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Abstract
Saudi labour unemployment is a very serious issue in Saudi Arabia which is further increasing with over dependence on foreign labour. This study empirically investigates this issue by employing ARDL cointegration technique on a sample period of 1980-2015. Our estimates suggest that foreign labour, wage rate and female participation are responsible for an increasing Saudi labour unemployment. On the other hand, number of graduates and government social security benefits are helping in combating Saudi labour unemployment. Therefore, our study recommends the Saudi government to control foreign labour inflows up to some reasonable limit, to rationalize the minimum wage rate and to increase spending on education and social security benefits.

Key Words: Saudi Labour Unemployment; Foreign Labour; Social Security Benefits; Cointegration
JEL: E23; J61; H55; C12

1. Introduction

The issue of unemployment is attracting attention of researchers around the world. Rodrik (1997) suggests that the possible reasons behind high unemployment can be inflow of foreign labour and free international trade. The inflow of foreign labour changes the demand composition in different industries due to structural change in the economy which may not match with the supply of labour and hence results in unemployment (Tyers and Yang, 1997). On the other hand, foreign labour also expands the domestic market through increasing aggregate demand. That may have also positive impact in terms of increasing the employment level in any country. Secondly, foreign labour also fills the gap of skill shortage in any country and helps to continue the production process. Therefore, foreign labour may also help in the increasing employment level in any country. The impact of foreign labour has many dimensions and many possible links on native employment level. Therefore it is an empirical question to capture the exact impact in case of Saudi Arabia.

Saudi labour unemployment is a burning issue in Saudi Arabia with double digit unemployment rate. For example, it has been observed at 12.4%, 12.1%, 11.7%, 11.7 and 11.5% in the recent years 2011 to 2015 respectively. But, unemployment of foreign labour force is only fluctuating from 0.4% to 0.5% in these years. The productivity level and working hour of native labour are also observed lower than foreign labour and therefore they are demanding lesser in the private sector than that of public sector. Saudi Arabia is an oil-rich economy and has a better earning potential for educated, skilled and unskilled labour from developing countries. The foreign labour is even accepting the lower wage rate than the native ones in public and private sectors. Further, productivity level of foreign labour is greater than native labour. Therefore, private sector prefers the foreign labour instead of native ones. For example, the proportion of foreign labour in total labour force in the private sector has been observed at 89.2%, 86.6%, 84.9%, 84.5% and 83.6% in the years 2011 to 2015 respectively. This is showing a preference of private sector in demanding the foreign labour. Further, a minute falling proportion is also reflecting the government regulation to accommodate the native labour in the private sector. Most of natives are least interested in private sector and are remained unemployed in waiting of job opening in public sector due to higher wages in public sector. This is becoming a serious issue for the native labour where private employers are preferring foreign labour. Therefore, foreign labour is reducing the job opportunities for native labour and is also depressing the wage rate as well. Alternatively, government of Saudi Arabia is hiring more native labour on higher wages than private sector in the public sector to compensate the native labour from foreign labour competition and to maintain their economic welfare level. This is also a great financial burden on the public sector in accommodating the native labour.

Table 1.1:   Labour Statistics

Years	Saudi Labour Unemployment (%)	Foreign Labour Unemployment (%)	Foreign-Labour to Total Labour Force in Private	Remittances Ouflows to GDP (%)	Saudi-Labour to Total Labour in Public Sector (%)

			Sector (%)		
2011	12.4	0.4	89.2	4.2	92.1
2012	12.1	0.1	86.6	4	93
2013	11.7	0.2	84.9	4.7	94
2014	11.7	0.3	84.5	5	94.2
2015	11.5	0.5	83.6	5.6	94.4

Source: Saudi Arabian Monetary Agency (SAMA, 2017)

The government is facing a heavy cost in accommodating Saudi labour in terms of providing them social security benefits and providing jobs in public sector which is a heavy burden on fiscal budgets. For example, the proportion of native labour in public sector jobs is 92.1%, 93%, 94%, 94.2% and 94.4% in the years 2011 to 2015 respectively. It is also showing increasing proportional trend. Further, foreign labour is also remitting its major earned income to their mother countries which is again a big burden on the local Saudi economy. For example, remittances outflows have been observed as 4.2%, 4%, 4.7%, 5% and 5.6% of GDP in the years 2011 to 2015 respectively. Foreign labour could have a pleasant impact on aggregate demand and employment level. But due to remittances, aggregate demand is not rising at the rate of production and again creating a problem of cyclical unemployment due to lesser effective demand in the Saudi Arabia. The total labour force is also rising at average rate of 3.3% that is expected to contribute more unemployment in the upcoming years. The Saudi labour market is heavily depending on the foreign labour to meet the requirement of job market particularly in the professions where Saudi labour has not/low skills. Foreign labour is increasing the competition for the native labour and is becoming a reason for increasing native-labour unemployment in Saudi Arabia. Therefore, it is becoming a serious issue in the present age.

Based on above discussion, it seems pertinent to quantify the net impact of foreign labour inflow on Daudi unemployment level. Further, the impact of immigration has been investigated in previous literature but particularly the impact of foreign labour without permanent residency has never been investigated according to our literature survey. Therefore, the present study is going to contribute the literature by investigate this issue in Saudi Arabia.

2. Literature Review

A vast literature is existing on the influence of immigration/foreign-labour inflows on unemployment of native labour. For example, Marr and Siklos (1994) inspect the influence of immigration on native labour unemployment in Canada by using causality tests on the quarterly time series of 1962-1990. They report that immigration has significantly caused the native-born unemployment after a period of 1978 in analysis. But before this period, causality analysis could not find any relationships. On the same country, Marr and Siklos (1995) use a long data set for 1926-1992 by employing vector auto-regressive and causality test analyses after including a variable of wage rate in analysis. Their study concludes that immigration is significantly causing the native unemployment rate and immigration is not caused by unemployment rate in the empirical analysis. Similarly, Konya (2000) finds a long run causality from immigration to unemployment by using data of 1981-1998 for Australia. Feridun (2004) uses the data set of Finland by including a variable of

economic growth in analysis and reports that one-way relation is running from foreign labour to unemployment and economic growth. Feridun (2005) does a same exercise for Norway economy and finds that immigration is not directly causing to the unemployment but it is only causing economic growth in Norway that may have indirect impact on unemployment. With a same model, Feridun (2007) investigates this causal-relationship of immigration and unemployment by utilizing a time period of 1980-2004 for Sweden. He finds a feed-back effect in economic growth and immigration relationships in the short-run and migrants are only causing to economic growth in the long-run. Further, unemployment has caused the immigration. Withers and Pope (1993) employ the standard test to find the association between immigration to total population ratio and unemployment rate in Australia. They find that unemployment rate is causing the immigration but the influence of foreign labour on unemployment remain insignificant. Longhi et al. (2005) investigate the impact of immigrants on the wages by using the OECD countries' data set and find that foreign labour has a bad impact on wages. They also find that this impact remains stronger in case of low-skilled workers. Waal (2012) investigates this issue by using data of 1998-2007 for twenty-two Dutch cities in a panel setting. He finds a positive contribution of immigration on unemployment in his analysis. He also finds a negative effect of producer's services and a negative effect of combined immigration and producer's services on unemployment level in his analysis. Further, working population has been remained insignificant in analysis and lower educational share has been helped in reducing unemployment. Shan et al. (1999) investigate this issue for New Zealand and Australia in the time-series data set. They do not find any causal relationship between unemployment and immigration. Further, they report that change in industrial structure of employment, capacity utilization, unemployment benefits and wage rate are observed major determinants of unemployment in causality analysis for both countries. Kemnitz (2003) inspects the relationship between immigration and unemployment in different skill level. He finds that immigration with lower level of skills increases the unemployment particularly in case of low-skilled native labour. Further, it has positive influence on the high-skilled native labour and pensioners. D'Amuri et al. (2010) investigate the influence of recent and past migrants on wages and unemployment. They find that migrants show minute negative influence on wages and unemployment. On the other hand, lagged immigration shows a strong negative influence on unemployment level and a minute negative influence on wages. Jean and Jimenez (2011) examine this issue for eighteen OECD countries for a period of 1984-2003. They find an insignificant influence of migrants on unemployment. They argue that this influence is a very short run phenomena and it has a very temporary effect. It is majorly due to the market competitive conditions of recipient countries and due to unemployment benefit majorly. Triandafyllidou (2016) collects many aspect of immigration in the recipient countries, for example, racial, social, cultural, demographic, political and economic impacts. In case of economic impacts, the most of debate has been done on the labour market in terms of wage-effects and unemployment issues. He also argues that immigrants are generally welcome by receipt countries for particular skills and qualification. Therefore, immigrants are showing greater efficiency in labour market and increase competition for native labour force. Further, they are also responsible for native unemployment in recipient countries.

In the past literature, we have found a mix evidence of significant and insignificant relationship between unemployment and immigration/foreign labour inflows. Most of studies are reporting significant contribution of immigration/foreign labour on native

unemployment but insignificant results have also been reported by Withers and Pope (1993), Marr and Siklos (1994), Feridun (2005), Jean and Jimenez (2011) and Shan et al. (1999). Further, for a Saudi case of a heavy dependence on foreign labour without a permanent residence is rare example in the world. Therefore, we could not find an exact study which could support our hypothesis of relationship between foreign labour without residency and native unemployment. This study is going to contribute by exploring the influence of foreign labour on Saudi labour unemployment in Saudi Arabia.

3. Model, Hypotheses and Estimation Strategy

3.1 Model

There are number of factors which are determining the unemployment. In case of Saudi labour unemployment, we are focusing the real ground variables which are affecting the Saudi unemployment particularly. Our proposed model is as follows:

$$logSUEMP_t = f\ (logFL_t, logWR_t, logGRAD_t, logGSS_t, logFEMPART_t) \qquad (1)$$

Here, *t* is time subscript and showing the sample of annual data of period 1980-2015. $logSUEMP_t$ is log of number of unemployed Saudi labour. FL_t is log of number of foreign employed labour. $logWR_t$ is log of wage rate. $logGRAD_t$ is log of number of graduates from universities and vocational institutions. $logGSS_t$ is a log of numbers of people supported by government social security program. $logFEMPART_t$ is log of percentage of Saudi female labour participation in total labour force. All data utilized in the model is sourced from Saudi Arabian Monetary Agency (SAMA, 2017).

3.2 Hypotheses

H₁: Larger number of foreign labour, greater the Saudi unemployed labour

There are approximately 80% to 90% foreign labour in private sector of Saudi Arabia and approximately 60% to 70% foreign labour in total labour force. A higher demand for foreign labour in the private sector is due to the acceptance of comparatively lower wages by foreign labour in the private sector. Private sector is definitely profit oriented and wants to reduce its cost of production as much as possible. On the other hand, foreign labour is more productive and is willing to acceptance all kind of responsibility even dirty jobs. This argument is also supported by Kemnitz (2003) as foreign labour is reducing chance of native labour in the low skill jobs. Further, foreign labour is usually demanded with particular skill argued by Triandafyllidou (2016) and skill shortage in native labour can be responsible for native labour unemployment. Therefore, larger numbers of foreign labour could have adverse effect on the employability of Saudi labour. But, foreign labour can play a pleasant role in overall employment creation by increasing the aggregate demand in the country hence it may also have positive effects on the Saudi employment. Eventually, the foreign labour is remitting the most of the income earned from Saudi Arabia to their mother countries to enhance their well-being in the mother countries and to support their families. This fact can also be supported by the heavy remittances outflows from the Kingdom which is 5% of GDP approximately. Therefore, the overall impact of foreign labour can be claimed as adverse. The adverse impact of immigration / foreign

labour has also been reported by Marr and Siklos (1995), Konya (2000), Feridun (2007), Waal (2012) and D'Amuri et al. (2010). Therefore, this present study is also hypothesizing an adverse impact of foreign labour on Saudi unemployment by hypothesizing a positive relationship between foreign labour and Saudi unemployment.

H2: Larger number of graduates, lesser the Saudi unemployed labour

The increasing quantity of Saudi graduates may increase the Saudi unemployment by an addition in labour force if more jobs are not available for their particular skills and qualifications. This is a quantitative argument and qualified Saudi graduates, particularly graduated in demanding scant skill in the country, can have pleasant effects on Saudi employment as well. Triandafyllidou (2016) also claims that skill shortage is majorly responsible for native unemployment and therefore qualified Saudi labour may replace with foreign labour if they are qualifying according to the job market requirements. For example, medical staff mostly comprises of expatriate labour and increasing medical Saudi graduates are replacing sharply the expatriate medical staff recently. Taking this argument at aggregate level, we are hypothesizing a negative relation between number of graduates and Saudi unemployment.

H3: Larger number of social security awardees, lesser the Saudi unemployed labour

Social security benefits are generally awarded to the marginal people in the country like unemployment allowance to the unemployed labour. These benefit may reduce the motivation of labour to do jobs and may increase unemployment as argued by Jean and Jimenez (2011) and Shan et al. (1999). But, these kinds of benefits may also have pleasant impact on the employment by increasing aggregate demand in the country. This argument is also valid as poor people, who are awarded by social security benefits, can have higher marginal and average propensity to consume and can support higher aggregate demand argument. This, in turn, may reduce the Saudi cyclical unemployment. Aside of both argument, it is purely an empirical question and we are initially hypothesizing a negative relation between number of social security awardees and Saudi unemployment.

H4: Higher wage rate, greater the Saudi unemployed labour

Higher wage rate is responsible for higher unemployment among Saudi labour. A high wage rate is signals for higher cost of production and standard demand for labour theory also suggests a negative relation between wage and demand for labour. Therefore, lesser Saudi labour might be demanded at higher wage rate and Shan et al. (1999) also report an adverse influence of higher wages on unemployment. Further, private sector is preferring more of foreign labour who are even willing to work at lower wage rate than that of market wage rate. Longhi et al. (2005) finds the negative impact of foreign labour on wage rate as well and lower wage can be responsible for voluntary unemployment by Saudi labour. Due to theoretical and empirical prediction of a negative relation of wage and demand for labour, we are hypothesizing a positive relation between wage and Saudi unemployment.

H5: More Saudi female labour participation, greater the Saudi unemployed labour

Female labour force participation is increasing the volume of the total labour force and hence responsible for higher overall Saudi unemployment. Due to cultural factors, the female labour participation was very low before two decades. Due to educational improvement, the female participation in labour force is increasing day by day and it is increasing unemployment. Therefore, this study is hypothesizing a positive relation between female labour participation and Saudi unemployment.

3.3 Estimation Strategy

Before testing our hypotheses, we test the normality and stationarity of variables. For this purpose, Ng and Perron (2001) suggest a very efficient and modified unit root test by GLS detrending data procedure. The test statistic is given below:

$$MZ_\alpha^d = (T^{-1}(y_T^d)^2 - f_0)/2k \tag{2}$$

$$MSB^d = (k/f_0)^{1/2} \tag{3}$$

$$MZ_t^d = MZ_\alpha^d \times MSB^d \tag{4}$$

$$MPT_t^d = ((\bar{c})^2 k + (1 - \bar{c})T^{-1})(y_T^d)^2 / f_0 \tag{5}$$

Equation 2, 3, 4 and 5 are efficient versions of Phillip-Peron test and provide the efficient results even in small sample size. Further, the evidence of stationarity can be confirmed with four statistic. After ensuring the stationarity of variables, this study conduct the cointegration test. This study uses most efficient technique of ARDL proposed by Pesaran et al. (2001) which is even efficient in the existence of a mix evidence of integration. Test equation is as follows:

$$\Delta w_t = \varphi + \gamma w_{t-1} + \sum_{i=0}^{m} \vartheta_i \Delta x_{t-i} + \sum_{i=1}^{m} \theta_i \Delta y_{t-1} + \varepsilon_t, \quad \text{t=1,2,….,T} \tag{6}$$

Where, w is the vector of both dependent and independent variables of this present study. x contains determinants of Saudi unemployment discussed in equation 1 and y contains the Saudi unemployed labour. After regressing equation 6, wald test may be utilized to test the null hypothesis, $\gamma = 0$, of no cointegration. After ensuring cointegration in equation 6, long run parameters can be calculated through normalizing procedure suggest by Pesaran et al. (2001). Further, we may estimate the short run parameters from the Error Correction Model (ECM) of our selected ARDL model. The ECM is given below:

$$\Delta w_t = \phi + \sum_{i=0}^{m} v_i \Delta x_{t-i} + \sum_{i=1}^{m} \vartheta_i \Delta y_{t-1} + oECT_{t-1} + \varepsilon_t \tag{7}$$

Here, coefficient of ECT_{t-1} may utilize to ensure the short run relationship in the model if its value is found negative and significant. Afterwards, we could be able to explain the short run parameters associated with respective differenced variables in equation 7.

4. Data Analyses and Discussions

Table 4.1 displays the Ng-Perron unit to verify the integration level. Results show that all variables have unit root in their levels except female labour participation variable which is stationary at 1% level of significance at level. Other variables are stationary at 10% level of significance at their first differences. Though the integration is found mix but it is sufficient to proceed for ARDL cointegration analysis.

Table 4.1:   Unit Root Tests

Variables	MZa	MZt	MSB	MPT
$logSUEMP_t$	-7.1648	-1.8945	0.2640	12.7202
$logFL_t$	0.0005	0.0162	33.5609	20.5423
$logGRAD_t$	-1.8034	-0.8678	0.4812	44.5262
$logWR_t$	2.4881	14.8492	5.9680	90.0314
$logGSS_t$	-3.2541	-1.2458	0.8745	19.2544
$logFEMPART_t$	-119.1763***	-30.9464***	0.0161***	0.0642***
$\Delta logSUEMP_t$	-16.4487*	-2.8652*	0.1742*	5.5556*
$\Delta logFL_t$	-15.6314*	-2.7254*	0.1845*	6.6654*
$\Delta logGRAD_t$	-16.5933*	-2.8738*	0.1732*	5.5309*
$\Delta logWR_t$	-5.7154*	-1.8745	0.2654*	4.4354*
$\Delta logGSS_t$	-17.5465*	-2.5794*	0.2549*	5.5467*

Note: *, ** and *** showing stationary at 10%, 5% and 1% respectively.

Table 4.2 shows the regression results of ARDL cointegration technique and diagnostic tests. The F-value (13.0219) from bound test is larger than upper bound critical F-value and shows the presence of a strong cointegration in our proposed ARDL model. Further, all diagnostic tests' F-values are reasonability low and their p-values are at least larger than 0.1. Therefore, our proposed model is out of any econometric problem. In the long run estimates, foreign labour has a positive and significant effect on Saudi unemployed labour at 5% level of significance and this result is confirming our hypothesis H_1. Further, this impact is also found elastic. Therefore, we can claim that foreign labour is significantly responsible for Saudi labour unemployment. This result also matches with the previous findings of Marr and Siklos (1995), Konya (2000), Feridun (2007), Waal (2012) and D'Amuri et al. (2010). This also corroborates the fact that foreign labour is not supporting Saudi employment by increasing aggregate demand. But, it is responsible for Saudi unemployment through increasing competition for Saudi labour and has adverse impact on Saudi labour employment. Number of graduates has negative, elastic and statistically significant impact on the Saudi labour unemployment. This result supports our hypothesis H_2. It also confirms that increasing number of graduates are

fulfilling the job market requirements and are reducing Saudi labour unemployment at aggregate level. We can claim here that Saudi educational institutes are producing graduates with the requirements of Saudi labour market. Further, the coefficient of government social security recipients is negative, elastic and significant. This result is confirming our hypothesis H_3. This result is contradicting the findings of Jean and Jimenez (2011) and Shan et al. (1999). But, we can claim that increasing social security benefits are supporting higher aggregate demand in the Kingdom and resultantly it has pleasant effect on the Saudi labour employment by reducing Saudi unemployment. The estimation of our hypothesis H_4 is also found valid with a positive, elastic and significant sign. It means that our results are following the standard demand for labour theory and signify that increasing wage rate are depressing employment and increasing Saudi unemployment. Further, this result also corroborates the findings of Shan et al. (1999). In the last, long run results also corroborate our hypothesis H_5 with minute but statistically significant elasticity. It means that increasing female labour participation is increasing Saudi unemployment.

Table 4.2:   Regression Results

Long Run Estimates			
Variables	**Coefficients**	**t-value**	**p-value**
$\log FL_t$	1.1934	2.7171	0.0187
$\log GRAD_t$	-2.7689	-3.0921	0.0093
$\log GSS_t$	-2.5449	-2.7515	0.0176
$\log WR_t$	3.9394	1.8814	0.0844
$\log FEMPART_t$	0.2366	3.6898	0.0031
Intercept	-18.8670	-3.2615	0.0068
Short Run Estimates			
$\Delta \log SUEMP_{t-1}$	-0.8834	-1.8291	0.0923
$\Delta \log FL_t$	-2.2095	-3.0541	0.0100
$\Delta \log FL_{t-1}$	-1.4415	-2.5783	0.0242
$\Delta \log FL_{t-2}$	6.55301	2.0282	0.0653
$\Delta \log GRAD_t$	2.6939	4.2690	0.0011
$\Delta \log GRAD_{t-1}$	1.1597	2.4868	0.0286
$\Delta \log GSS_t$	-2.5555	-3.1863	0.0078
$\Delta \log GSS_{t-1}$	1.1270	2.9113	0.0131
$\Delta \log GSS_{t-2}$	-8.5975	-3.1511	0.0084

$\Delta\log WR_t$	-8.6148	-2.8787	0.0139
$\Delta\log WR_{t-1}$	-7.4357	-2.8996	0.0133
$\Delta\log WR_{t-2}$	7.0372	2.4913	0.0284
$\Delta\log FEMPART_t$	-0.1601	-2.8536	0.0145
$\Delta\log FEMPART_{t-1}$	0.1025	2.3477	0.0369
ECT_{t-1}	-0.9925	2.6511	0.0211
Bound Test (F-value)	13.0219	Upper critical F-value at 1% = 4.68	
Heteroskedasticity	F-value = 2.0175		0.1065
Serial Correlation	F-value = 0.5041		0.6186
Jarque-Bera	F-value = 0.0957		0.9532
Ramsey RESET	F-value = 1.4424		0.2550

The second portion of table 4.2 shows the short run results. At first, the negative and statistically significant parameter of ECT_{t-1} is showing the presence of short run relationships and convergence in the model. Further, foreign labour has mix results in the short run as it is decreasing Saudi unemployment up to its first lag which is may be due to increase in aggregate demand in the short run but its second lag is confirming the long run results by increasing unemployment. Impact of lagged foreign labour variable is also confirming the findings of D'Amuri et al. (2010). Likewise, social security benefits, wage rate and female labour participation have mix effects on the Saudi unemployment with different lag lengths. Number of graduates are increasing unemployment in short run as it is reason for an increase in labour force immediately. Further, the adjustment of newly graduates in the labour market may require time and therefore, it has pleasant impact only in the long run.

5. Conclusions

This study checks the effect of foreign labour, number of graduates, number of government social security recipients, wage rate and female participation on the Saudi employment by utilizing ARDL cointegration for a period 1980-2015. We have found a mix order of integration in unit root analyses and have found a strong cointegration and short run relationships in our proposed model. In the long run results, foreign labour, wage rate and female participation are found responsible for an increasing Saudi unemployment and number of graduates and number of government social security benefits are helping in reducing Saudi unemployment. Therefore, we conclude that foreign labour is creating adverse impact on Saudi labour employment on aggregate level due to competition. Further, the competition effect of foreign labour on Saudi labour can be claimed stronger than an increasing aggregate demand hypothesis. Further wage rate is not reflecting the market wage rate as higher wage rate is responsible for higher Saudi unemployment and market wage rate may clear

the problem of unemployment according to perfect competition assumption. Furthermore, female labour participation is responsible for higher unemployment according to our hypothesis. On the other hand, government educational policy in terms of produced graduates and social security benefits are helping in reducing Saudi unemployment.

Based on the results, our study recommends the government of Saudi Arabia to control the inflow of foreign labour up to some reasonable point to protect the Saudi labour employment. Further, minimum wage rate law needs rationalization as higher wage is responsible for higher unemployment in Saudi Arabia. Furthermore, the female participation is increasing the unemployment and therefore, there is need to create employment opportunities for female labour to avoid increasing unemployment. On the other hand, number of graduates are helping in reducing unemployment. Therefore, spending on education sector should be increased to combat the Saudi unemployment particularly in those areas which is lagging the qualification of Saudi labour to be employed with a need of labour market. Last but not least, government social security benefits are helping in increasing aggregate demand and reducing unemployment. Therefore, government should allocate more funds from her budget for this purpose.

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