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The Economic Impact of Immigration on Host Countries:

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Abstract

Over the past 40 years, the impact of immigration on employment, wages and other economic indicators has been robust and continually increasing. The relationship between migration and unemployment is determined by the characteristics of immigrants. This paper assesses the impact immigration has on economic development and unemployment in Saudi Arabia by explaining the shape of the causal relationship between immigration and economic performance on a macroeconomic scale. The data used for Saudi Arabia contains annual observation in the period between 1990 and 2010. With an econometric analysis based on the Jarque-Bera test for normal distribution, Dickey-Fuller for unit root test, Johansen cointegration tests and a vector error correction model test, we reveal that there is no cointegration among the variables. The Granger causality test explains that when the level of immigration raises, GDP per capita also increases. It has also been shown that immigration has no substantial influence on unemployment levels and vice versa.

Keywords: economic development, immigration, unemployment, cointegration,

JEL Classification: J6, F22, F41, O11, O15, E23

1. Introduction

Migration has been treated as a complex phenomenon which includes all social sciences. The Saudi labour market described as immensely reliant on foreign workers, which means that Saudi Arabia has two distinct labour markets: one for Saudis and the other for foreigners. These two markets are separate because they have very different characteristics. In this case, we need to decide if the native and the immigrants are either substitutes or complements. In Saudi Arabia, it is, of course, clear that the immigrants and the foreign labour force are complements to the native. The purpose of this paper is to assess the impact of immigration to Saudi Arabia- as a host country- on economic development and unemployment, by explaining the nature of the causal relationship between immigration and the economic performance, which we express it here by GDP per capita, and unemployment.

Migratory patterns are apparently part of the history and cultural links of a country, legal and political framework, socio-economic characteristics, cultural specificities and the frame in the economic cycle and economic activity (Fromentin V., 2013). The article of Shah, N. M. (2008) defines Saudi Arabia as an oil-rich Gulf country; this oil-rich Gulf stat comprise a region with the origins of unusually high international migration of persons coming from a wide range of countries. The six countries that comprise of this sub-region include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates (UAE), which are joined for several purposes in an association known as the Gulf Cooperation Council (GCC).

The importance of importing labour is significant on Saudi Arabia's economy. The predominant demand for workers in the oil industry, which is the largest sector of the economy. Moreover, Saudi Arabia still in the development phase and has many infrastructure projects which entail temporary labour. Also, the high demand for the low skilled jobs, natives find it shameful to work such as janitors, cleaning jobs, plumbing, and gardening. Finally, the great need for skilled labour in lack of this type of employment in the domestic labour market. Unemployment among migrants is tiny proportion, but it is a fact. While most unemployment appears among natives. The question here is, does the immigration raise the unemployment rates in natives' labour market?

The first section shows the immigration literature review in the host countries. The next section views the theoretical framework through which immigration may affect the labour market in Saudi Arabia as a host country, then brief historical evidence that contains an immigration history and population developments for Saudi Arabia. The third section includes descriptive statistics and the correlation matrix among the differences of the series in the case of Saudi Arabia, and for all variables. The forth section contains the unit root test for defining the difference between the series and how many lags are needed to determine the lagged differences term. Then we use co-integration analysis; the importance of the co-integration analysis is to avoid the risk of spurious regression, and also, helps identify long-run economic relationships between two or various

variables. The Last test used is the Granger causality test to see if the GDP per capita increases by the number of immigrants or vice versa and whether the immigration affects the unemployment rate. In other words, the Granger test defines the type of the relationship between immigration and the economic variables (GDP *per capita*, and unemployment).

This paper analyses the interrelationships between immigration, economic output and unemployment based on Johansen cointegration tests and a vector error correction model test (VECM). The results support that there is no cointegration among the datasets. While Granger causality test explains that when the level of immigration raises, GDP per capita also increases. It also shows that immigration has no substantial influence on unemployment levels and vice versa.

2. Literature Review

"The most important lesson is that the economic impact of immigration varies by time and place and can be beneficial or harmful" Borjas (1994)

Harris and Todaro (1970) are the founders of the analysis work on migration flows in a setting of underemployment and real wages. They expected that migrations probably have a negative influence on the general level of employment, since workers may be persuaded to migrate to certain regions because of the higher wages even if the unemployment rate in these regions is high. Meanwhile, Berry & Soligo (1969) found that the resident agent profits with an inundation of migrants, since his income constantly increases. When they studied the effects of immigration on the welfare of a representative agent of the destination country, they noticed that the international commerce increased, and immigration was a source of "exchange gains".

However, Borjas (1994) showed that the market function works in an ideal way: the production which is generated by immigrants will not be ingested by the earnings of the immigrants when a surplus of immigration appears. Withers and Pope (1985) studied the relationship between unemployment and immigration in Australia from 1948 to 1982, and they found that there is no evidence of the causality from immigration on unemployment. Marr and Siklos (1994) studied the relationship between immigration and the unemployment rate in Canada using quarterly data for the period 1962-1990, and they found that past unemployment did not cause immigration. However, recent immigration would cause unemployment.

Altonji, J. G., & Card, D. (1991) studied the effects of immigration on the labour market outcomes of less-skilled natives. They examined this relationship in the existence of immigrant communities across the states, and the distance from the Mexican borders as instruments for immigration flows before 1960. They found two significant results: the first is there is no evidence that immigrants crowded out employment, and the second is that immigration had a robust and positive correlation

with total factor productivity and a negative relationship with the high skill-bias of production technologies.

Friedberg, R. M., & Hunt, J. (1995) studied the impact of immigrants on host country wages, employment and growth. They found that there is no evidence of economically significant reductions in native employment. Also, Islam (2007) examined the relationship between unemployment and immigration in Canada in a period from 1961 to 2002. He found no evidence of the rise of aggregate unemployment due to immigration in the long term. He demonstrated that there is a positive relationship between the GDP per inhabitant, immigration and real wages. Gross (1999) studied the impact of the flow of immigrant workers in France from 1975 up to 1995, he found that immigration has a negative impact on the permanent unemployment rate in the long term, but immigrants increase unemployment in the short term.

Feridun (2005) studied the nature of the causal relationship between immigration, unemployment and economic development in Norway. He found that when the level of immigration rises, the GDP per capita also increases, and he observed that immigration has no impact on unemployment, and vice versa. Fromentin, V. (2013) analysed the interrelations between immigration, the labour market and economic growth and in particular between immigration and unemployment. Through an econometric analysis, he found that a statistical connection exists between immigration and unemployment, and revealed a negative relationship between the net inflow of immigrants and unemployment. Variations in immigration have a negative influence on the unemployment rate in the long term.

3. Research Framework

The influences of immigration on employment, wages and other economic aspects depend on the characteristics of immigrants and to what extent their skills complement those of existing workers (McGuinness & Hawkins, 2016).

The effect that immigration has on the host country's labour market is illustrated in the classical theories of labour economics. Although the possible adverse effects that immigration can have on the wage and employment levels of natives according to the classical theories, immigration may also have a role to play in raising skill levels and overall welfare of this host country (Borjas 2002). The amount of which is influencing by the rate of foreigners' participation on public services and public finances which depends mostly on their skills, age, and employment income (McGuinness & Hawkins, 2016).

3.1 Theoretical Framework

This section demonstrates the theoretical framework through which immigration may affect the labour market in the host countries; then, the next section presents the immigrants' history in Saudi Arabia through the last few decades.

The theory of international labour mobility suggests that workers will move from their home countries to foreign countries seeking higher wages (immigration). Aforementioned, in turn, will cause an increase in wages in the country of origin due to a smaller supply of workers, and a shrinkage in wages in the foreign countries due to increases in the supply of workers. This case, in particular, the case for low-skilled workers because there are more unskilled people migrating at any period, as a result of the scarcity of skilled labour (Alhamad, H. S. 2014).

The supply side and the demand side of the labour force will be reviewed in this part, in the cases where the native and the immigrants are either substitutes or complements. On the supply side, an increase in the labour supply through increased immigration in the labour market will lead to increased competition for jobs among immigrants; this will reduce the market wage for immigrants. Consequently, this competition for jobs in the local labour market between natives and immigrants will reduce the earnings of natives (Feridun, M. 2005).

In the case of complementary inputs, which is the paper’s leading case, immigration flows could lead to increased wages for native workers, if there are skill shortages in the host country and immigrants relieve these impasses. In this case, immigrants and native workers are employed in two distinct labour markets, and they are complementary inputs in production and the increased demand for labour leads to higher wages for native workers. When foreign-born and native-born workers are complements in production, an inflow of foreign worker will augment the productivity of native workers (Feridun, M. 2005).

The study of the demand side follows. Immigration has both demand and supply-side effects in the goods market. Immigrants demand goods and services, and then the expenditure generated by the inflow of immigration increases the demand curve for goods and services. This, in turn, causes an increase in the demand for labour (Borjas, G. 1999).

There are two perspectives needed to study the impact of immigration on a level of unemployment in the host country. The first perspective is that the employment of immigrants decreases the employment of domestic workers. Supporters argue that a given number of jobs exists in the economy and that if one of these positions is taken by im migrants, the number of jobs decreases. At the other extreme is the case where immigrants only accept work that resident workers are unwilling to perform and thus receive no jobs from native workers (McConnell et al. 2003).

3.2 The History of Immigrants in Saudi Arabia

For the last thirty years, expatriates and emigrants have come to outnumber nationals in various of the GCC countries' populations. During the 1970s and 1980s, large-scale migration of "guest" workers began as a reaction to the dramatical increase in the price of oil, and the following plans of the GCC countries for rapid development (Shah, N. M. 2008).

Saudi Arabia was one of the most undeveloped and poorest countries in the world when oil was found in the late 1930s (El Ghonemy, 1998). After that, Saudi Arabia needed foreign expertises and labour, to exploit its vast oil reserves. As a consequence, there was a growth in the numbers of foreign technical, professional and administrative personnel, mainly from other Middle Eastern countries. Moreover, a much more considerable increase in the figures of foreign workers came with the oil-price boom following the 1973 oil crisis (Gibney, M. J., & Hansen, R., 2005).

Despite the passage of 40 years from the beginning of the first oil boom in Saudi Arabia, the Saudi economy still depends almost entirely on the foreign labour force. In 1974, the number of the foreign labour forces was about 700 thousand that equals 12.5% of the Saudi population (which did not exceed 7 million during that time). After ten years, the number of people in the foreign labour force reached 2 million, or 23% of the Saudi population. In 1994, the number kept increasing rapidly despite the economic regression. It reached 5 million or around 28% percent. Nowadays, the foreign population is more than 10 million. That means that the number of the foreign population has doubled more than 1100% between 1997 and 2016. On the other hand, the Saudi population has not increased more than 223% during the same period.

4. Data & Methodology

The study uses macroeconomic data that contains annual observations in the period between 1990 and 2010. Unemployment data and GDP per capita are obtained from the World Bank's World Development Indicators Database, while Immigration data is brought from The Gulf Labour Markets and Migration programme database[‡]. Unemployment denoted by UNEP, is measured by the size of foreign or foreign-born residents as a percentage of total population. GDP per capita, indicated by GDP, is calculated as gross domestic product divided by mid-year population. Unemployment, denoted by UNEM, refers to the percentage of the total labour force that is without work but available for and seeking employment.

4.1 Descriptive Statistics

Figure 1 illustrates the GDP per capita for Saudi Arabia from 1990 to 2010. GDP per capita has risen from approximately 24,000 in 1990 to just over 40,000 in 2010—which reflects the impact of increasing oil prices and exports. The Saudi economy was relatively stable between 1993 and 2003;

[‡] GLMM programme is an international independent, non-partisan, non-profit joint programme of a major Gulf think tank. Website http://gulfmigration.eu

this indicates oil price stability in the same period. Figure 2 shows the Immigrant Percentage in Saudi Arabia. It increased from less than 25% at the beginning of the series in 1990 to over 30% by the end of the period in 2010. The immigrant ratios were stable in Saudi Arabia between 1993 and 2003 during the same period of the stable in oil price.

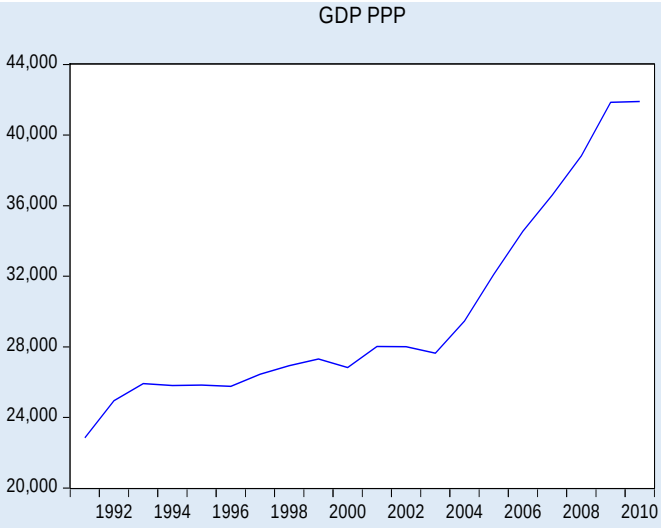

Figure 1 GDP per capita for Saudi Arabia from 1990 to 2010

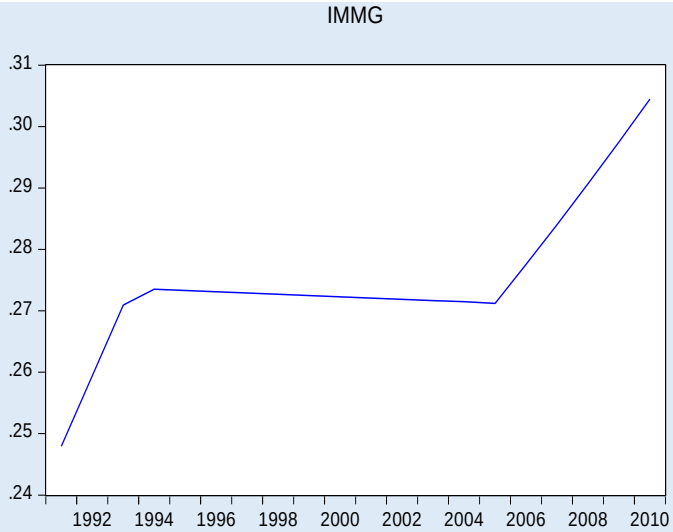

Figure 2 Immigrant percentage in Saudi Arabia from 1990 to 2010

Source 1: Immigration Data from The Gulf Labour Markets and Migration programme database.
Source 2: GDP per capita Data from World Bank Development Indicators Database.

Figure 3 shows the unemployment rates in Saudi Arabia; it is fluctuating between 6.5% and 4.5% over the series in the period between 1990 and 2010. The unemployment rates did not reflect the increase of the Saudi economy, nor the growth of the immigration ratio over this period.

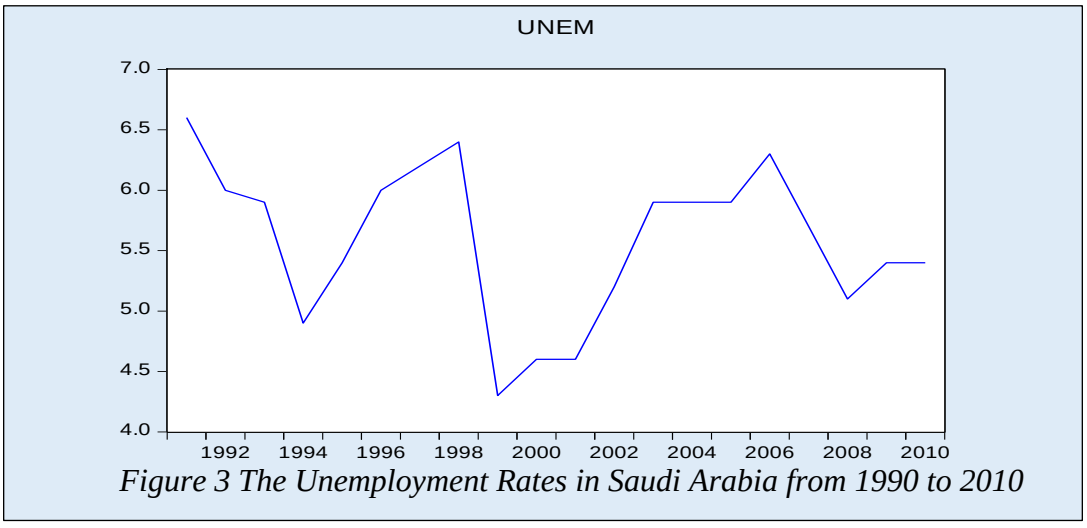

Figure 3 The Unemployment Rates in Saudi Arabia from 1990 to 2010

Source: Unemployment Data from World Bank Development Indicators Database.

Table 1 presents the descriptive statistics of the data used before logarithmic transformations. The measures of skewness, kurtosis, mean, dispersion of the measures about the mean, and the probabilities of the Jarque-Berra test statistic (these indicate that we are faced with a normal distribution of the data sets). For the series, the skewness coefficient is relatively close to zero, which indicates that the series is close to a normal distribution. The kurtosis coefficient is relatively close to five for all series, which reinforces the argument that we are close to normal distribution. For the (GDP_PPP), (IMMG) and (UNEM) series, the probability associated with Jarque-Bera is higher than 5%, which indicates that the process follows a normal distribution.

Table 1: Descriptive Statistics

	IMMG	UNEM	GDP_PPP
Mean	0.275054	5.585	29877.56
Median	0.272583	5.8	27475.53
Maximum	0.304477	6.6	41897.89
Minimum	0.247952	4.3	22843.1
Std. Dev.	0.012116	0.644225	5747.936
Skewness	0.523203	-0.422119	1.056618
Kurtosis	4.293014	2.224485	2.785428
Jarque-Bera	2.305707	1.095135	3.759839
Probability	0.315734	0.578355	0.152602
Sum	5.501077	111.7	597551.1
Sum Sq. Dev.	0.002789	7.8855	628000000
Observations	20	20	20

4.2 Correlation Matrix

Table 2 presents the simple correlations estimated for the levels of the series (GDP per capita, immigration rate, and unemployment), and no evidence of correlation was found. However, a correlation between GDP per capita and immigration rate naturally appeared over 80%, which reflects the impact of oil exports effects in both variables.

Table2: Correlation Matrix

	GDP PPP	IMMG	UNEM
GDP PPP	1	0.89	0.11
IMMG		1	0.28
UNEM			1

4.3 Stationary Test in Levels and First Differencing (ADF Unit Root Test)

The test for a unit root proceeds on the coefficient. If the coefficient is significantly varied from zero, the hypothesis that y contains a unit root is rejected. Rejection of the null hypothesis implies stationarity. If the estimated ADF statistic is higher than McKinnon's critical value, then the null

hypothesis is not rejected, and it is assumed that the considered variable is non-stationary (Feridun, M. 2005).

It is necessary to analyse whether the endogenous variables are stationary since their degree of integration determines the estimation procedure (Fromentin V., 2013). The importance of the Unit Root Test is to meet the conditions to perform Granger-causality tests and analyse the stationarity of the time series and establish the order of the integration present. We use the Augmented Dickey-Fuller unit root test to examine the stationarity of the data series. It includes running a regression of the first difference of the series against the series lagged once, a constant, and a time trend. The Dickey-Fuller unit root tests enable us to not only determine the stationary or non-stationary character of a time series with the determination of a pattern (unit root test) but also determine the correct way to make the series stationary (Dickey & Fuller, 1979, 1981). This procedure is applied once again after having transformed the series under consideration in first differencing. If the non-stationarity null hypothesis is rejected, and it is possible to conclude that the series is integrated of order I (Fromentin V., 2013).

Table 3: Augmented Dickey-Fuller Unit Root Test Results

	Test with an intercept		Test with an intercept and trend		Test with no intercept and trend	
	Levels	1st differences	Levels	1st differences	Levels	1st differences
GDP	0.851062	-2.835737	-0.5598	-3.44352	3.937254	-2.398521*
IMMG	0.557203	-2.416394	-1.62323	-2.512081	-0.83107	-2.352618*
UNEM	-2.87063	-4.430006*	-2.73238	-4.300798	-0.53356	-4.557284*
CV 1%	-3.83151	-3.857386	-4.5326	-4.571559	-2.69236	-2.699769
CV 5%	-3.02997	-3.040391	-3.67362	-3.690814	-1.96017	-1.961409

*****McKinnon Critical Value
The lag length was determined using Schwartz Information Criteria (SIC).

By using Immigration, Unemployment, and GDP data, we ran the ADF unit root test on the levels. The results verify the acceptance of the null hypothesis in all of the three tests. The first test we start with a constant and trend, then with a constant and the final test is neither a constant nor a trend. Then, the process is non-stationary for the three series. Moreover, the series has a unit root, so the next step is to use the correct (Difference Stationarity) process, so the proper method of stationarity is that of first differences.

After the first differencing, the null hypothesis of non-stationarity for the three series was accepted under conditions of the constant and trend test. Then, unemployment was found significant with an intercept test, but we rejected the null hypothesis of non-stationarity at the 5% level, since the three series are needed to integrate to order I. So, all the time series are considered order I, in the test with no intercept or trend in the 5% level. Since the series are integrated of the same order, they present a risk of cointegration. The presence of a unit root for these series justifies resorting to the cointegration test (Feridun, M. 2005).

5. The Long-Run Relationship (Cointegration Test)

The purpose of the cointegration test is to determine the dynamics of market adjustment in the long term, by estimating the relationship between immigration and the macroeconomic variables (unemployment, and GDP per capita PPP). By using cointegration analysis, it helps us identify long-run economic relationships between two or several variables, and avoid the risk of spurious regression. If the cointegration relationship is defined, the model should include residuals from the vectors (lagged one period) in the dynamic Vector Error Correcting Mechanism (VECM) method. Sequentially, the Johansen cointegration test is used to identify the cointegrating relationship among the variables.

The Johansen cointegration test provides the numbers of cointegration relationships to be determined using two tests based on the eigenvalues of a matrix (Johansen, S. 1988). The procedure is divided into two stages: the calculation of two residuals, and then the computation of the matrix enabling the calculation of the eigenvalues. These tests function by the exclusion of alternative hypotheses and are conducted sequentially. The null hypothesis of the maximum eigenvalue statistic coincides with that of the trace statistic, but its alternative hypothesis assumes that there are r +1 cointegration relationships between the series. The objective is to improve the power of the test by limiting the alternative to a cointegration rank which is just one more than under the null hypothesis (Fromentin, 2013).

Table 4: Johansen Cointegration Rank Test (Trace)

Null Hypothesis	Eigenvalue	Trace Statistics	5% Critical Value	Prob.**
None	0.390296	15.20028	24.27596	0.4398
At most 1	0.289560	6.294196	12.32090	0.4011
At most 2	0.007776	0.140516	4.129906	0.7570

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 5: Johansen Cointegration Rank Test (Maximum Eigenvalue)

Null Hypothesis	Eigenvalue	Max-Eigen Statistics	5% Critical Value	Prob.**
None	0.390296	8.906081	17.79730	0.6049
At most 1	0.289560	6.153680	11.22480	0.3325
At most 2	0.007776	0.140516	4.129906	0.7570

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 4 and Table 5 are the Johansen Cointegration Rank Tests based on two tests the eigenvalues of the matrix and the Trace Statistics. The tables indicate that we can reject the null hypothesis at the 5% level. In other words, the tests determine that there is no cointegration between the variables at this level, which supports our long-run relationship assumption between immigration and the macroeconomic variables (unemployment, GDP per capita PPP).

6. Causality Results

The Granger-Causality Test is used to find the causality relationship between the variables. Immigration is said to "Granger-cause" GDP per Capita if and only if GDP per Capita is better predicted by using the past values of Immigration than by not doing so with the recent values of GDP per Capita. The first case is unidirectional causality exists if one of the variables cause the other but not the vice versa. Another case is if the two variables do not have any impact on each other then this case is statistically independent. Finally, the feedback result appears when the two variables cause each other. Granger's definition of causality is framed in terms of predictability (Granger 1969).

Table 6: Granger Causality Test Results

	F-Statistics			
Null Hypothesis:	Lag 1	Lag 2	Lag 3	Lag 4
Immigration does not Granger Cause GDP per Capita	14.3881***	2.91068*	2.91068	2.36858
GDP per Capita does not Granger Cause Immigration	26.1710***	11.7829***	11.7829***	13.3169***
Unemployment does not Granger Cause Immigration	2.51847	0.39399	0.39399	0.39399
Immigration does not Granger Cause Unemployment	0.15014	0.16746	0.16746	0.16746

** Reject the null hypothesis at the 10% level.*
*** Reject the null hypothesis at the 5% level.*
**** Reject the null hypothesis at the 1% level.*

The classical approach to transact with integrated variables is to distinguish them to make them stationary. (Hassapis et al. 1999) Prove that in the lack of cointegration the direction of causality can be decided upon via standard F–tests in the first-differenced VAR. According to the maximum eigenvalue and trace tests, since we do not reject the null hypothesis of no cointegration at the 5% level, the method can be used.

Table 5 illustrates the results of the Granger-Causality test. These results represent the regressions (null hypotheses) between the three variables in this analysis which are Immigration, GDP per Capita, and Unemployment. The null hypothesis that immigration does not Granger cause GDP per capita is rejected for the 1-year lag, at the 1% level, and also in the year two lag at the 10% level. Which means that Immigration flows are important for GDP per Capita for all Native or foreigners in the short term while this relationship disappeared in followed lags. However, the null hypothesis

that GDP per Capita does not Granger-Cause immigration is rejected at the same 1% level in the four-year lags, which mean that there is a feedback relationship between the two variables within 1-year lag and 2-year lag. Therefore, this is evidence of reverse causality, the obvious influence of GDP raising on immigration absolute number is obvious due to the increasing demand of foreigners' labour market and the total growth of the economic activities.

Furthermore, the null hypotheses that immigration does not Granger-cause unemployment are not rejected in any lag at any level. That means the causality relationship between the two variables does not exist. Moreover, the impact of immigration on the unemployment among the native Saudi nationals is very weak which applicable with the theoretical framework. Moreover, results show no evidence of reverse causation either. As well, the null hypotheses of the causality between unemployment and immigration are rejected. In short, we find that the GDP per Capita has an impact on immigration and vice versa, but we did not find a robust impact of immigration on unemployment and vice versa in Saudi Arabia in the period between 1990 and 2010.

7. Conclusion

Saudi Arabia was one of the most undeveloped and poorest countries in the world when oil was found in the late 1930s. After that, Saudi Arabia needed foreign expertises and labour, to exploit its vast oil reserves. Unemployment among migrants is very small proportion, but it is a fact. While most unemployment appears among natives. The question here is, does the immigration raise the unemployment rates in natives' labour market?

The objective of this paper is to measure the interrelationships between immigration, economic output and unemployment based on Johansen cointegration tests and a vector error correction model test (VECM) in Saudi Arabia in the period between 1990 and 2010. The investigation in the research is to assess the impact immigration has on economic development and unemployment in Saudi Arabia by explaining the shape of the causal relationship between immigration and economic performance on a macroeconomic scale.

The results of the unit root test show that all the series are non-stationary in levels but imply that the series is stationary in the order I (first differences). With an analysis of the interrelationships between immigration, economic output (GDP per Capita) and unemployment through an econometric analysis based on Johansen cointegration tests and a vector error correction model test for the long-run relationship reveal that there is no cointegration among the datasets.

The Granger-Causality test shows that when the level of immigration increases, GDP per capita also increases. It has also been found that immigration has no impact on unemployment, and vice versa. While the main effect immigration has on the level of economic development and the GDP per capita.

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