following implicit model expressed as:

$$\log Emp = f(\log FDI, \log GS, \log MV, \log Inf)$$

Where: employment is a function of foreign direct investment inflow (FDI) stock, gross savings (GS), manufacturing volume (MV), and inflation (Inf.) proxy by consumer price index.

Secondly, gross capital formation was related to foreign direct investment inflow, gross saving and inflation. The implicit function is expressed as:

$$\log GCF = f(\log FDI, \log GS, \log MV, \log Inf)$$

While FDI inflow, and gross saving, are hypothesized to positively affect gross capital formation, inflation is hypothesized to negatively affect gross capital formation.

4.2 Analytical Techniques

Firstly, the article checks the stationarity properties of each of the series. This is essential in order to avoid spurious results produced by non-stationary variables often observed in macro-economic variables. If any variable is found to be non-stationary at level, the first-differencing is initiated and if necessary, a second differencing is carried out. This article utilizes the Augmented Dickey-Fuller (ADF) and Phillips-Perron test. If variables are integrated of the same order $I(1)$, a Johansen co-integration test can be carried out; if series are not integrated of same order, an Engle-Granger or ARDL tests for co-integration can be carried out.

Following the unit root test and confirmation that series are in the same order of one I(1), co-integration tests for the validation of existence of a long-run equilibrium relationship between the series is carried out. Co-integration relationship examines whether the stationary linear combination of two or more series converge to long-run equilibrium over time. This article used one of the commonly used tests for co-integration, namely, the Johansen co-integration test. Johansen’s co-integration test produces two tests (trace statistics and maximum eigenvalue) provided by Johansen maximum likelihood method to determine the number of co-integrating equations.

The existence of a long-run relationship suggests that a form of causality exist between the series, but it does not indicate the direction of causality. Hence a restricted VAR (i.e. VECM) is employed to check the existence and direction of long-run and short-run causality between series. If no long-run equilibrium relationship is observed, an unrestricted VAR is utilized to check short-run relationship.

5. RESULTS AND DISCUSSION

5.1 Stationarity Test

Table 1 present results of the stationarity test of the series using the Phillip-Perron unit root test. The result indicates that at level, all the variables are non-stationary, but after first differencing, they became stationary and are integrated of the same order. The test was conducted with intercept but no trends.

Table 1: ADF and Phillips-Perron Unit Root Tests

Variables	ADF		PP		Decision
	Level	First Diff.	Level	First Diff.	
LogEmp	-0.3340	-3.6785*	-0.3924	-3.6643	I (1)
LogGCF	-0.1248	-6.3059*	0.0858	-6.6844*	I (1)
LogFDI	-0.8501	-6.4966*	-0.7636	-6.4963*	I (1)
LogGS	-0.2958	-3.3071**	-0.2760	-6.9163*	I (1)
LogMV	-0.8604	-5.9438*	-0.6810	-6.2505*	I (1)
LogInf	-2.1301	-5.5451*	-1.9689	-11.0042*	I (1)

Note: Critical Value at 5%, (Level: -2.95, First Difference: -2.95)

Source: Computed from Eview 7

5.2 Analysis of Effects of Foreign Direct Investment Inflow on Employment

The long-run relationship among the variables considered in model 1 is examined using the Johansen co-integration tests (maximum eigenvalue and trace statistics) which are reported in Tables 2. The number of co-integrating equations for both tests is one, it could be inferred that there is a long-term equilibrium relationship between employment, foreign direct investment inflow and other variables under consideration. That means variables in employment functions move together in the long-term. The identification of a long-run relationship justifies the investigation of a granger causality using VECM. The normalized long-run co-integrating equation is represented as:

$$\log Emp_t = 14.7 + 0.025 \log FDI_t + 0.011 \log GS_t + 0.182 \log Inf_t + 0.015 \log MV_t$$

s.e.	0.0184	0.0176	0.0215	0.1713
T-statistics	-1.398	-5.981	-8.457	0.086

The long-run co-integrating equation estimate of the employment function shows that two variables used in the model (gross savings and inflation) are statistically significant. The estimate also show that though foreign direct investment stock inflow show a positive relationship with employment, it is however not significant. This is contrary to the general opinion that FDI inflow significantly affect employment.

Table 2: Unrestricted Co-integration Rank Test (Maximum Eigenvalue and Trace Test)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic/ Maximum Eigenvalue	5% Critical Value	Prob.**
Unrestricted Cointegration Rank Test (Trace)				
None *	0.708280	76.95464	69.81889	0.0120
At most 1	0.485746	36.29990	47.85613	0.3814
At most 2	0.279916	14.35365	29.79707	0.8202
At most 3	0.070096	3.516849	15.49471	0.9386
At most 4	0.033329	1.118606	3.841466	0.2902
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
None *	0.708280	40.65474	33.87687	0.0067
At most 1	0.485746	21.94625	27.58434	0.2231
At most 2	0.279916	10.83680	21.13162	0.6636
At most 3	0.070096	2.398243	14.26460	0.9785
At most 4	0.033329	1.118606	3.841466	0.2902

Max-eigenvalue test and Trace test indicates 1 cointegrating equations respectively at the 0.05 level

After confirming and discussing the results of long-run relationship among series of employment model, the next step is to analyse the causality in the employment model through VECM with an optimum lag of 1. Results of the VECM Granger causality/block exogeneity Wald tests is presented in table 3. As shown in the table, No long-run causality is observed among the series due to the non-significance of the error correction term. Furthermore, no form of causality is observed between our variables of interest i.e. employment and FDI inflow. A uni-directional short-run causality from employment to manufacturing volume is confirmed by the *chi* statistics in the employment equation which is statistically significant at 5 percent level of significance.

Table 3: VECM Granger Causality/Block Exogeneity Wald tests

Dependent Variable	χ^2 -statistics of lagged 1 st differenced term (p-value)				
	D(logEmp)	D(logFDI)	D(logGS)	D(logMV)	D(logInf)
D(logEmp)	-	0.1596 (0.6895)	0.2806 (0.5693)	4.4567 (0.0348)	2.4340 (0.1187)
D(logFDI)	0.4160 (0.5189)	-	0.0301 (0.8622)	0.3134 (0.5756)	0.3595 (0.5488)
D(logGS)	0.0017 (0.9673)	0.0021 (0.9637)	-	0.1797 (0.6716)	0.7265 (0.3940)
D(logMV)	2.5297 (0.1117)	0.0294 (0.8639)	0.6395 (0.4239)	-	1.2873 (0.2565)
D(logInf)	0.0122 (0.9122)	0.0785 (0.7793)	0.7883 (0.3746)	0.0243 (0.8760)	-

Source: Computed from Eviews 7

5.3 Analysis of the Effect of Foreign Direct Investment Inflow on Gross Capital Formation

Table 4 presents the result of the Johansen co-integration test for the gross capital formation function reflecting one co-integration equation from both tests. The result did not confirm the existence of a long-run relationship between gross capital formation, foreign direct investment inflow, gross savings, inflation and manufacturing sector performance. This is however not according to our a priori expectation. Thus following based on these Johansen co-integration test results, a restricted VAR was carried out to check the causality among series in the gross capital formation model.

Table 4: Unrestricted Cointegration Rank Test (Maximum Eigenvalue and Trace Test)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
Unrestricted Cointegration Rank Test (Trace)				
None *	0.579660	80.93773	88.80380	0.1615
At most 1 *	0.533615	52.33694	63.87610	0.3161
At most 2	0.360985	27.16641	42.91525	0.6714
At most 3 *	0.255169	12.38808	25.87211	0.7844
At most 4 *	0.077620	2.666349	12.51798	0.9136
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
None *	0.579660	28.60080	38.33101	0.4145
At most 1 *	0.533615	25.17053	32.11832	0.2765
At most 2 *	0.360985	14.77832	25.82321	0.6543
At most 3 *	0.255169	9.721736	19.38704	0.6486
At most 4 *	0.077620	2.666349	12.51798	0.9136

Max-eigenvalue and Trace tests indicates no co-integrating equations at the 0.05 level

Furthermore, the VAR Granger Causality/Block Exogeneity Wald tests are applied using the optimum lag length of 1 to check the existence and direction of short-run causality between variables examined. Table 5 presents the results of the Granger test. The results indicates that there is no causality relationship between gross capital formation and foreign direct investment which are our variables of interest.

Table 5: VAR Granger Causality/Block Exogeneity Wald test

Dependent Variable	χ^2 -statistics of lagged 1 st differenced term (p-value)				
	D(logGCF)	D(logFDI)	D(logGS)	D(logMV)	D(logInf)
D(logGCF)	-	0.477729 (0.4859)	2.298710 (0.1295)	1.1282 (0.2882)	2.205304 (0.1375)
D(logFDI)	0.0272 (0.8690)		0.000273 (0.9868)	1.5344 (0.2154)	0.129560 (0.7189)
D(logGS)	0.7918 (0.3736)	0.173573 (0.6770)	-	0.7393 (0.3899)	0.777679 (0.3779)
D(logMV)	0.1360 (0.7123)	0.131130 (0.7173)	0.396270 (0.5290)	-	8.510709 (0.0035)
D(logInf)	(0.7988) 0.3714	0.057411 (0.8106)	0.067801 (0.7946)	3.4493 (0.0633)	-

Source: Computed from Eview 7

6. DIAGNOSTIC TEST

The diagnostic test for both models as presented in the table 6 indicates that the residuals are normally distributed, hence the Jarque-Bara null hypothesis of normal distribution of residual is accepted. The null hypothesis of no serial correlation is accepted. This is so because the Breusch-Godfrey Serial Correlation test of the two models is greater than 0.05. The Breusch-Pagan-Godfrey test of Heteroskedasticity also indicates no evidence of Heteroskedasticity.

Table 6: Diagnostic Test of Models

	Model 1		Model 2			
Normality Test						
Jarque-Bera	4.8325	Probability	0.089	1.328	Probability	0.515
Breusch-Godfrey Serial Correlation LM Test						
F-statistic	2.3934	Probability	0.113	1.084	Probability	0.3537
Obs*R-squared	5.4873	Probability	0.064	2.633	Probability	0.2681
Breusch-Pagan-Godfrey Heteroskedasticity Test						
F-statistic	1.1505	Probability	0.372	1.558	Probability	0.1852
Obs*R-squared	11.331	Probability	0.332	13.679	Probability	0.1881

Source: Computed from Eview 7

7. CONCLUSION

The paper attempted a time series analysis which includes the long-run co-integration test and causality relationship to investigate the effect of foreign direct investment inflow on employment and capital formation in South Africa for the period of 1980-2014. Applying the Johansen co-integration test, existence of long-run relationship was confirmed for employment model which do have FDI inflow as independent variable. It was also seen that FDI inflow has a positive effect on employment but the effect is not significant in the long-run. The granger causality also indicates non-existence of causal relationship between employment and FDI. The two results implies that the current FDI trend cannot drive desired employment growth in South Africa. Likewise, non-existence of a long-run equilibrium relationship was confirmed in the gross capital formation model. The VAR causality test further indicates no short-run causality between gross capital formation and FDI inflow. These results are as a result of the low yet technology intensiveness of FDI inflow in the Country. This study conclude that while the current state of FDI inflow in the country cannot drive desired employment

growth and capital formation, it is however imperative for the South African government to stimulate and stabilize FDI inflow by enacting relevant policies and create a friendly business climate for foreign investors so as to derive the benefit of foreign direct investment. Additionally, the link between foreign investors and the domestic market need to be improved as it could have an indirect positive effect on employment creation.

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