The Dynamic Effect of Globalization on Unemployment Rate in Iran: A Co-integration Analysis

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Received: July 27, 2011 Accepted: August 29, 2011 Published: January 1, 2012
doi:10.5539/ibr.v5n1p120 URL: http://dx.doi.org/10.5539/ibr.v5n1p120

Abstract

In this research, the dynamic effect of globalization on unemployment rate in Iran is investigated during the period 1971 to 2006 using Johansen-Juselius co-integration test. Thus, the trade intensity index (ratio of total exports and imports to GDP) as a measure of globalization have used. Also in this model, gross domestic product, the consumer price index as well as other variables affecting the unemployment rate have considered. Findings show that the globalization has a significant and negative effect on unemployment rate. The value of error correction coefficient is equal to -0.46 implying that around 95% of the unemployment rate adjustment occurs after two years.

Keywords: Globalization, Unemployment Rate, Openness, Co-integration, Error Correction Mechanism

1. Introduction

Globalization is a process of socio-economic integration across the globe and is one of the most hotly-debated topics in international economics. It is a progression by which events, decisions and activities in one part of the world have significant consequences on other parts of the globe. Globalization is a total mindset in which the entire world becomes a single market so that the corporate strategy is based on the dynamics of global business environment. (Pradhan, 2010)

Globalization has both benefits and costs and thus has supporters and opponents. Mandle (2003) has discussed at length the benefits and costs of globalization. He attacks the anti-globalization movement and refutes the false notions associated with major criticism of globalization. His major premise is that globalization is concerned with economic growth necessary to take care of poverty and therefore, globalization is promoted because development and integration of the global markets have a substantial impact on poverty reduction.

It is essential to look at globalization trends in Iran for the period ranging from 1971 to 2006.

Insert Figure 1 Here

The paper is organized in V Sections. Section II summarizes some recent literature on the subject. Section III explains data and mathematical model employed to capture the influence of globalization on unemployment rate. Section IV incorporates the empirical results. Section V concludes the study and discusses some implications for the current debate about the impacts of globalization on unemployment rate in general.

2. Literature Review

Aremo, et al. (2010) addressed the impact of globalization on labour force utilization in Nigeria. They showed that globalization practice could generate negative impact on employment in both short- and long run periods suggesting that if globalization continues as being practiced, globalization could further worsen the extant decrepit state of unemployment in Nigeria other things being equal.

Maurizio (2009) analyzes the Argentine experience of the interactions of macroeconomic regime, labour performance, income distribution and poverty during the Convertibility Plan and the new macroeconomic regime that followed the collapse of the currency board regime. The macroeconomic framework is found to have a bearing on the social situation. Further, the negative effects of the macroeconomic configuration on the labour market and income distribution persist even after the country has resumed a growth path. The complete recovery of the standard of living conditions thus requires additional public policy efforts targeted at the more vulnerable groups, even under macroeconomic regimes more favourable to employment generation.

Dutt, et al. (2009) present a model of trade and search-induced unemployment, where trade results from Heckscher–Ohlin (H-O) and/or Ricardian comparative advantage. Using cross-country data on trade policy, unemployment, and various controls, and controlling for endogeneity and measurement-error problems, they find fairly strong and robust evidence for the Ricardian prediction that unemployment and trade openness are negatively related. This effect dominates the positive H-O effect of trade openness on unemployment for capital-abundant countries, which turns negative for labour-abundant countries. Using panel data, they find an unemployment-increasing short-run impact of trade liberalization, followed by an unemployment-reducing effect leading to the new steady state.

Daniels, et al. (2006) develop a model of an open economy containing both sectors in which wages are market-determined and sectors with wage-setting arrangements. A portion of the latter group of sectors coordinate their wages, taking into account that their collective actions influence the equilibrium inflation outcome in an environment in which the central bank engages in discretionary monetary policymaking. Key predictions forthcoming from this model are (1) increased centralization of wage setting initially causes inflation to increase at low degrees of wage centralization but then, as wage centralization increases, results in an inflation drop-off; (2) a greater degree of centralized wage setting reduces the inflation-restraining effect of greater central bank independence; and (3) increased openness is more likely to reduce inflation in nations with less centralized wage bargaining. Analysis of data for seventeen nations for the period 1970–1999 provides generally robust empirical support for all three of these predictions.

Lee and Vivarelli (2006) use an ex-post measurable definition of globalization, namely increasing trade openness and FDI. A general result is that the optimistic Heckscher- Ohlin/Stolper-Samuelson predictions do not apply, that is neither employment creation nor the decrease in within-country inequality are automatically assured by increasing trade and FDI. They also show that: 1) the employment effect can be very diverse in different areas of the world, giving raise to concentration and marginalization phenomena; 2) increasing trade and FDI do not emerge as the main culprits of increasing within-country income inequality in DCs, although some evidence emerges that import of capital goods may imply an increase in inequality via skill-biased technological change; 3)increasing trade seems to foster economic growth and absolute poverty alleviation, although some important counter-examples emerge.

Jenkins (2006) considers the impact of foreign direct investment on employment in Viet Nam, a country that received considerable inflows of foreign capital in the 1990s as part of its increased integration with the global economy. he shows despite the significant share of foreign firms in industrial output and exports, the direct employment generated has been very limited because of the high labour productivity and low ratio of value added to output of much of this investment. He also shows that the indirect employment effects have been minimal and possibly even negative because of the limited linkages which foreign investors create and the possibility of "crowding out" of domestic investment.

The findings of Tule (2004), Ozughalu and Ajayi (2004) emphasized that the negative effects of globalization could generate a rising inequity and inequality in the distribution of the dividends of globalization.

Ghose (2000 and 2003) analyses the relationship between trade liberalization and manufacturing employment. He highlights that - although increasing trade and FDI have been relevant only in a small bunch of newly industrialized countries - for those countries the growth of trade in manufactured products has implied a large positive effect on manufacturing employment.

3. Data and Methodology

The annually data covering the period 1971-2006 comes from the Central Bank of the Islamic Republic of Iran. The variables used are as follows:

UNEMP=Unemployment rate

OPEN=Trade intensity index

CPI=Consumer price index

GDP=Gross domestic product

DUM80=Dummy for years of war (1980-1987)

Gonzales (1994) argued that the Johansen and Juselius (1990) procedure has superior properties than the Engle-Granger two-step procedure. The maximum likelihood methodology suggested by JJ is based on the following VAR model:

$$X_t = \mu + \Pi_1 X_{t-1} + \Pi_2 X_{t-2} + ... + \Pi_p X_{t-p} + \varepsilon_t \quad (1)$$

Where X is a (n x 1) vector of variables, μ is a (n x 1) vector of constant terms, Π_1, Π_2, …, Π_p are (n x n) coefficient matrices and ε is a (n x 1) vector of error terms with zero mean and constant variables. The reparameterization of (2) can be written as:

$$\Delta X_t = \mu + \sum_{i=1}^{p-1} \Gamma_i X_{t-i} + \Gamma X_{t-p} + e_t \quad (2)$$

Where Γ_I = - I + Π_1 + … + Π_i (i= 1, 2, …, p-1), and Γ = - I + Π_1 + … + Π_p. The rank of the matrix Γ, the matrix determining the long-run relationships between variables, is equal to the number of independent co-integrating vectors denoted by r. If r = 0, then the elements of X are nonstationary, and (2) is a usual VAR in first differences.

Instead, if the rank (Γ) is n and r=n, then the elements of X are stationary. ΓX_{t-p} is error-correction factor, if r = 1. For other cases, 1 < r < n, there are multiple co-integrating vectors. The number of distinct co-integrating vectors can be obtained by checking the significance of characteristic roots of Γ.

JJ suggests two test statistics to determine the number of co-integrating vectors. The first statistic, likelihood ratio or trace statistic, is for testing the hypothesis that the co-integrating rank is at most r against a general alternative. The second test, max statistic, is employed for testing the alternative hypothesis r + 1 and given by $\lambda_{\max}$ (r, r+1) = - T ln(1- λ_{i+1}). It should be clear that if characteristic roots are close to zero, both λ_{trace} and $\lambda_{\max}$ statistics will be small.

4. Empirical Analysis

Nelson and Plosser(1982) affirm, we first need to check for the stationarity of the series. Several unit root tests exist to check for stationarity of the series. In order to proceed for the co-integration analysis, one must establish that the variables possess the same order of integration. A variable is called integrated order of d, I(d), if it has to be differenced d times to become stationary (Kennedy, 1996). We apply the Augmented Dickey-Fuller (1981) test to examine the stationarity characteristics of the series.

Insert Table 1 Here

Results clearly indicate that the variables are not stationary at level but the first differences of the logarithmic transformations of the series are stationary. Therefore, it can be safely said that series are integrated of order one I (1).

The next step to carry on the co-integration testing procedure is to determine the optimal lag-length and to specifying the model. To proceed with this, the Akaike Information Criterion (AIC) was calculated for lags ranging from one to four for all possible co-integration vectors form models with either restricted intercepts and no trends or unrestricted intercepts and restricted trends. The maximum absolute value of the criterion suggests a specification of model without intercept or linear trend, one lag and one co-integration vector.

Insert Table 2 Here

In Table 2. results of trace, λ_{trace}, and maximal eigenvalue, $\lambda_{\max}$, test statistics are presented. The results indicate that there is exactly one co-integrating vector in the model. This means that a single vector uniquely defines the co-integration space (Harris and Sollis, 2005).

Insert Table 3 Here

Normalized co-integrating coefficients with standard errors are presented in Table 3.

Based on the estimated coefficients reported in Table 3, the long-run equilibrium unemployment rate is given by the following equation:

$$LUNEMP = -0.40LOPEN + 0.45LCPI - 1.83LGDP + 0.38DUM80 \quad (3)$$

Since all the variables are measured in logarithms, the regression coefficients can be directly interpreted as elasticities. The results reveal that both trade intensity index and gross domestic product have significant negative impacts on unemployment rate. The long-run elasticity from the coefficients OPEN and GDP suggests that a 1 per cent increase of the OPEN and GDP yield 0.40 per cent and 1.83 per cent decrease in UNEMP respectively. The long-run elasticity from the coefficient CPI suggests that a 1 per cent increase of the CPI yield 0.45 per cent increase in UNEMP.

Insert Table 4 Here

The vector error correction model (VECM) estimation result is given in Table 4. As expected, the error correction variable ECM (-1) has been found negative and also statistically significant. The Coefficient of the ECM term suggests that adjustment process is quite fast and 46% of the previous year's disequilibrium in unemployment rate from its equilibrium path will be corrected in the current year.

5. Impulse Response Function (IRF) and Variance Decompositions (VDC)

To evaluate the dynamic interactions among the variables and the relative importance of various shocks, the study uses impulse response function and variance decompositions as additional checks of the above findings.

Insert Figure 2 Here

Since shocks to a particular variable can generate variations both in itself and in other variables, we employ the orthogonalized methodology of Sims (1980) to determine impulse responses. In this approach it is possible to trace out the time path of the various shocks on the variables.

It is showed in Figure 2 that the response of LUNEMP to a one standard deviation (S.D.) shock in LCPI is stronger at the beginning. The response to LCPI's standard deviation innovation becomes stronger and stronger to maximum at the fifth period and changes to a steady value. LUNEMP responses negatively to a positive shock in LOPEN and LGDP and this response lasts for a few periods of time and it becomes weak gradually to a steady value.

The results of VDC are reported in Table 5.

Insert Table 5 Here

The results show that the GDP is responsible for explaining 40% of the variation of unemployment rate in first period. This percentage reaches 70% after nine time periods. It seems that the GDP has a greater impact, compared to other variables, on the unemployment rate. These results support the results of the co-integrating equation above. Results obtained from the variance decomposition procedure are given in Figure 3.

Insert Figure 3 Here

6. Conclusions

In this paper, we examine the dynamic effect of globalization on unemployment rate in Iran using annual time-series data for the 1971-2006. The paper utilizes Johansen-Juselius Co-integration Methodology and Vector Error Correction Modeling to analyze this relationship for Iran.

The results of trace, λ_{trace}, and maximal eigenvalue, $\lambda_{\max}$, test statistics indicate that there is exactly one co-integrating vector in the model. This means that a single vector uniquely defines the co-integration space. Based on the results of short-run and long-run, the trade intensity index and the gross domestic product are negatively related with unemployment rate, while the Consumer price index is positively related with unemployment rate. The error correction variable ECM (-1) has been found negative and statistically significant. The Coefficient of the ECM term suggests that adjustment process is quite fast and 46% of the previous year's disequilibrium in unemployment rate from its equilibrium path will be corrected in the current year. The results of the variance decomposition show that the GDP is responsible for explaining 40% of the variation of unemployment rate in first period. This percentage reaches 70% after nine time periods. It seems that the GDP has a greater impact, compared to other variables, on the unemployment rate.

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Table 1. Unit Root Analysis

		intercept but not a trend	intercept and a linear trend	
Variable	ADF-Level	ADF-Ist Diff	ADF-Level	ADF-Ist Diff
LUNEMP	-1.8772	-8.1327	-1.7644	-9.5176
LOPEN	-2.7689	-4.5988	-2.2236	-4.7649
LCPI	-0.62802	-3.2359	-1.9772	-3.7861
LGDP	-0.10067	-3.8110	-1.9112	-6.4874
5% Critic Value	-2.9591	-2.9627	-3.5615	-3.5671

Table 2. Johansen Co-integration Test Statistics

λ_{trace} Test Null Hypothesis	Alternative Hypothesis	λ_{trace} Statistics	95 per cent C.V
r = 0	r >= 1	37.5663	33.6400
r <= 1	r >= 2	24.7005	27.4200
λ_{max} Test Null Hypothesis	Alternative Hypothesis	λ_{max} Statistics	95 per cent C.V
r = 0	r = 1	73.3304	70.4900
r <= 1	r = 2	40.7641	48.8800

Note: denotes the number of Co-integrating vectors and the 95 per cent confidential level of the trace and maximum eigenvalue statistics. * denotes significance at 1 per cent significant level.

Table 3. Normalized Co-integrating Coefficients: 1 Co-integrating Equation

LUNEMP	LOPEN	LCPI	LGDP	DUM80
1.0000	0.39691	-0.44707	1.8283	-0.37993
	(0.16552)	(0.14625)	(0.53231)	(0.12936)

Table 4. Error correction model results

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	11.0036	3.8326	2.8710[0.007]
Ecm1(-1)	-0.45971	0.16026	-2.8685[0.007]
	D.W	2.03	
	Serial Correlation	0.012384[0.911]	
	Functional Form	0.079575[0.778]	
	Normality	3.9850[0.136]	
	Heteroscedasticity	0.10293[0.748]	

Table 5. Variance Decomposition of unemployment rate

period	LUNEMP	LOPEN	LCPI	LGDP
0	1.0000	0.0192	0.0162	0.3987
1	0.9013	0.0239	0.0245	0.5374
2	08069	0.0260	0.0468	0.6064
3	0.7407	0.0269	0.0652	0.6429
4	0.6957	0.0275	0.0784	0.6645
5	0.6644	0.0278	0.0878	0.6785
6	0.6418	0.0282	0.0946	0.6882
7	0.6249	0.0283	0.0998	0.6954
8	0.6119	0.0284	0.1038	0.7010
9	0.6015	0.0285	0.1069	0.7053
10	0.5932	0.0286	0.1095	0.7088

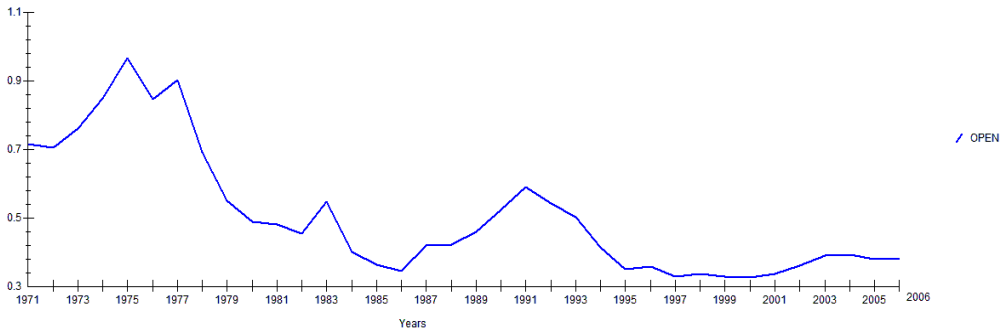

Figure 1. Globalization Trends in Iran

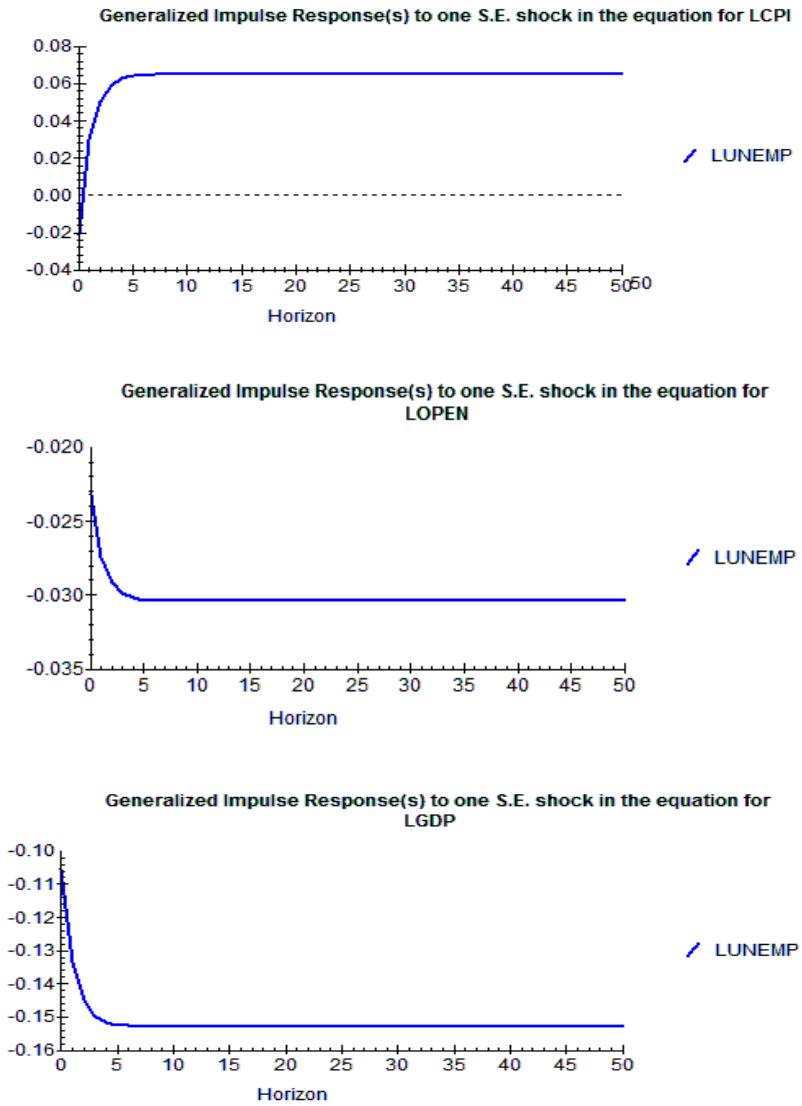

Figure 2. Impulse responses to innovations

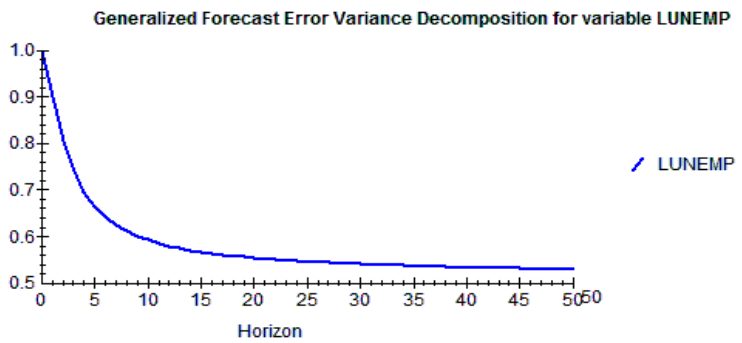

Figure 3.Variance Decompositions