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Does Foreign Direct Investment Affect Industrial Workers? Evidence from Kingdom of Saudi Arabia

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Abstract

This paper aims at determining the essential variables that affect the employment of industrial workers in the kingdom of Saudi Arabia (KSA) by focusing on the role of foreign direct investment as an indicator of financial openness. By using the methodology of the Autoregressive Distributed Lag (ARDL) to identify the impacts on both the short and long run during the period (1990-2014), it turns out that foreign direct investment does not have a positive impact on the employment of industrial workers which is contrary to the hypothesis of the study. The empirical results have shown that there is a positive and significant impact of both exports and inflation on industrial employment on the long run only. Thus, the current paper is important in the decision making concerning investment and labor market in KSA.

Keywords: Foreign direct investment, Industrial workers, Cointegration, ARDL, Saudi Arabia.

JEL classification: F21, F41, F66.

1- Introduction

Saudi economy suffers from being mono-economy as it relies essentially on the oil sector. According to the latest data in 2014, oil revenues constitute about 86% of the total government revenues and share with 83% of total exports revenues. Concerning the continuous fluctuations that characterize the oil price during the period (1990-2013) and the notable recently decline until it reached \$97 per barrel in 2014, it has become necessary to accelerate the diversification of the economic base by relying on other sectors, especially the industrial sector (Saudi Arabian Monetary Agency, SAMA).

The industrial sector is a pioneer sector in the process of economic development. It affects and gets affected by other sectors through a chain of forward and backward links. Its performance indicators represent a mirror that reflects the Saudi economic reality.

The level of employment in this sector is regarded as one of the most related indicators to the Saudi labor market which generally suffers from a high unemployment rate as it records around 5.7% in 2014. However, the increase in the number of workers in the existing factories from 155733 workers in 1990 till it

reached 935256 workers in 2014, its growth rate witnessed a retreat in 2014 as it recorded only 8.5% after it had reached 10.6% in 2013 and 30.8% in 2012. Thus, the percentage of workers in factories did not exceed around 7% of the total labor force and 3% of the total population of in 2014 (SAMA)

To improve the performance of the industrial sector in general and raise its indicators of employment, in particular, Saudi government takes active efforts to attract foreign direct investment. This is based on the ability of this kind of investment to affect positively through its role in constructing new projects and industries, supporting the local productive projects and raising the efficiency of the human element; thus creating more job opportunities. According to the international statistics, the net inflows of foreign direct investments have reached 8011.7 million \$ in 2014, which constitutes around 1.1% of the gross domestic product (World Bank).

In this context, the current study seeks to determine the essential variables that affect the employment of industrial workers in KSA by focusing on the role of foreign direct investment. It enables the decision maker to identify the nature of the impact of financial openness on industrial employment in KSA. The hypothesis of the study is represented in the following: "The increase of foreign direct investment leads to improve the employment of industrial workers in KSA".

The importance of this study is due to the rareness of economic studies concerned with the employment effect of foreign direct investment in the Arab Gulf economies in general that most of the previous studies were concerned instead with the growth effect of this investment. In addition to this, it is regarded as one of the first sectoral studies that measure the impact of foreign direct investment on the employment of industrial workers in KSA in particular.

This study depends on the methodology of ARDL developed by Pesaran et al. (2001) in order to limit the impacts within the short term and long run. This methodology resembles Error Correction Model (ECM) as it allows estimating the features of the relationship between the variables in the short and long run. Yet, they differ in that the first is applicable regardless of the degree of integration of variables either it was zero degree or the first degree (Al-Tarawneh and Al-Assaf, 2014). This methodology avoids the analogous problems that result from the decrease of the number of the observations of the sample but the variables should not be integrated from the second degree. The period (1990-2014) is covered in this paper as it is the newest available data of the variables especially the labor data in factories with regards to it as the essential used indicator.

The rest of the study is divided as follows: The second section is to review the newest literature to the subject of the study. The third section analyzes the features of foreign direct investment in KSA. The fourth section discusses the developments of industrial labor in KSU and the indicators of the impact of foreign direct investment on it. The fifth section presents the structure of the study model and the applied methodology. Then the sixth section displays the empirical results. The last section contains the conclusions and recommendations.

2- The literature of the relationship between foreign direct investment and labor market :

Many studies have tackled the subject of the impact of foreign direct investment on labor. These studies differed from each other in the special and temporal scope and the used methodology and it has been noted that the results were different between the two variables.

Regarding the non-Arab developing countries and on the micro level data, a number of studies have concerned the factories performance such as the study of Arbache (2004) that estimated the impact of foreign direct investment on the labor market in Brazil using the model of the fixed effects. The study relied on annual data for 24 factories during the period (1996-2000). The study has concluded that there is a direct relation between foreign direct investment and human capitalism.

With a more extended view, the study of Wei (2003) used the method of Ordinary Least Squares (OLS) to analyze the impact of foreign direct investment on labor in the main sectors of the Chinese economy. The results of the relationship between foreign direct investment and labor differ according to the sector. There is a significant positive relationship in the agricultural sector. Concerning the agricultural sector, there is insignificant relationship although the gross domestic product has a strong positive impact on labor. As for the trade sector, the study has pointed out that there is a clear negative relationship between foreign direct investment and labor but for the gross domestic product, it has a positive impact on labor during the period (1985-2011).

Using time-series data, the study of Jayaraman and Singh (2007) has reached that there is a positive significant relationship on Fiji as the increase of the flows of foreign direct investment leads to the increase of job opportunities. The application has depended on the ARDL model during the time period of 1970-2003. Using a different methodology with more recent data, the study of Tshepo (2014) has reached the same result. This study relied on Johanson cointegration test and Granger causality test in discussing the impact of foreign direct investment on economic growth and labor in South Africa during the time period of 1990-2013.

As for the studies that relied on panel data, Mucuk and Demirsel (2013) found out that FDI increases unemployment in turkey and Argentina, but reduces unemployment in Thailand. The study covered 7 developing countries through the period (1981-2009). Panel unit root, panel cointegration, and panel causality tests were used to analyze the data for this study. Also, the study of Mayom (2015) showed there was a positive and significant effect on employment, by applying the same kind of data on 48 countries from sub-Saharan Africa during (1991-2009).

Relative to the extra factors that affect employment beside foreign direct investment, the study of Salami and Oyewale (2013) has reached that inflation rate; export rate, import rate, and exchange rate interact positively with employment. It was applied on Nigeria during the period (1990-2010) and used the OLS method,

There were limited studies regarding the employment impact of foreign direct investment in non- Gulf Arab countries. In Egypt, the study of Massoud (2008) applied TSLS regression technique using sectoral national accounts data throughout

the period 1974-2005. The results were mixed as follows; aggregate foreign direct investment had an insignificant effect on the demand for labor, except when it interacted with the size of the technology gap, then it had a negative effect. Also, Greenfield and manufacturing foreign investment had a positive effect when they interacted with the level of human capital and exports, while foreign investment involving mergers and acquisitions and those directed to agriculture and services had a negative direct effect and insignificant interactive effects. On the other hand, Nahidi and Badri (2014) pointed that the employment impact of foreign direct investment was positive in Egypt during 2002-2010 by using a panel data. With the same nature of effect, the study of Bashier and Wahban (2013) described the impact of foreign direct investment on labor employment in Jordan for the period 1980-2012 by using the fully Modified Ordinary Least Square approach (FMOLS).

On the level of Gulf Cooperation Council countries (GCC), featured with the similarity between their economic structures and their large dependence on petroleum as an essential income source, the focus of the previous studies was on the effect of foreign direct investment on economic growth (Al-Iriani, 2007; Hussein, 2009; Faras and Ghali, 2009; Almfraji, et al. 2014). However, the studies that concern with the impact of foreign direct investment inflow on labor, particularly are limited. The study of Joshi and Ghosal (2009) has investigated the impact of foreign direct investment on labor in Oman during 1998-2006. The study shows the correlation between this kind of investment and government employees is positive and very high at 96%. The number of Omanis in the private sector has shown an 115% increase while for expatriates in the private sector the increase has only been 7%. The correlation between this investment inflow and Omanis employed in private sector is also positive and high at 93%

In KSA which is the country subject to the study, no study was available except for one represented in the study of Jaouadi (2014) that estimated the impact of foreign direct investment on unemployment using Johansen cointegration test during the period of 1991-2012. It concluded that there foreign direct investment increased unemployment on the short and long run because of the inefficiency of the Saudi labor market. The study attributed this to the policies of labor ministry that adopt fixing the salaries of the Saudi workers so the foreign investors found that recruiting expatriates labors provides them with professional workers of low wages.

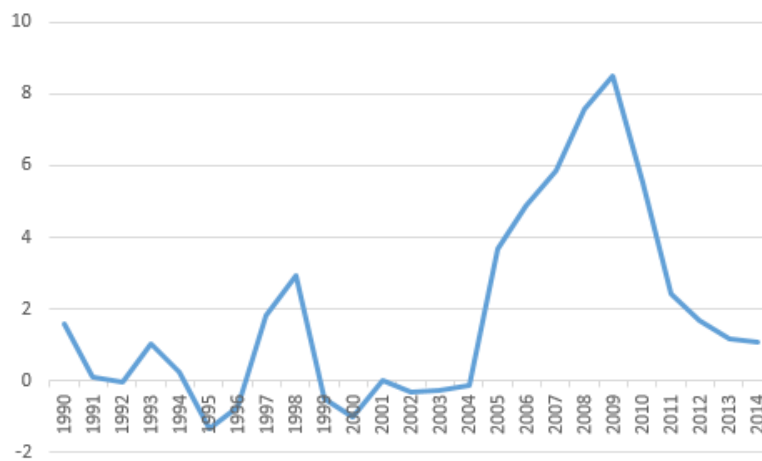
3- Trends of foreign direct investment in KSA:

KSA seeks to attract foreign direct investment believing that it has a great role in transferring the new techniques and creating new job opportunities. Figure (1) refers to the development of the flows of foreign direct investment as a percentage of the gross domestic product. The period (1990-2000) has witnessed fluctuations in the percentages of the flows around low rates mostly less than 2%. This may be due to a lack of a transparent investment law until it was issued in 2000 and to the existence of many restrictions on the foreign investors. It was noted that foreign direct investment has been increased from 2000 till it reached the highest value 8.5% in 2009. This improvement was due to the rise in the prices of oil and gas relatively, in addition to

that, the security and political stability. KSA intensified its efforts in order to attract this investment through developing industrial cities, free areas and facilitating measures needed for starting any commercial activity. But it was noted that the flows decreased after that as they were still affected by the global economic crisis and bank credit decline globally especially those coming from advanced countries.

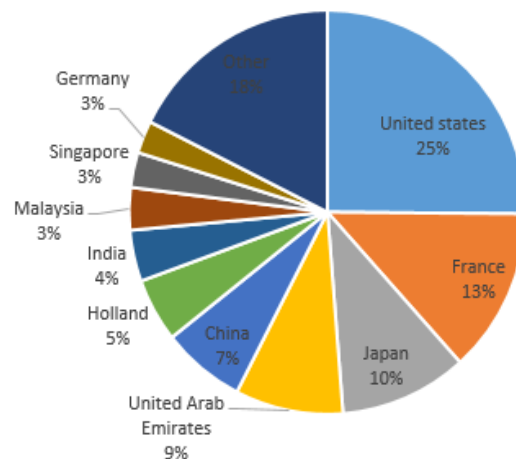
The Arab investment climate report points out that USA, France, Japan, UAE, China, and Netherlands are regarded as the leading investing countries in KSA during 2003-2015, according to the investment cost for the projects (figure 2). The investments of USA in KSA hit around 25% of the total foreign direct investment according to commercial and economic relationships between the two countries that underwent many agreements, especially the agreement of technical cooperation and the agreement of the guaranteed private investments. France came in the second rank by around 13% and Japan with a percentage of 10% of the total foreign direct investment.

Figure (1)
KSA inflows of foreign direct investment during (1990-2014)



Source: Authors' calculations depending on (World Bank).

Figure (2)
The most important investing countries in KSA during (2003-2015)



Source: Authors' calculations depending on (The Arab Investment & Export Credit Guarantee Corporation).

4- Employment of industrial workers in KSA:

The incentives that the country provided to support and develop national industries, including providing the necessary infrastructure and the new industrial cities, contributed to increasing the job opportunities during the last years and increasing the number of workers in general in factories as it rose from 155773 workers in 1990 to 935256 workers in 2014. It is noted from the table (1) that the industry of food products represents the most industrial sector where workers are recruited which coincides with its nature as a labor-intensive industry.

Table (1)
Number of KSA industrial workers in manufacturing during (1990-2014)

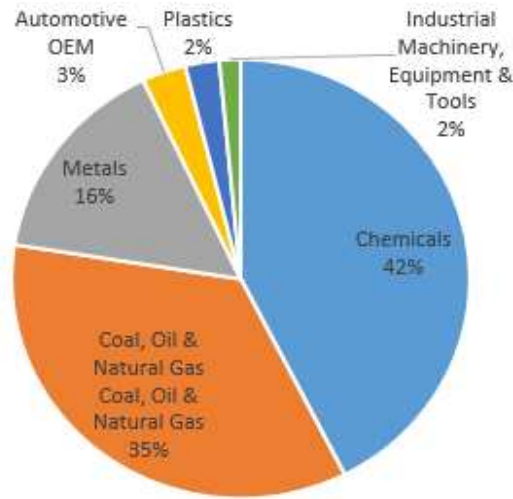
Year	Reformed metals	Rubber & plastic products	Chemical materials & products	Food products	Other manufacturing industries	Total
1990	18208	11273	14043	14069	92243	155733
1995	26701	23753	23131	21290	140419	243545
2000	37055	33445	30253	31008	181294	323653
2005	44812	39630	37895	41098	204547	377752
2010	64437	53016	48617	72540	292952	544484
2014	103375	86639	80252	141537	509531	935256

Source: Authors' calculations depending on (Saudi Arabian Monetary Agency).

Figure (3)
KSA inflows of foreign direct investment in industrial sector during (2003-2015)

Source: calculations on (The Investment Credit

Authors' depending Arab & Export Guarantee



Corporation).

Looking at the sectoral distribution of foreign direct investment in KSA according to the investment cost in figure (3), it turns out that the highest percentage of workers is in chemical industry with 42%; this industry is one of the capital-intensive industries that relies on the resources of oil and natural gas followed by the industry of coal, oil and gas with a percentage of 35%, then the metals with a percentage of 16%.

Table (2)

The industrial workers in KSA inflows of foreign direct investment projects during (2003-2015)

Industry Type	Number of companies	Number of Projects	Number of workers
Chemicals	41	52	17959
Coal, Oil & Natural Gas	28	33	7154
Metals	24	29	15024
Automotive OEM	16	18	7980
Plastics	19	21	3689
Industrial Machinery, Equipment & Tools	81	93	10196
Total	209	246	62002

Source: Authors' calculations depending on (The Arab Investment & Export Credit Guarantee Corporation).

Table (2) points at the indicators of the impact of foreign direct investment on workers in the industrial sector. Totally, the foreign projects provided 62002 job opportunities which imply an average of only 252 job opportunities for each project.

This indicates that the impact of foreign investments on employment tends to be limited in this sector. It is clear that the chemical sector control the largest number of industrial workers with a ratio of 29% as each project in this sector has an average of 345 workers, followed by the sector of metals with a ratio of 24%. These low averages accord with these industries as capital-intensive industries.

5- The econometric model:

This model aims at measuring the impact of foreign direct investment on industrial labor in KSA, reaching to judge the extent to which the hypothesis of the study is achieved or not. This model included the most important variables about which most of the literature that discussed the relationship between foreign direct investment and labor market in general, have agreed. The functional form of our model is:

$$IW = f(FDI, EXP, CPI)$$

Where:

IW = the industrial employment rate or the industrial workers in existing factories as a percentage of the total population.

FDI = the net inflows of foreign direct investment as a percentage of GDP.

EXP = Commodity and service exports as a percentage of GDP.

CPI = inflation expressed by the consumer price index (2005=100).

It is expected that the inflows of the foreign direct investment will have a positive effect on industrial labor in the host country. This positive effect is achieved through the contribution of these investments in supporting local projects, industries and constructing new projects which increase the demand of industrial labor and lead to create extra job opportunities inside the host economy (Driffield and Taylor (2000); Arbache, 2004; Massoud,2008) .

Also, exports affect positively, which means that the increase in the external demand leads to a rise in the growth of exporting industries and an increase in the employment opportunities of the industrial sector (Salami and Oyewale, 2013).

There is an argument around whether the inflation has a positive or a negative effect on employment. This was evident in the studies of (Matthew and Johnson, 2014; Salami and Oyewale, 2013). Generally, this effect depends on how far the inflation is regarded as an incentive for profits thus expanding investment or as a frustrating to consumers demand thus reducing investment.

The study relies on time series data of the variables included in the model according to the latest data that is provided. It extended to cover the period of (1990-2014). The data of the dependent variable has been got from the annual statistics of SAMA. As for the data of the net inflows of foreign direct investment, they were collected from the World Bank development indicators. United Nations conference on trade and development was the source of both exports and inflation (UNCTAD statistics).

The methodology of the model is based on ARDL methodology. It is based on the past values of the variables in the estimation process. It has been developed according to the study of (Pesaran et al, 2001). We used Microfit 4.1 statistical software.

According to the methodology of the study, we can re-form the indicative equation as follows:

$$\Delta IW = \alpha + \beta_1 IW_{t-1} + \beta_2 FDI_{t-1} + \beta_3 EXP_{t-1} + \beta_4 CPI_{t-1} + \sum_{i=1}^p \phi_{1i} \Delta IW_{t-i} + \sum_{i=1}^K \phi_{2i} \Delta FDI_{t-i} + \sum_{i=1}^m \phi_{3i} \Delta EXP_{t-i} + \sum_{i=1}^n \phi_{4i} \Delta CPI_{t-i} + \mu_t \dots\dots\dots$$

(1)

In order to identify the extent of the stationarity of each variable as the starting point before applying the methodology, the test of Kwiatkowski – Philips– Schmidt Shin (KPSS) was used. It is one of unit root tests that suits small samples. Its null hypothesis implies that the interested variable is stationary against the alternative one that is not. The test results are as shown in the table (3). It points out that all the time-series for all the variables are stationary at the level of significance 1%.

The application of ARDL methodology includes proceeding two steps. The first step is represented in the existence of a long-term equilibrium relationship between the variables. As for the second step; it is represented in estimating the indicators of the relationship in the long term then in the short term (Malawi, 2013).

Table (3)
The results of stationarity test

Variables	Constant, Linear Trend	Constant
	LM-static.	LM-static.
IW	0.136436(3)**	0.657545 (3)*
FDI	0.078213 (3)***	0.310360 (3)***
EXP	0.108400 (2)***	0.527494 (3) *
CPI	0.169060 (3)*	0.576667 (3) *
critical values	1% = 0.2160 5% = 0.1460 10% = 0.1190	1% = 0. 7390 5% = 0.4630 10% = 0.3470

Source: Authors' calculations.

-Values in brackets refer to the lag periods selected by using Newey-West automatic.

*significant at 1%, ** significant at 5%, *** significant at 10%.

The first step requires getting the statistic value F depending on Wald test. The null hypothesis states that there is no a cointegration relationship between the variables, as (H0:β1=β2=β3=β4=0), against the alternative hypothesis, as at least one of them does not equal zero.

Table (4)
Wald test results

F statistic= 5.383773(0.0171)		
Significance	I(0)	I(1)
5%	3.32	4.35
10%	2.72	3.77

Source: Authors' Calculations.

-The critical values have been gotten from (Pesaran et al., 2001) from table C1.iii

Table (4) states that the calculated value for test F exceeds the highest limits of the critical value at a significance of 5%. Thus, the null hypothesis could be rejected which means that there is a long-run equilibrium relationship between variables or in other words a cointegration relationship in the long run.

It is important to point that the goodness of fit of this model is relatively high as the probability values of all the diagnostic tests are more than 0.05. The regression specification passes all diagnostic tests against autocorrelation, heteroscedasticity, non-normal residual, and incorrect functional form. Table (5) reports the results of diagnostic tests. Also, the regression specification fits well. Figure (4) shows actual and fitted dependent values. Figure (5) shows the residuals and two standard error limits.

The model indicates that there is a significant impact of each explained variable on industrial workers in KSA according to the table (6). The following equation can express the model (values between brackets represent the standard deviation of the parameter)

$$IW = -2.7972 - .063994 FDI + .025352 EXP + .034072 CPI \dots \dots \dots (2)$$

(.50413) (.033655) (.0090993) (.0046656)

Table (5)
Diagnostic tests

Test	Static value	P. value
Lagrange multiplier test	F(1,15)= 1.1899	[0.293]
Normality test	χ^2 (2)= 3.5079	[0.173]
Hetero. Test	F(1,15)= 1.4260	[0.246]
Ramsey's Reset test	F(1,15)= .23233	[0.637]

Source: Authors' Calculations.

Figure (4)
Actual and fitted dependent values

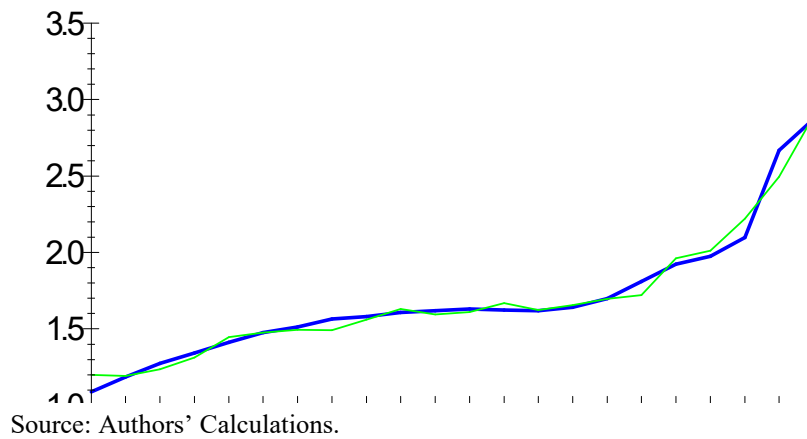
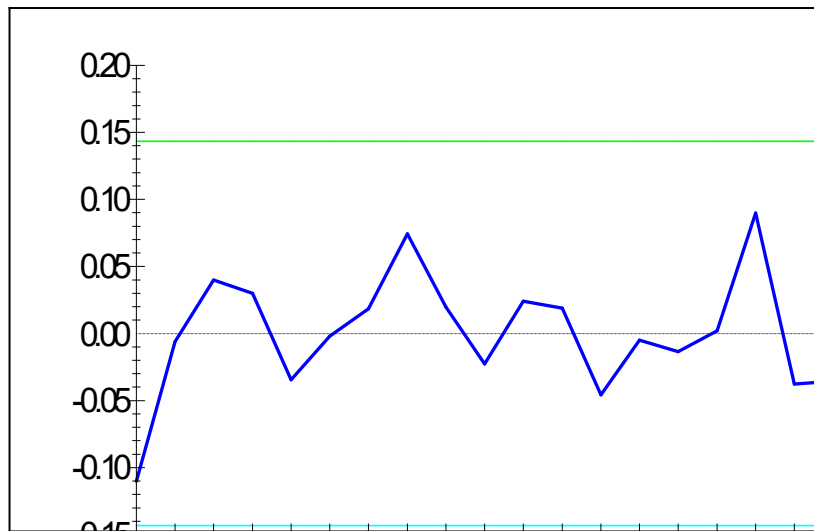


Figure (5)

The residuals and two standard error limits



Foreign direct investment, which represents one of the most important forms of financial openness, has a negative effect on the industrial employment. The coefficient of foreign direct investment effect states that the increase in its ratio to the gross domestic product with 1% will lead to decrease the rate of industrial workers with about 0.1% at a significance of 10%.

However, this result is contradicting the hypothesis of the study, it could be explained with three reasons as follows: First, the nature of the industries in which

this kind of investments is focused in KSA. In other words, its structure is predominated by the rise of capitalism intensity which leads to decrease the demand of the labor in the industrial sector. One of the prominent evidences is what is clear through the analytic frame of distributing foreign direct investment in figure (3) as the chemical industry captured the biggest share of the total of this investment with a percentage up to 42%. Second, considering the pattern of the investment that is adopted by foreign companies in KSA, we find out that it tends to the mergers and acquisitions (M&A) projects. This can be inferred from the increase in the value of cross-border mergers and acquisitions sales in KSA from 657 million \$ in 2011 to 1429 million \$ in 2012, and the decrease of the value of announced greenfield projects from 5627 in 2011 million \$ to 2033 million \$ in 2012 (UNCTAD, 2015). Third, the distortions of the Saudi labor market including the policies of fixing higher salaries while the skill level of the local labor is still low.

Whereas it turns out that there is a positive impact of trade openness, represented in the exports of the commodities and services as a percentage of the GDP, the rate of industrial workers rises with 0.02% on the long run when the exports of the commodities and services rise to the gross domestic product with 1% at a significance of 5%. This reflects the importance of the role that the exports play in activating the industrial labor market in KSA. This impact ensures the importance of the mechanism of the exports multiplier in motivating the economic growth according to the economic theory.

The results also show that higher inflation stimulates creating job opportunities in industrial sector, thus increasing the employment rate in it with 0.03% at a significance of 1%. This means that the rise of the level of prices is regarded as an indicator of producers' profits increase. These optimistic expectations reflect on increasing investments and the number of factories which makes it necessary to the growth of the demand of labor and creating more jobs.

Table (6)
Estimated long run coefficients using the ARDL approach
ARDL (1, 0, 1, 1)

	Dependent variable: <i>IW</i>	
independent variables	Coefficient	P.value
<i>FDI</i>	-.063994	[.075]
<i>EXP</i>	.025352	[.013]
<i>CPI</i>	.034072	[.000]
<i>Constant</i>	-2.7972	[.000]

Source: Authors' Calculations.

Considering the estimation results in the short run as shown in table (7), it is clear that the model has high explanatory ability. The coefficient of determination

means that the independent variables explain around 73% of the changes witnessed by the rate of industrial employment.

On a basis of the values of coefficients and probabilities, the negative effect practiced by foreign direct investment still continues, even if the value of its coefficient decreases comparatively with what it is in the long term. At significance of 5%, the rate of industrial employment in the short run decreases with 0.02% when the foreign direct investment increases with 1%. Short run effects of the exports and inflation on the level of employment in industrial sector were not significant. This because the emergence of the direct and indirect effects of such variables needs a sufficient time to take place.

The negative significant value of error correction coefficient ECM (-1) fulfills the necessary requirements to make sure that there is a long run relationship. Its value points that the disequilibrium that occurs in the short run is corrected with a percentage of 37% annually to reach long run equilibrium, which means that there is a relative slowness in the modification process.

Accordingly, the hypothesis of the study is neither achieved in the short run nor in the long run. It is noted that this result agrees to a great extent with the study of (Jaouadi, 2014) which was applied also on the Saudi economy in regard to the nature of the negative effect practiced by foreign direct investment. But they differed in that the later was focusing on the rate of unemployment in general but the current study is focusing on the rate of industrial employment in particular with another kind of methodology and more recent data.

Table (7)
Estimated short run coefficients using the ARDL approach
ARDL (1, 0, 1, 1)

independent variables	Dependent variable: ΔIW	
	Coefficient	P. value
ΔFDI	-.024040	0.051
ΔEXP	-.0011989	0.731
ΔCPI	-.0035920	0.679
<i>Constant</i>	-1.0508	0.000
<i>ECM (-1)</i>	-.37566	0.002
R ² = .73401		
F-statistic=11.0383		
Prob(F-statistic) =0.000		

Source: Authors' Calculations.

6- Conclusions and recommendations:

This study tackles foreign direct investment and its impact on the employment of industrial workers in KSA. In that concern, it seeks to present an indicative formula that includes the most important variables governing the employment of industrial

workers by focusing on the role of foreign direct investment as an indicator of financial openness.

Using ARDL methodology to identify the effects in the short and long run during the period (1990-2014), it turns out that the hypothesis of the study is not achieved in both of runs. This kind of investment practices a negative effect on the rate of industrial workers. This is can be explained as we mentioned before by the pattern of investment in KSA which is predominated by the focusing on capital-intensive industries and the nature of mergers and acquisitions. Also, the distortions of Saudi labor market play an important role in supporting this effect.

According to the empirical model, in the long run, it turns out that there is a positive effect of trade openness. The rate of employment of industrial workers rises with a percentage of around 0.02% when the exports of commodities and services increase with a percentage of 1% at the significance of 1%. The results also show that higher inflation stimulates creating job opportunities in the industrial sector. However in the short run, exports and inflation missed their significant effects which need more time in order to take place.

From the results of the study, decision makers in KSA should adopt a strategy that magnifies the positive effects of financial openness on one side and decreasing the negative effects on the other side. They have to conduct a continuous assessment of various forms and patterns of foreign direct investment through a disaggregated level assessment and concern about that help in stimulating the employment, especially the greenfield projects. They should review the policy of incentives and privileges given to foreign investors to become more related to the employment consideration. Also, it is important to continue motivating trade openness through supporting exports.

Conflict of interests: The authors have no conflict of interests by any means to be declared.

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