TRADE BALANCE AND UNEMPLOYMENT IN JORDAN

Mohammad Alawin

The University of Jordan, Jordan

Abstract

This paper presents theoretical and empirical evidence on the nature of the relationship between trade balance and unemployment rate in Jordan for the period 2000:Q1-2012:Q2. The major finding of this paper indicates an absence of a long-term relationship between the variables of interest. However, the results show that deficit in trade balance causes unemployment, and unemployment causes a deficit in trade balance in the short-run. This indicates that, in the short-run, trade liberalization is able to increase aggregate productivity in some sectors and able to increase efficiency of economic performance in terms of employment opportunities in Jordan.

Keywords: Trade balance, Unemployment, Economic Growth, Cointegration, Jordan.

Introduction

Jordan is a developing country with highly educated human resources, which witnessed in the 1970s relatively high economic growth rates. Nonetheless, it faced a declining economic performance in the 1980s. In the early 1990s Jordan adopted structural adjustment programs to redirect policies and stabilize both the economic and financial sectors. However, the reform programs were not enough to achieve reasonable growth rates. The tension began to emerge in the Jordanian economy; a trade balance deficit side by side with low volume of exports all reflected in undesirable rates for some economic indicators; most notably the issue of unemployment.

The trade balance is a major tool to analyze sources of economic performance in many both developed and developing countries. This is also the case of the Jordanian economy in which trade balance is considered a major economic indicator. In the 1990s to 2000s, Jordan has recorded unstable trade balance, and this happened because of the global economic crises such as the financial crisis in 1997. Consequently, the chronic deficits in the

balance of trade for Jordan reached 822 million JD in 1990 and 5105 million JD in 2008. Then, it continued rising up to 7340 JD in 2011.

Globally, the expansion in trade deficit due to economic crises continued to grow. This has generated a large volume of both theoretical and empirical literature. However, most of these studies paid more attention towards the developed countries (Moore and Ranjan, 2005; Porto, 2008; Felbermayr*et al*., 2011; and Nanthakumar*et al*., 2011).

This paper will contribute to the literature by providing new evidence on the nature of the relationship between trade balance and unemployment in Jordan, using different econometric techniques. In contrast to the previous individual-country level research, this paper is one of the rare studies, according to the researcher's best knowledge, that addresses the relation between the trade balance and unemployment dynamics. The rest of the paper is organized as follows: section 2 covers the literature review of the study, section 3 deals with data and methodology, section 4 presents the results, and, finally, section 5 reflects the concluding remarks.

Literature Review

The role of trade liberalization in macroeconomic dynamics, specifically after 1970s, has generated a large volume of empirical studies with mixed findings, using cross sectional, time series and panel data. While most of the global studies focused on trade liberalization, trade openness and the effects of globalization on labor market stability, we find out that the local studies dealt only with the problem of unemployment. For example, Melitz (2003) assumed homogeneous workers and full employment. They predicted that workers win from trade liberalization. Meanwhile, Shapiro and Stiglitz (1984) linked product market mixing to labor market churning. Simulations show that, for reasonable parameter values, as many as one-fourth of existing ‘good jobs’ may be destroyed in liberalization.

Papageorgiou*et al*.(1990) examined the benefits of trade liberalization on unemployment in 19 countries. The finding indicated that trade liberalization did not raise unemployment in the manufacturing sectors of the economy.

Dollar and Collier (2001) recognized a significant transitional correlation between trade liberalization, skill premium and wage inequality. Moore and Ranjan (2005), using a cross sectional data, concluded that the effect of trade on overall unemployment scenario is ambiguous. Dutt*et al*. (2009) investigated the effect of trade on unemployment. It used cross country data over the period 1990-2000, this study found out strong evidence for the Ricardian prediction that unemployment and trade openness is negatively related.

Bjornstad and Skjerpen (2006) investigated the relationship between trade and inequality in wages and unemployment in Norway. It used a large macro econometric model with heterogeneous labor. This study maintained that the pressure on import prices has increased skill mismatch and somewhat surprisingly decreased wage differentials.

Besides, Porto (2008) examined the links between trade liberalization and unemployment in Argentina. The findings showed that an increase in agro-manufactured export product leading both lower unemployment rate and increase labor market participation rate. In addition, wages increase owing to the increase in export prices.

Hasan*et al*. (2011) investigated the relationship between trade liberalization and unemployment in India. The results showed that no evidence of any unemployment increases the effects of trade reforms. The analysis revealed that urban unemployment declined with liberalization in states with flexible labor markets and larger employment shares in net exporter industries.

Felbermayr*et al*., (2011) observed the relation between trade and unemployment for the 20 rich OECD countries. This study used panel data and pure cross-sectional data. The main finding established empirical regularity, where trade openness does not increase structural unemployment in the long run. The benchmark specification suggested that a 10% point increase in total trade openness reduced aggregate unemployment by about three quarters of one percentage point.

Arouri (2007)observed the problem of unemployment in Jordan and discussed whether foreign direct investment flow helps solve the problem of unemployment in Jordan. The empirical results indicated no existence of contributing foreign direct investment flows to the reduction of unemployment in Jordan, due in part to being capital-intensive investments and relying on foreign labor significantly.

Finally, Awad (2011) studied unemployment issue in Jordan over the period 1977-2010. This study included that to return unemployment rates in Jordan to the normal level (4%), this requires a real economic growth rate of 25%. The empirical results provided support for a strong positive relation between inflation and unemployment.

Most of the previous studies focused on the trade openness which is measured using the empirical formation of imports plus exports relative to nominal GDP. Although the trade openness measure reflects the actual exposure of the economy, it does not indicate the real effect on trade stability of a nation. Therefore, we employ the volume of trade balance to ensure the effects of trade stability which can be measured collectively.

This study will focus on testing and interpreting trade balance deficit and the phenomenon of unemployment in Jordan, using a standard model based on macroeconomic theories. Specifically, the Okun's law linking the rate of real economic growth and unemployment rate, and the main prediction for this law is that increasing growth rates in real production will reduce the unemployment rate by the factor of sensitivity which is equal to half. In this area, Phillips curve theory linking unemployment and inflation rates include an opposite relationship between the two variables in the short term. Therefore, the significance of revealing the nature of this relationship has important implications regarding to options and the effectiveness of macroeconomic policies adopted in Jordan.

This paper will be able to contribute significantly to the literature by providing new evidence on the Granger causality relationship between trade balance and unemployment. The paper uses causality test proposed by Granger (1969) to test the direction between the two variables. The focus of this study is to investigate both the long-run and the short-run relationship between trade balance and unemployment in Jordan over the period from 2000:Q1 to 2012:Q2.

Moreover, the unit root test (the Augmented Dickey Fuller -ADF) statistics is used to examine the stationarity of the data. The Johansen's cointegration method (1988) is utilized to examine the long-run relationship between trade balance and unemployment.

Data and methodology

The data used are quarterly-time series covering the period 2000Q1 – 2012Q2. The data were mainly sourced from both the Central Bank of Jordan (CBJ) and the Department of Statistics (DOS).The econometric techniques employed are the unit root test, cointegration, and the vector error correction model (VECM). Based on the theoretical arguments presented in the literature, the theoretical relationship between trade balance and unemployment can be specified as follows:

$$UE_t = f(TB_t) \qquad (1)$$

Where, '*UE*' is the logarithmic value of unemployed labor in Jordan, and '*TB*' refers to the logarithmic value of trade balance for Jordan. Data for variables of interest were converted into natural logarithms. So, they can be interpreted in growth terms after taking the first difference.

This paper will use causality test proposed by Granger (1969). The causality test is considered an important statistical test, determining the direction of the relationship between

economic variables and allowing verifying the direction of the relationship between the variables of time-series models (Gujarati, 2003).

We begin our estimation, performing the unit root analysis by using Augmented Dickey Fuller (ADF) test. This is important to avoid the spurious regression and random walk problems. The unit root test will be conducted for each variable to ensure that they are stationary. According to Ghosh and Rao (1994), the ADF test is conducted by estimating the following regression equation:

$$\Delta y_t = \alpha + Bt + \delta y_{t-1} + \sum_{i=1}^{m} \gamma_i \Delta y_{t-i} + \varepsilon_t \qquad (2)$$

Where, 'Δy_{t-1}'is equal to (y_{t-1}- y_{t-2}), and 'm' is the maximum lag length of the dependent variable to ensure that 'ε' is the stationary random error.

The null hypothesis of a unit root is rejected if the t-statistic associated with the estimated coefficients exceeds the critical values of the test. The ADF specification accounts for possible autocorrelation in the error process 'ε' through the lagged dependent variable on the right hand side. The practical rule for establishing the value of m (i.e. the number of lags) is that it should be relatively small in order to save degrees of freedom, but sufficient to remove the serial correlation in the residuals. The weakness in this test is that the power of the test may be adversely affected by miss-specifying the lag length (Ghosh and Rao, 1994).

The next step is to judge whether the variables share a common stochastic trend. Cointegration can be regarded as the empirical counterpart of the theoretical notion of a long-run relationship among the variables. Differently, a cointegration of two or more variables suggests that there is a long run or equilibrium relationship between the variables. Cointegration technique provides means of identifying and hence avoiding spurious regressions generated by non-stationary series. When variables are cointegrated, the OLS estimates from the cointegrating regression will be super-consistent (Ghosh and Rao, 1994).

Accordingly, it is possible to determine the long-run relationship between the two variables. The Johansen cointegration test will be employed. The Johansen procedure not only determines the number of cointegrating vectors but also provides estimates of the vectors. For the purpose of testing the number of cointegrating vectors, Johansen (1988) proposed using two likelihood ratio test, namely; the trace test and the maximum eigenvalues tests. The trace statistic for the null hypothesis of 'r'; the cointegrating relations is computed as follows:

$$Trace = -T \sum_{t=r+1}^{P} \ln(1 - \hat{\lambda}_t)$$

Where $\hat{\lambda}_{r+1},...,\hat{\lambda}_p$ are the $p - r$ smallest estimated eigenvalues.

The likelihood ratio test for the null hypothesis of r cointegrating vectors against the alternative of r+1 cointegrating vectors (the maximum eigenvalue statistic) is computed as:

$$\lambda_{\max} = -T\ln(1-\hat{\lambda}_{r+1})$$

In addition, in order to perform the causality test, the causal relations can be expressed through the following two equations:

$$UE_t = \alpha_0 + \sum_{i=1}^{a}\alpha_1 UE_{t-i} + \sum_{i=1}^{b}\alpha_2 TB_t + \gamma Z_{yt-1} + \varepsilon_t$$

$$TB_t = \beta_0 + \sum_{i=1}^{m}\beta_1 TB_{t-i} + \sum_{i=1}^{n}\alpha_2 UE_t + \gamma Z_{Xt-1} + \varepsilon_t$$

Where 'Z_{yt-1}' and 'Z_{xt-1}' represent the error terms, lagged by one period for the real trade balance and unemployment equations, respectively. The coefficient 'γ' measures the long run equilibrium relationship, while 'α' and 'β' measure the short-run causal relation.

Results

This study examines the degree of integration of the variables and uses ADF test for the statement whether variables are stationary or not. This test is performed at the level, the first difference and the second difference with intercept together with a constant and trend. Results of ADF test are presented in Table (1), which indicates the fact that all variables appear to be integrated of an order of zero, i.e. I (0). Accordingly, the results of unit root tests indicate that the variables are not able to reject the null hypothesis at their levels. After applying the first difference, only 'UE' was able to reject the null hypothesis.

Table 1: Augmented Dickey Fuller test (variables logarithm)

Variables	ADF Results at Level	Optimal Lag
Trade Balance	-0.4567	0
Unemployment	-2.319	1
Variables	ADF Results at First Difference	Optimal Lag
Trade Balance	-7.385***	0
Unemployment	-6.903***	2

- (*), (**), (***) indicate rejection of null hypotheses in a level of 10%, 5% and 1%, respectively.
- The ADF test is based on including a constant in the regression equation.
- Optimal lag length calculated based on Schwarz Information Criterion test.

The next procedure is to test for cointegration. The Johansen's procedure was used to detect the number of cointegrating vectors. Schwarz Information Criterion is used to determine the lag length periods (lagged one period), and then testing autocorrelation lengths for a specific lag. For choosing the acceptable test of cointegration, among three models

which are explained in Table (2), the table shows that model 1 is the preferred model. Thus, the result of that model shows that there is cointegration between the variables.

Table 2: Cointegration Rank and Model Selection: Trace Statistics

	Model1	Model2	Model3
	(Without Constant "Without trend") in Correction Error {CE}and without Constant or trend in VAR	Constant in CE &VAR and without trend in CE and VAR	Constant in CE &VAR and a liner trend in VAR
R	*VAR Lag Order Selection Criteria: SIC (Lag 2)*		
0	18.78(20.26)*	18.63(15.49)	33.00(25.87)
1	2.82(9.16)	2.75(3.84)	12.86(12.51)

Note: Figures in parentheses represent the critical value at the level of significance of 5%.

Table (3) indicates that the statistical trace and maximal eigenvalue tests confirm these results. In this respect, Engle and Granger (1987) have shown that if variables are cointegrated, a vector error correction model (VECM) exists. VECM combines both the short run and the long run properties and avoids the spurious regression problem.

Table 3: The Trace and Eigenvalues Tests

Null Hypotheses	The Optimal Lag	Statistical Value	
		Trace Test	Eigenvalues Test
	2		
$r = 0$		18.782	15.955*
$r \leq 1$		2.827	2.827

(*) indicate the moral degree of 1%.

Table (4) specifies the results of the causality test and the degree of significance for the error term of the dependent variable. It shows that the error term of the growth of trade balance-*as a dependent variable*–is insignificant set the 10% level; therefore the growth of unemployment does not cause the trade balance deficit over the long term. Also, it shows that the error term of unemployment growth-*as a dependent variable*- is insignificant at 10%, therefore the trade balance deficit does not cause long-term unemployment.

Table 4: Results of Granger Causality in multivariate

Dependent Variable	Trade Balance Growth Lagged	Unemployment Growth Lagged	ECT
Trade Balance Growth	-	11.425***	-0.068
Unemployment Growth	9.763***	-	0.264

(*), (**), (***) indicate the moral degree of 1% and 5% and 10% respectively.
Note: Numbers are the calculated value for statisticalχ^2.

Given the parameter lagged of the growth of variables, it is potential to figure out the short-term relationship; the coefficient lagged growth of the trade balance deficit held

statistically significant at the 1% level of significance in the growth of unemployment equation. The coefficient for growth rate of unemployment in the growth equation for trade balance deficit was statistically significant at the 1% level of significance. Indeed, this means that unemployment is important in influencing the growth of the trade balance deficit in the short term. Also, trade balance deficit is of importance to influence the growth of unemployment in the short term.

Conclusion

This paper investigated the relationship between trade balance and unemployment in Jordan for the period 2000:Q1-2012:Q2. The results indicated the absence of a long-term relationship between the two variables. Despite that result, the study investigated evidence of a causal relationship between short-term unemployment and the volume of trade balance. This causal relationship of increasing trade balance deficit is able to increase unemployment in Jordan. Thence, the trade balance deficit has a negative impact on the Jordanian economy causing unemployment in Jordan to rise.

References:

Arouri, Fathi (2007). "Unemployment in Jordan." *Analytic and Synthetic Notes*, European University Institute, No. 03.

Awad, Taleb (2011). "The Problem of Unemployment." *Economic Observatory*, University of Jordan.

Bjornstad, R. and Skjerpen, T. (2006). Trade and Inequality in Wages and Unemployment. *Econometric Modeling*, 23(1), 20-44.

Central Bank of Jordan, *Monthly Statistical Reports*, various issues.

Dollar, D. and Collier, P. (2001). Globalization, Growth and Poverty: Building and Inclusive World. *Oxford University Press*, New York.

Dutt, P.; Mitra, D.; and Ranjan, P. (2009). International Trade and Unemployment: Theory and cross-national Evidence. *Journal of International Economics*, 78(1), 32-44.

Engle, Robert and Granger, C. (1987). Cointegration and Error Correction: Representation, Estimation and Testing. *Econometrica*, 55(2), 251-276.

Felbermayr, Gabriel; Prat, Julien; and Schmerer, Hans-Jörg. (2011). Trade and Unemployment: What Do the Data Say? *European Economic Review*, 55 (6), 741-758.

Ghosh, M. and Rao, J. (1994). Small Area Estimation: An Appraisal. *Statist Science*, 9(1), 55-76.

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37(3), 424-438.

Gujarati, D. (2003), "Basic Econometrics", *McGraw Hell*, 4th ed., New York.

Hasan, R.; Mitra, D.; Ranjan, R; and Ahsan, R. (2011). Trade Liberalization and Unemployment: Theory and Evidence from India. *Journal of Development Economics*, 97(2), 269-280.

Johansen, S. (1988). Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control*, 12(2), 231–254.

Melitz, Marc. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. *Econometrica*, 71(6), 1695-1725.

Ministry of Labor, *Annual Reports*, Amman, Jordan.

Moore, M. and Ranjan, P. (2005). Globalizations vs. Skilled-biased Technological Change: Implications for Unemployment and Wage Inequality. *Economic Journal*, 115(503), 391-422.

Nanthakumar, Loganathan; Sukemi, Muhammad; and Kogid, Mori. (2011). Dynamic Causal Relationship between Trade Balance and Unemployment Scenario in Malaysia: Granger non-Causality Analysis. *Economics and Finance Review*. 1:13-20.

Papageorgiou, D.; Choksi, A.; and Michaely, M. (1990). Liberalizing Foreign Trade in Developing Countries: The Lesson of Experience. *World Bank*, Washington.

Porto, G. G. (2008). Agro-manufactured export prices, wages and unemployment. *American Journal of Agriculture Economics*, 90(3), 748-764.

Shapiro, Carl and Stiglitz, Joseph. (1984). Equilibrium Unemployment as a Worker Discipline Device. *The American Economic Review*, 74(3), 433-444.