Economic Growth and Unemployment in Arab Countries: Is Okun's Law Valid?

Imad A. Moosa

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Abstract

Two models are used to measure the responsiveness of unemployment to output, as represented by Okun's law, in four Arab countries: Algeria, Egypt, Morocco and Tunisia. In no case does Okun's coefficient turn out to be statistically significant, which means that output growth does not translate into employment gains. Some reasons are suggested for this finding, which implies that boosting growth is not a sufficient condition for reducing unemployment in Arab countries.

النمو الاقتصادي والبطالة في الدول العربية : مدى ملاءمة قانون اوكن

عماد موسى

ملخص

إن تقدير معامل أوكن الذي يقيس استجابة البطالة لنمو الناتج، له أهمية في صياغة السياسات لأنه يدلل على تكلفة البطالة في الاقتصاد. وقد تحدد هدف هذه الورقة في تقدير هذا المعامل لأربع دول عربية توفرت لها معلومات هي: الجزائر ومصر والمغرب وتونس. تخلص الورقة إلى عدم ملاحظة أن عدم إنطباق قانون أوكن في الدول تحت الدراسة يخالف النتائج التطبيقية التي تدعم وجود هذا القانون في الدول المتقدمة. وهناك ثلاثة أسباب يمكن ن تفسر هذه النتيجة أن البطالة في الدول العربية لا تتغير حسب الدورة الاقتصادية، وأن أسواق العمل في هذه الدول ليست مرنة؛ وأن هياكل هذه الاقتصادات ليست متنوعة بما فيه الكفاية.

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Introduction

Okun’s law is a representation of the connection between output and unemployment, hence relating the level of activity in the goods market to the level of activity in the labour market over the business cycle. It has been found to hold as a strong empirical regularity by several economists. Okun’s law has attracted the attention of economists, not only because it is a robust empirical regularity but also because of its importance as a macroeconomic building block. When it is combined with the Phillips curve, it produces the aggregate supply curve. Moreover, it has implications for macroeconomic policy, particularly in determining the optimal or desirable growth rate, and as a prescription for reducing unemployment. Estimating Okun’s coefficient, which is a measure of the responsiveness of unemployment to output growth, is important because it indicates the cost of unemployment in terms of output. Okun’s law is often used as a benchmark for measuring the cost of unemployment.(1)

The objective of this paper is to estimate Okun’s coefficient, and explore the validity of Okun’s law, for four Arab countries: Algeria, Egypt, Morocco and Tunisia. There is nothing special about these countries, but the choice was dictated by the availability of data, which is lacking, inadequate or faulty for other MENA countries. This exercise is undertaken because very few attempts of this kind, if any, have been made. The motivation for doing this work is straightforward. If Okun’s law is valid for these countries, this will provide an idea about the kind of unemployment prevailing in these countries (cyclical or otherwise). This would then imply whether or not unemployment can be reduced by boosting growth. Two models are used for measuring Okun’s coefficient: the gap model and a modified version of the growth rates model.

Unemployment and Growth in Arab Countries

Unemployment has been recognised as a major problem in Arab countries, particularly non-oil producing ones. Unemployment rates in the Middle East and North Africa (MENA) region, which encompasses the Arab world, are among the highest in the world. The literature on unemployment in the MENA region reflects mixed views about the proposition that growth has failed to deliver jobs, which is another way of saying that Okun's coefficient is low or insignificant. Thus, it may seem strange that not many attempts have been made to estimate Okun's coefficient for Arab countries.

Motivated by the proposition that "providing good employment opportunities is perhaps the greatest challenge facing the MENA region", Keller and Nabil (2002) present some crude estimates of the responsiveness of employment to GDP growth (the closest thing to Okun's coefficient). They report what they call the "elasticities of employment with respect to GDP growth" for eight MENA countries, including the four Arab countries examined in this paper. This elasticity is calculated by dividing the average employment growth rate by the average GDP growth rate over a period of many years extending into the late 1990s. On average for the eight countries, the elasticity turns out to be 1.1 but the strange result is that it is three times the average for Algeria, which in turn is 6 times the elasticity for Egypt and more than three times that of Kuwait (another oil-producing country). This is a rather strange result that does not seem to be consistent with the fact that the unemployment rate in Algeria was 29.9% in 2000 compared with 19.8% in 1990, whereas Egypt witnessed a fall of unemployment from 8.6% in 1990 to 7.9% in 2000. Furthermore, it is not easy to explain why the elasticities in two oil-producing countries (Algeria and Kuwait) differ significantly.

Keller and Nabil (2002) suggest that economic growth in the MENA region has been insufficient compared to the region's labour force and that high growth does not guarantee good labour market outcomes. They also suggest that unemployment will persist with high economic growth if it is capital-intensive (rather than employment- intensive) and point out that employment has strongly expanded despite low levels of growth. This, they argue, is a reflection of the nature of the process of employment creation in the region where public sector employment has been used as a refuge for large portions of the labour force.

Keller and Nabil (op.cit.) reach the conclusion that improving the region's labour market outcomes can be achieved by improving the growth prospects and increasing the employment intensity of growth. What is rather strange is the argument that the so-called employment elasticities are "healthy by international standards" and that they are "unlikely to be improved". This argument means that Okun's coefficient in MENA countries is comparable to what is found in developed countries, which is counter-intuitive and a proposition that is not supported by the results presented in this paper. Differences between the structures of developed economies and those of MENA, as well as differences in the rigidity of labour markets, must translate into differences in Okun's coefficients, i.e., they should be higher in developed economies.

Gardner (2003) addresses the issue of whether or not current GDP growth in MENA countries generates adequate employment or that higher GDP growth is required (and if so, by how much), stating at the outset that "the bleak job picture is one of the region's most urgent and destabilising problems". He touches upon two points that are relevant to the discussion presented in this paper: (a) the public sector remains an important sourcec of employment and job creation; and (b) labour market rigidities in some countries are likely to impose serious efficiency costs and could undermine the economy's ability to grow in response to structural changes.

Contrary to the arguments put forward by Keller and Nabil (op.cit.), the analysis of the World Bank (2007a) seems to suggest that Okun's coefficient is low in Arab countries. According to this analysis, the MENA region experienced an average growth rate of 5.2% during the period 2000-2006, yet MENA countries continue to struggle with high unemployment rates.

In its World Development Report, the World Bank (2007b) suggests that MENA countries have increased schooling among both young people and women, arguing that if the gap between young people's education, energy and hopes and the limited number of opportunities that actually exist for them becomes wider, these young people are likely to become increasingly frustrated. The World Bank identifies some challenges and priorities that include obtaining the right skills for jobs in the private sector, improving access to information, improving the quality of primary education, and increasing the incentive for firms to provide training for employees. In the World Bank report, high unemployment is viewed as a reflection of lower-than-average growth rates (among developing countries) and schooling systems that do not impart market-relevant skills and learning.

Another view put forward by the World Bank is that labour markets in MENA countries protect the rights of incumbents, making it hard for new entrants to find jobs. These points pertain to the problems of structural and frictional unemployment – factors that will be used later to explain the low responsiveness of unemployment to growth in Arab couriers.

The Empirical Evidence on Okun's Law

Several economists have followed Okun (1962) by testing the relation between unemployment and output to obtain estimates for Okun's coefficient. The list includes, inter alia, Smith (1975), Gordon (1984), Knoester (1986), Kaufman (1988), Prachowny (1993), Weber (1995), Moosa (1997a, 1999), Attfield and Silverstone (1998), Lee (2000), Harris and Silverstone (2001), Sogner and Stiassny (2002), and Silvapulle et al (2004). These studies generally provide support for the empirical validity of Okun's law but the estimates of Okun's coefficient vary substantially across countries and over time. Moreover, there seems to be some strong evidence for a structural break in the relation, a finding that has been attributed by Lee (2000) to: (a) structural changes caused by rising female labour force participation; (b) productivity and wage slowdown; and (c) corporate restructuring.

The empirical estimates of Okun's coefficient are also sensitive to model specification, which may take the form of static versus dynamic models (for example, Weber 1995). Another form of variation in model specification is the use of the first-difference model as opposed to the gap model. In the first difference model, the output and unemployment variables are expressed in first differences (growth rates), but in the gap model, they are measured in terms of the cyclical components or deviations from long-term trends (for example, Lee, 2000). If the gap model is selected, another problem arises pertaining to the choice of the decomposition (or detrending) method, which produces different estimates of the trends and cycles. The choice in this case is among, inter alia, linear trend, HP filter, Beveridge-Nelson decomposition and the unobserved components model.

More recently, economists have started to pay attention to the possibility of asymmetry in the output-unemployment relation as represented by Okun's law. Here, the meaning of asymmetry is that the response of unemployment to output growth is different when the economy is expanding from that when the economy is contracting. This is different from the conventional specification, which encompasses symmetry in the sense that expansions and contractions in output have the same absolute effect on unemployment.

Using alternative estimation methods, Brunner (1997) finds similar asymmetric features in U.S. output data. Likewise, Rothman (1991) provides some evidence indicating that unemployment responds asymmetrically to positive and negative growth shocks. More recently, Silvapulle et al (2004) suggest that there are good reasons to believe, and ample empirical evidence to support, the proposition that the output-unemployment relation as represented by Okun's law is asymmetric. They define Okun's coefficient based on a dynamic model that allows for asymmetry in the relation between cyclical output and unemployment. Using data from the United States for the post-war period, their results show that: (a) the short-run effects of positive cyclical output on cyclical unemployment are quantitatively different from those of negative ones; and (b) the data are consistent with the proposition that cyclical unemployment is more sensitive to negative than to positive cyclical output. The findings are rationalised by outlining several theoretical explanations of asymmetry.

Methodology

Two models are used to calculate Okun's coefficient in this paper: (a) the gap model; and (b) the growth rates model. The gap model is based on static and dynamic regressions of cyclical unemployment on cyclical output, where the cyclical components of output and unemployment are calculated by applying the Hodrick-Prescott (1997) filter (HP filter) to the observed time series, which are decomposed into trends and cycles.(2) Formally, the HP filter is used to estimate the trend path $\{Z^*_t, t = 1,2,...,n\}$ of a time series $\{Z_t, t = 1,2,...,n\}$, subject to the constraint that the sum of the squared second differences of the time series is not too large. The trend is calculated from the observed time series by solving the optimisation problem:

$$\min_{Z_1^*, Z_2^*, \cdots Z_n^*} \left\{ \sum_{t=1}^{n} (Z_t - Z_t^*)^2 + \lambda \sum_{t=2}^{n-1} (\Delta Z_{t+1}^*)^2 \right\} \quad (1)$$

where the smoothing parameter, λ, is normally determined by the frequency of the observations. Once the cyclical components have been extracted, Okun's coefficient can be calculated from the static regression:

$$U_t^c = \alpha + \gamma Y_t^c + \varepsilon_t \tag{2}$$

where U^c and Y^c are, respectively, the cyclical components of unemployment and output, whereas γ is Okun's coefficient. Equation 2 implies that the relation is contemporaneous, which may not be plausible theoretically. It may also be inadequate empirically owing to the omission of short-run dynamics. Following Hendry et al (1984), the dynamic ARDL model used here is:

$$U_t^c = \alpha + \sum_{i=1}^{m} \beta_i U_{t-i}^c + \sum_{i=0}^{n} \gamma_i Y_{t-i}^c + \upsilon_t \tag{3}$$

where the contemporaneous (impact or short-run) effect of output on unemployment is measured by the coefficient γ_0 while the long-run effect is measured by calculating a function of the coefficients, φ, which is given by:

$$\varphi = \frac{\sum_{i=0}^{n} \gamma_i}{1 - \sum_{i=1}^{m} \beta_i} \tag{4}$$

The question that arises here is whether Okun's coefficient is γ_0 or φ. The tendency is to define Okun's coefficient as measuring the long-run effect, as the relation between unemployment and output is not necessarily contemporaneous. Both of these parameters will be reported.

The second model is a structural time series version of the growth rates model, which may be written as:

$$u_t = \mu_t + \phi_t + \delta_t \Delta y_t + \varepsilon_t \tag{5}$$

where u_t is the observed logarithmic value of unemployment, μ_t is the trend component, ϕ_t is the cyclical component, ε_t is the irregular component, and Δy_t is the growth rate of output such that $y = \log_e(Y)$. The trend and cycle are assumed to be uncorrelated while ε_t is assumed to be white noise. The basic idea behind Equation 5 is that unemployment may be explained in terms of its components and the growth rate of output.(3) In this model, Okun's coefficient, δ_t, has a time subscript because the model is estimated in a time-varying parametric (TVP) framework to capture any variation in the coefficient.

The trend component, which represents the long-term movement of a series, is represented by:

$$\mu_t = \mu_{t-1} + \beta_{t-1} + \eta_t \tag{6}$$

$$\beta_t = \beta_{t-1} + \zeta_t \tag{7}$$

where $\eta_t \sim NID(0,\sigma^2_\eta)$, and $\zeta_t \sim NID(0,\sigma^2_\zeta)$.$\mu_t$ is a random walk with a drift factor, β_t, which follows a first order autoregressive process as represented by Equation 7. This process collapses to a simple random walk with drift if $\sigma^2_\zeta = 0$, and to a deterministic linear trend if $\sigma^2_\eta = 0$ as well. If, on the other hand, $\sigma^2_\eta = 0$ while $\sigma^2_\zeta \neq 0$, the process will have a trend which changes relatively smoothly.

The cyclical component, which is assumed to be a stationary linear process, may be represented by:

$$\phi_t = a\cos\theta t + b\sin\theta t \tag{8}$$

where t is time and the amplitude of the cycle is given by $(a^2+b^2)^{1/2}$. In order to make the cycle stochastic, the parameters a and b are allowed to evolve over time, while preserving continuity is achieved by writing down a recursion for constructing ϕ before introducing the stochastic components. By introducing disturbances and a damping factor, the following is obtained:

$$\phi_t = \rho(\phi_{t-1}\cos\theta + \phi^*_{t-1}\sin\theta) + \omega_t \tag{9}$$

$$\phi^*_t = \rho(-\phi_{t-1}\sin\theta + \phi^*_{t-1}\cos\theta) + \omega^*_t \tag{10}$$

where ϕ^*_t appears by construction such that ω_t and ω^*_t are uncorrelated white noise disturbances with variances σ^2_ω and $\sigma^2_{\omega^*}$ respectively. The parameters $0 \le \theta \le \pi$ and $0 \le \rho \le 1$ are the frequency of the cycle and the damping factor on the amplitude respectively. In order to make numerical optimisation easier, the constraint $\sigma^2_\omega = \sigma^2_{\omega^*}$ is imposed.(4)

Data

The raw data sample, which was obtained from the International Financial Statistics CD ROM produced by the International Monetary Fund, consists of annual observations covering the period 1990-2005 on unemployment and output (GDP) in the four countries. The problem with the data sample is that there is only a small number of observations, which makes it rather difficult to estimate the dynamic version of the model. For this reason, and due to the unavailability of quarterly data, the author had to resort to interpolation to derive quarterly data from the available annual data. In what follows, a description of the interpolation method is presented.(5)

The interpolation method used here may be found in the writings of economists working on continuous-time dynamic models (for example, Wymer, 1979). This method has been applied (without rationalisation) by Goldstein and Khan (1976) who used it to derive quarterly series on real and nominal income from the corresponding annual series. It is typically applied to flow variables, but since absolute changes in stock variables are themselves flow variables, the method may be applied to the first difference of a stock variable. Given a base period observation on the level of the stock variable, the first differences may be subsequently converted into level observations.

Consider a flow variable, Z_t, which has a time path represented by the function $Z_t = f(t)$. An observation on the variable at the end of year 1 does not indicate that the annual value of the variable is realised at the end of the year, but rather that it accumulates over the period 0-1. Hence, the annual observation can be conceived to be the area under the curve in the interval 0-1, which means that it can be expressed mathematically as:

$$Z_1 = \int_0^1 f(t)dt \quad (11)$$

Interpolation in this case amounts to partitioning the area under the curve to obtain quarterly observations. Thus, the first quarter observation of year 1 is the area under the curve in the interval 0-0.25. This is given by:

$$Z_1^1 = \int_0^{0.25} f(t)dt \quad (12)$$

and so on. Assume now that the time path of Z_t can be approximated by a quadratic function of the form:

$$f(t) = at^2 + bt + c \quad (13)$$

where a,b and c are parameters to be estimated. It follows that:

$$Z_t = \int_{t-1}^{t} (at^2 + bt + c)dt \quad (14)$$

By evaluating the definite integral (14) for t=1,2,3, the system of simultaneous equations follows:

$$Z = XA \quad (15)$$

or:

$$\begin{bmatrix} Z_1 \\ Z_2 \\ Z_3 \end{bmatrix} = \begin{bmatrix} \alpha_1 & \beta_1 & \gamma_1 \\ \alpha_2 & \beta_2 & \gamma_2 \\ \alpha_3 & \beta_3 & \gamma_3 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \end{bmatrix} \quad (16)$$

By solving Equation 16, the values of a,b and c are obtained as:

$$\begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 1/2 & -1 & 1/2 \\ -2 & 3 & -1 \\ 11/6 & -7/6 & 1/3 \end{bmatrix} \begin{bmatrix} Z_1 \\ Z_2 \\ Z_3 \end{bmatrix} \quad (17)$$

Having obtained the values of a,b and c, the interpolated quarterly observations are calculated from the definite integral:

$$Z_t^i = \int_{t_1}^{t_2} (at^2 + bt + c)dt \tag{18}$$

where Z^i_t is the observation for quarter i (=1,2,3,4) of year t (=1,2,3), t_1 = t - 1 + 0.25(i-1), and t_2 = t - 1 + 0.75 + 0.25(i-1). Since output is a flow variable whereas unemployment is a stock variable, the procedure is applied to the level of output, Y_t, and the first difference of unemployment, ΔU_t, to derive the quarterly data.

Empirical Results

The HP filter is applied to the interpolated quarterly data to extract the cyclical components of output and unemployment, which are basically deviations from the fitted trends. Since unemployment is measured in percentage terms whereas output is measured in absolute monetary terms, the cyclical component of unemployment is taken to be the absolute difference between the actual series and the fitted trend. In the case of output, however, the cyclical component is measured as the percentage deviation from the fitted trend.

Table 1 reports the estimates of the static regression Equation 2, including the coefficients and their t statistics (in parentheses). The coefficient of determination is reported as a measure of the goodness of fit, and three diagnostic test statistics are reported for serial correlation and heteroscedasticity. The results show that none of the estimated Okun's coefficients is statistically significant. In any case, the results are not reliable because the estimated models exhibit significant serial correlation as indicated by the DW and SC statistics, resulting from the lack of dynamics in the equation (hence, dynamic misspecification). At one time, the next step would have been to correct for serial correlation, but Mizon (1995) has warned against this (mal) practice. This is because serial correlation implies model misspecification (most likely missing variables), in which case the solution should be model re-specification.

Table 1. OLS Estimates of Equation 2

	Algeria	Egypt	Morocco	Tunisia
α	-0.011	-0.001	-0.00009	0.001
	(-0.09)	(-0.002)	(-0.59)	(0.002)
γ	0.024	-0.079	0.102	-0.056
	(1.28)	(-2.26)	(1.16)	(-1.50)
R^2	0.03	0.08	0.02	0.04
DW	0.32	0.23	0.27	0.22
SC	42.46	51.21	53.62	51.96
HS	21.24	2.15	2.32	0.02

N.B.
t statistics are enclosed in parentheses.
SC is a test statistic for serial correlation distributed as $\chi^2(4)$ (Godfrey, 1978a, 1978b).
HS is the Koenker (1981) test for heteroscedasticity, distributed as $\chi^2(1)$.

Given the results of estimating Equation 2, the results of estimating Equation 3, are reported in Table 2. The model is estimated by specifying a maximum lag of four, then picking the best model out of all possible combinations on the basis of the Schwarz Bayesian criterion (SBC). It turns out that the preferred model is the one in which m=2 and n=1, or an ARDL(2,1). The results show that the introduction of dynamics leads to a significant improvement in the goodness of fit and diagnostics. The dynamic model passes the tests for serial correlation and heteroscedasticity, in which case the results should be reliable. But again, they show that Okun’s coefficient is not significant in any case. There is also some dynamics in cyclical unemployment as there is significant dependence at lags 1 and 2 quarters. This means that cyclical unemployment is independent of cyclical output, implying that cyclical unemployment is either self-propelled or that it is caused by variables other than cyclical output. The focus of interest here is the finding that unemployment is not responsive to changes in output.

Table 2. OLS Estimates of the ARDL Model (Equation 3)

	Algeria	Egypt	Morocco	Tunisia
α	-0.011	-0.001	-0.00009	-0.012
	(-0.09)	(-0.002)	(-0.59)	(-0.43)
β_1	1.089	1.294	1.401	1.274
	(8.65)	(10.84)	(13.19)	(10.68)
β_2	-0.322	-0.407	-0.610	-0.463
	(-2.62)	(-3.39)	(-5.71)	(-4.01)
γ_0	0.018	0.005	0.015	-0.024
	(1.35)	(0.30)	(0.39)	(-1.21)
φ	-0.045	-0.007	-0.015	0.032
	(-0.98)	(-0.31)	(-0.38)	(1.07)
R^2	0.77	0.86	0.85	0.83
DW	2.09	1.99	2.18	2.14
SC	3.56	5.27	4.08	3.42
HS	1.24	0.25	1.08	3.51

N.B.
t statistics are enclosed in parentheses.
SC is a test statistic for serial correlation distributed as $\chi^2(4)$ (Godfrey, 1978a, 1978b).
HS is the Koenker (1981) test for heteroscedasticity, distributed as $\chi^2(1)$.

Table 3 reports the results of estimating Equation 5 in a TVP framework. This is done by writing the model in state-space form, then estimating it by maximum likelihood using the Kalman filter to update the estimates of the state vector as more and more data points are used. What is presented in Table 3, therefore, is the estimated final state vector. Also presented are the coefficient of determination and the diagnostics for serial correlation and heteroscedasticity.(6) The estimated coefficients and components include the trend and three cycles at three different frequencies, as well as γ_t, the time-varying Okun's coefficient that turns out to be insignificant.

The significance of the trends and some of the cycles indicate that output growth does not affect unemployment on either a secular or cyclical basis. The significance of the components may be taken to imply that other missing variables affect unemployment. It may be noted that it is not the concern here what these variables may be. Rather, the focus of interest is finding whether or not unemployment is responsive to output growth. Obviously however, it does not imply the failure of Okun's law in the four countries.

Table 3. Maximum Likelihood Estimates of the Growth Rates Model (Equation 5)

	Algeria	Egypt	Morocco	Tunisia
μ_t	2.846	2.245	4.120	2.717
	(53.82)	(495.50)	(1.13)	(587.11)
ϕ_{1t}	-0.035	0.030	-0.029	0.019
	(-1.43)	(3.74)	(-1.13)	(1.61)
ϕ^*_{1t}	-0.128	-0.001	-0.007	-0.0009
	(-6.21)	(-0.75)	(-0.22)	(-0.05)
ϕ_{2t}	-0.066	0.044	-0.061	-0.015
	(-4.08)	(3.85)	(-3.15)	(-1.86)
ϕ^*_{2t}	-0.560	0.016	0.164	-0.034
	(-7.89)	(0.74)	(8.44)	(-4.18)
ϕ_{3t}	-0.017	0.082	-1.611	-0.067
	(-0.52)	(12.37)	(-0.44)	(-9.34)
ϕ^*_{3t}	0.022	-0.127	-10.70	0.042
	(0.68)	(-18.40)	(-4.79)	(6.34)
δ_t	-0.049	-0.024	0.16666	-0.062
	(-0.49)	(-0.28)	(1.13)	(-0.60)
R^2	0.98	0.97	0.99	0.95
DW	1.99	1.81	1.77	1.87
SC	0.78	3.25	3.52	2.93
HS	2.35	0.21	0.32	0.10

N.B.
t statistics are enclosed in parentheses.
SC is the Ljung-Box (1978) test statistic for serial correlation, distributed as $\chi^2(2)$.
HS is an F test statistic for heteroscedasticity, distributed as F(20, 20).

Conclusion

Irrespective of the model used to estimate Okun's coefficient, the results presented in this study suggest that unemployment and output are unrelated in the four countries examined. This is in contrast with the results found for more advanced economies, in which case, there must be a reason why there is a difference. Obviously, the structures of the economies examined in this study differ from those of the U.S., Japan and Europe where Okun's law seems to work rather well as an empirical regularity.

Based primarily on the previous discussion of unemployment and growth in Arab countries, three reasons may be suggested for the finding that Okun's law is not valid for the four countries examined in this study:

• The first reason is that unemployment in these countries is not cyclical, but rather structural and/or frictional. Structural unemployment results from changes in the economy that are not matched by changes in education and training. This means that people are unemployed not because the economy is in a recession but because they do not have the skills to do the available jobs. Frictional unemployment, on the other hand, results from failure to match job vacancies with the available job seekers. People may have the skills to do certain jobs but they are unaware of the availability of vacant positions that match their skills. Output growth cannot reduce these kinds of unemployment.

• The second explanation is rigidity of the labour markets in these countries, particularly because the labour market is dominated by the government as the prime source of demand for labour. This is the same reason why unemployment is more responsive to changes in output in the U.S. and Canada than in Europe and Japan. The flexibility of the labour market (for example, the ease by which employers can hire and fire workers and the absence of labour laws such as minimum wage legislation) is conducive to a higher Okun's coefficient. It is plausible to suggest that the dominant role played by the government in the labour markets of the countries under study leads to labour market rigidity and so does the tendency to protect the positions of the incumbents.

• The third explanation is the structures of these economies, which is dominated by the government and perhaps one sector (for example, the oil sector in Algeria). If the dominant sector is not labour-intensive, then growth in this sector (which propels overall economic growth) will not reduce unemployment. This would be true for oil-producing countries in general. Okun's coefficient tends to be higher in developed than in developing economies because the former are more diversified than the latter.

But no matter what the reason is for the insignificance of Okun's coefficient, it may be suggested that the lack of growth does not explain the unemployment problem in the four countries examined in this paper. There is no reason to believe that this finding is not valid for other Arab countries. The suggested reasons for the failure of Okun's law in Arab countries may provide areas of concern that have to be addressed by policy makers.

Footnotes

(1) See, for example, Moosa (1997b).

(2) The HP filter was first suggested in a working paper in 1980 that was not published in a journal until 1997. Indicative of the popularity of this technique is the fact that the working paper turned out to be the most heavily cited working paper ever. Of course, this is possibly due to the fact that it remained a working paper for some seventeen years.

(3) Hence, this is different from the conventional growth rates model in the sense that the dependent variable is the log level of unemployment rather than its absolute or percentage change. The advantage of this specification is that it allows the distinction between the behaviour of the trend and cycle of unemployment.

(4) For details, see Harvey (1985, 1989).

(5) For details, see Moosa (1995).

(6) Note, however, that the diagnostics for higher order serial correlation and heteroscedasticity are different from those appearing in Tables 1 and 2.

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