

A DYNAMIC INVESTIGATION OF THE MACROECONOMIC DETERMINANTS OF UNEMPLOYMENT IN PAKISTAN

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Abstract

This research is aiming to explore the incidence of macroeconomic variables on the variation in rate of unemployment in the economy of Pakistan through the estimation of dynamic model. Keeping unemployment rate within lowest possible levels is a challenging task for the economists and policy makers. The negative consequences of higher unemployment rates are not only confined to the economic consequences, rather it has direct linkages with numerous other socio-economic factors as well. In order to estimate the extent of long run relationship among the variables we used Johansen co integration test and Vector Error Correction technique is used to explore the short run behavior of the variables. The empirical findings suggest the prevalence of Okun's law and Phillips curve in the short run for the economy of Pakistan. Another important contribution of this study is associated with the magnitude of energy supply and economic uncertainty, and it suggests that the impact is larger for unemployment in the short run while population has large effect in magnitude in the long run.

Keywords: Unemployment, Okun's Law, Phillips Curve, Co-integration, Vector Error Correction.

JEL Classification: E340

Introduction

This study is aiming to explore the behavior of important macroeconomic factors determining the unemployment trends in the economy of Pakistan. On the macroeconomic front the performance of the economy of Pakistan is relatively sluggish for the last few years. There are several factors behind this stagnant economic growth such as the contribution of Total Factor Productivity (TFP) is reported to be around only 18%, lack of capital accumulation due to persistent low savings rates, no innovation and structural change and stagnant export. Persistent high unemployment of human resources in Pakistan not only hinders the utilization of economic potential of available resources but it also has negative consequences for the socio-economic fabrics of the

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society. As far as the theoretical foundation of this research is concerned, we are using the same line of reasoning extended by Kabaklarli, Hazel and Buluş (2011), they reported the existence of inverse relationship between economic growth, gross fixed investment and unemployment rate.

The higher unemployment rate in Pakistan is attributed with higher population growth rate and ever growing supply of labor force. The population of Pakistan, for the year 2000-01, was around 142.86 million and increased to 168.99 million in year 2008-09 and in 2014-15 it was reported to be around 189.19 million. The highest unemployment rate was observed in the year 2003-4 and reported to be around 8.27%. The unemployment rate declined slowly and remained steady around the average of 5 % annually. The labor force observed a growth of 41.38 million in 2000-01 to 61.04 million by the year 2014-15. The crude activity rate also observed an increasing tendency, for the year 2000-01 it was around 28.55% and by the year 2014-15, it was observed to be around 32.30%. For further details, see Table 1.

Table 1

Trends of Population, Crude Activity Rate, Size of Labor Force, and Unemployment Rate in Pakistan

Year	Population (Million)	Crude Activity Rate (%)	Labor Force (Million)	Unemployment Rate (%)
2000-01	142.86	28.55	41.38	7.82
2001-02	145.96	28.97	43.21	8.26
2002-03	149.03	29.23	44.12	8.27
2003-04	150.47	30.41	45.76	7.69
2004-05	153.96	30.41	46.82	7.68
2005-06	156.77	32.22	50.50	6.19
2006-07	161.98	31.82	51.55	5.33
2007-08	165.45	32.17	53.22	5.20
2008-09	168.99	32.81	55.91	5.45
2009-10	172.57	32.98	56.92	5.55
2010-11	176.20	32.83	57.84	5.94
2011-12	180.71	32.83	59.33	5.95
2012-13	183.57	32.88	60.34	6.23
2013-14	186.19	32.28	60.09	5.94
2014-15	189.19	32.30	61.04	5.93

Source: Economic Survey of Pakistan (Various Editions), Labor Force Survey (PBS).

The analysis of age specific participation rates and unemployment of labor force, keeping the distinction of rural urban divide, suggests various interesting trends. For instance, Table 2 is depicting that unemployment is not an area specific phenomenon in Pakistan. One distinguishing feature is the higher rate of participation of youth belonging to the lowest quintile of age group i.e. 10-14 years, in the rural as compared to the urban part of Pakistan. The youth of Pakistan is more prone to the unemployment and one important factor behind such phenomenon is the lower human development and lack of technical abilities among the youth along with sluggish trends in employment generation activities.

Table 2
*Labor force participation rates and unemployment rates
(Age Specific 2014-15)*

Age Group (years)	Labor force Participation Rates			Unemployment Rates		
	National	Rural	Urban	National	Rural	Urban
10--14	9.58	12.6	3.78	9.98	7.97	22.15
15--19	33.5	39.63	22.95	10.11	8.23	15.69
20--24	52.63	56.93	45.61	11	9.48	14.09
25--29	58.56	61.83	53.07	6.09	5.21	7.81
30--34	60.14	64.05	53.57	3.52	3.17	4.21
35--39	62.62	67.23	54.93	1.92	1.77	2.22
40--44	64.63	68.6	57.66	1.97	1.84	2.23
45--49	65.98	71.33	57.13	1.75	1.55	2.17
50--54	65.34	70.27	57.58	3.63	3.1	4.67
55--59	63.77	67.32	57.72	5.78	5.6	6.15
60--64	51.15	56.98	39.6	9.01	6.2	16.97
64 and above	27.56	30.28	21.67	11.12	4.2	32.09

Source: Labor Force Survey (PBS) 2014-15

As far as the creation of new employment opportunities in Pakistan are concerned, services and industrial sectors are playing the leading role. For the last few years the contribution of industrial sector remained sluggish in the creation of new employment opportunities mainly due to lack of capital accumulation in the sector. The labor market statistics suggest that this sector holds a share of 21.5% in the total employment. Additionally, political instability and economic uncertainty has severely affected the economy. The domestic and foreign investors remained reluctant to realize their investment plans in the country, mainly due to the political and economic uncertainty, and the sluggish trends of domestic and foreign capital formation resulted in unemployment and underemployment of human resources. It is also observed that exchange rate sharply increased from Rs. 68 to Rs. 100 since the year 2007, resulting in creation of additional pressure on foreign exchange reserve that further deteriorated the balance of payment. In fact, foreign exchange reserves were less than \$ 3 billion in

2013. All these factors contributed in the sluggish economic performance and higher rate of unemployment in Pakistan and this paper is aiming to explore the impact of these factors through estimation of dynamic model through sophisticated econometric techniques.

This paper is organized as: section 2 provides a brief review of literature related to the unemployment and its determinants, section 3 is about theoretical framework used to develop a model expressing the relationship between important variables, section 4 is dedicated for econometric model and data sources, analysis of the estimated models and findings are discussed in section 5 and in section 6 we have presented the important policy implications and conclusion.

Review of Literature

Unemployment and its determinants are among the most extensively discussed topics in the field of economics. Various economists, demographers, and sociologists have generously contributed a great deal of literature on this important issue. Most of the economists analyzed the issue of unemployment as a macroeconomic phenomenon and a considerable number of studies are focused to investigate the role of potential GDP, while few investigations remained concentrated on the linkages between current GDP and unemployment rate. Another important dimension of this issue is the output gap between potential and realized GDP, which has significant theoretical effect on unemployment. However, the empirical evidences suggest a varying trend in this regard. The negative relationship between the forecasted GDP and the rate of unemployment is also reported by Ball, Jalles, and Loungani (2014), and they endorsed the existence of Okun's law. While, Maqbool et al. (2013) and Marelli and Vakulenko (2014) also probed this relationship and suggested the prevalence of negative association between the aggregate economic performance and the rate of unemployment. While, Lal et al. (2010) suggested that there is no evidence in favor of Okun's law in most of the Asian countries due to sharp inflationary trends. On the similar line of reasoning, Cheema and Atta (2014) suggested the existence of positive relationship between economic uncertainty, output gap, and unemployment.

A considerable number of studies have also explored the effect of geographical and social factors on unemployment. For instance, Msigwa and Kipsha (2013) suggested that education, geographical location, gender, skills and marital status are crucial determinants of unemployment in Tanzania. Another interesting contribution is extended by Darma and Arsyad (2010) they suggested that in developing countries the unemployed people generally attempt to seek employment opportunities in formal sector particularly in government sector and such situation may result in prolonged unemployment. The unemployment trend for highly educated labor force were examined by Jamoussd and Gassab (2011), they concluded that higher education attainment and inadequate job creation are the prime factors behind the rising unemployment rate. Barnichon and Figura (2010) investigated the association between firm's hiring and unemployment with respect to the different phases of business cycle and they reported that the rise in overall economic activities have positive impact on firm's hiring and negative significant impact on unemployment.

The Philips curve must be vertical in the long run due to the tendency of full employment with only the possibility natural rate of employment in the long run (Friedman, 1968). However, few recent studies, including another study by Friedman, suggested the existence of a positive association among the unemployment and inflation rates (Haug & King, 2011; Rocheteau et al., 2007; & Dong, 2010). Kumar and Alok (2010) pointed out that labor union bargaining and efficiency wage in the inflationary period reducing employment and confirmed positive relationship between inflation and unemployment. While, Panday (2003) confirmed the claim that trade liberation has significant positive effect on earning and employment as well as on unemployment. Eriksson and Lagerström (2010) stated that high wages demanded by unemployed workers resulted in high unemployment. However, women are willing to get job at lower wages. As suggested by Contini (2010) the pace of new jobs creation, particularly for the youth, primarily depends on the macroeconomic environment of the nation. The nations with relatively better macroeconomic indicators are the nations with lower unemployment rate.

Energy consumption and economic performance are closely associated and deficiency of energy, particularly electricity, can potentially hinder the process of economic growth and prevalence of unemployment. For the first time in economic literature, Kraft and Kraft (1978) extended the causal relationship between energy consumption and economic growth. Recently a great deal of literature, for instance, Sari and Soytas (2007), Huang et al. (2008), Apergis and Payne (2009), and Mishra et al. (2009) also empirically probed the association between energy consumption and its impact on unemployment rate. Many nations, including Pakistan, are facing acute energy shortages and this is hindering their potential economic performance and resulting in unemployment rate.

Theoretical Model

The relationship between aggregate level of output and rate of unemployment was for the first time highlighted by the Okun's (1962). He empirically investigated this relationship and claimed that if output growth falls by 3% from potential rate, it will increase unemployment by 1%. The relationship between unemployment and output is described by the following equation:

$$\delta(U_t^* - U_t) = (Y_t - Y_t^*) \dots \dots \dots (1)$$

Where, U_t is representing the rate of unemployment in period t , U_t^* is natural rate of unemployment, Y_t is growth rate GDP and Y_t^* is potential output.

Similarly, Phillips (1958) empirically found a counter cyclical relationship over the business cycle. The equation representing the Phillips curve can be derived from the short run aggregate supply function as under;

$$Y = Y_p + \alpha (P - P_e) \dots \dots \dots (2)$$

Where, the variable Y is representing the actual level of output produced by the economy, Y_p

is representing the natural level of output, α is a positive constant, P is the actual price level, while P_e is representing expected price level. After rearranging equation (2) we got:

$$P = P_e + (Y - Y_p) / \alpha \dots\dots\dots(3)$$

If we subtract P_{t-1} from both sides of equation (3), the equation would show the relationship between inflation and output as under;

$$\pi = \pi_e + (Y - Y_p) / \alpha \dots\dots\dots(4)$$

Since, Okun's law stated that $(Y - Y_p) / \alpha = \delta(U_t^* - U_t)$, therefore, we obtain the following equation to reveal the relationship between inflation and unemployment.

$$\pi = \pi_e + \delta(U_t^* - U_t) \dots\dots\dots(5)$$

Where, π is the rate of inflation, π_e is the expected rate of inflation and δ is a constant. While, the unemployment rate is expressed through U_t and U^* is representing the rate of natural unemployment in the economy.

The relationship between energy crises and unemployment can be derived under assumption that due to energy shortage firms either stop production or shut down their business. In both scenarios, unemployment rate would increase due to scale effect. Let assume that a industry production function faced basic endogenous production function is

$$Y_{it} = A_t f(K_t, N_t) \dots\dots\dots(6)$$

Where Y_{it} , K and N are output (GDP) of i th firm in period t , Capital & Labour respectively and A is the level of production efficiency or it is called total factor productivity (TFP). There is another factor which may have significant impact on growth, therefore the above equation may be written as

$$Y_{it} = A_t f(K_t, N_t, EG_t) \dots\dots\dots(7)$$

Where, EG is Electricity Supply, the equation 7 would be transformed mathematically, the model is as under;

$$Y_{it} = A_t K_t^\alpha L_t^\beta EG_t^{1-\alpha-\beta} \dots\dots\dots(8)$$

Where α and β and $(1 - \alpha - \beta)$ are share of Capital, labour and energy. The sum of Capital and Labour and energy is equal to 1 under the assumption of Constant Return to Scale. The equation

(8) is can be converted into linear function by taking log and obtain elasticity of labour, capital and energy. The production function w.r.t time (t) and simplified as.

$$\ln Y_{it} = \ln A_t + \alpha \ln K + \beta \ln L + (1 - \alpha - \beta) \ln E_{gt} \dots \dots \dots (9)$$

The equation 9 indicates key determinant of industrial output. If country faced severe energy crises, the industrial sector may be affected resulting cutting down in production. Therefore, scale effect may increase unemployment.

Besides that, there are several other factors which may have significant relationship with unemployment, for instance political and economic uncertainty. The political instability and uncertainty in the economy also hurts the labor market badly. The political and economic uncertainties not only discourage domestic investors but also reduce the FDI inflows and such situation may result in trade deficit and exchange rate instability. In this regard we are intended to gauge the impact of real exchange rate as a determinant of unemployment rate in Pakistan. Furthermore, gross fixed capital formation is also another significant stimulant of economic activities and rate of unemployment. Thus, the theoretical equation for unemployment may be written as follows;

$$U_t = \beta_0 + \beta_1 Y_t + \beta_2 I_t + \beta_3 E_t + \beta_4 K_t + \beta_5 RER_t + \beta_6 Pop_t \dots \dots \dots (10)$$

Where, Y_t is output gap in period t, I_t is inflation in period t, E_t is energy supply in period t, K_t is gross fixed capital formation, Pop_t is population and RER_t is real exchange rate in period t. We expect that all parameters may have inverse relationship with unemployment.

Methodology

Data and Measurement of Variables

The variables which are used to estimate the model expressed by equation (10) are described as under:

- Unemployment rate is measured in terms of ratio between unemployed labor force and labor force participation.
- Real exchange rate and annual exchange rates are the average annual exchange rates of American Dollar and Pakistani Rupee.
- Annual rate of inflation is calculated through the average annual change in consumer's price index with respect to preceding year.
- In this study we opted to use the annual series of electricity supply as a proxy to capture the effect of variable of energy in our model.
- In order to measure the variable of output gap, we have estimated the regression equation between Y_t and potential output i.e., Y_p then used the following function to calculate output gap;
Output Gap (Y_o) = $Y_t - Y_p \dots \dots \dots (11)$

The annual stock of capital accumulation with respect to previous year's investment is used to measure the value of current capital stock:

$$K_t = I_t + (1-\Phi)K_{t-1} \dots \dots \dots (12)$$

We constructed the indicator of capital stock by combining the initial capital stock concept by applying the procedure extended by Nehru and Dhareshwar (1993) as under:

$$K_t = (1-\Phi)K(0) + \sum_{t=0}^{t-1} I_t - 1(1-\Phi)^i \dots \dots \dots (13)$$

Where, Φ is depreciation rate, and $K(0)$ is initial capital stock. In order to estimate the initial value of investment, we need to estimate a linear regression of the log of investment against time (t). Then the fitted value of initial investment is used to compute initial capital stock through following expression:

$$K_{t-1} = I_t / (g + \Phi) \dots \dots \dots (14)$$

Where, output growth rate is expressed by g and Φ is representing rate of depreciation of capital. A rate of 4 percent annual depreciation in capital stock is used by Nehru and Dhareshwar (1993) and Collins and Bosworth (1996). The same rate is used here to estimate initial capital stock.

Econometrics Model

We started our analyses by applying the Augmented Dickey-Fuller (1981) test to ensure that the data series has a unit root or not, this exercise is essentially require to determine the order of integration among the variables. After this exercise we can apply Johansson's maximum likelihood multiple co- integration test to evaluate the long run association between the variables. Later, to evaluate the short-run relationship between the variables we are intended to estimate Vector Error Correction Model (VECM). Granger (1986) and Engle and Granger (1987) extended the co-integration technique to estimate the long-run coefficients for consistent time series data. Shintani's (1994) suggested that Johansson method is relatively more reliable than the estimation techniques of Engle-Granger, particularly in the case of multivariate co-integration framework where we estimate Vector Autoregressive (VAR) econometric model. The procedures of estimation of VAR model are explained by Johanson (1988) and Johansen and Juselius (1990). The standard procedure of estimation of VAR model is provided as under:

Consider that X_t is time consistent data series represented through a vector of an order $I(1)$. Then the expression of a VAR of length p for the series X_t , would be of following form:

$$X_t = \sum_{j=1}^p \Pi X_{t-j} + \mu + \varepsilon \dots \dots \dots (15) \quad t=1, 2, 3 \dots T$$

The equation (15) can be used to estimate long run association and coefficients for the variables using consistent time series data series for Pakistan.

Empirical Results

The issue of unemployment has become severe for the last two decades, especially; the rapid growing population witnessed adding 1.2 million young entering in the labor market. The stagnant labor market situation was apparent with sharp rising unemployment. Therefore, the proposed study conducted to seek root causes of unemployment not only in the short run but also the long run. The time series data has been collected to analyse cointegration method for the long run association among the variables and Vector Error Correction Model (VECM) for investigate short run dynamics of unemployment. Table 3 presents the results of Augmented Dickey Fuller (ADF) method.

Table 3

Augmented Dickey Fuller (ADF) Unit Root Test

Variable	Estimated Values (First Difference)	Lag (s)
Unemployment	-6.46***	1
Output Gap	-2.91*	1
Inflation	-3.3**	1
Energy Supply	-6.31***	2
Gross Capital Formation	-4.83***	1
Population Growth	-5.07***	1
Real Exchange Rate	-6.44***	2

*** Significant at 1%, ** Significant at 5% and * significant at 10%

The Augmented Dickey Fuller (ADF) was carried out to conduct unit root test, all variables were unit root at level, therefore, first difference was used to test null hypothesis of unit root. Table 1 indicated that all variables were stationary at 1% and 5% except output gap which is significant at 10% level. The cointegration results are presented in Table 4.

Table 4

Johansen Co-integration Method

Maximum Rank	Eigen Value	Trace Statistics	Critical Value (5 %)
0	--	196.3749**	124.24
1	0.8718	112.1667**	94.15
2	0.67648	67.0267	68.52
3	0.58341	32.0009	47.21

** Significant at 5% level

We applied Johansen cointegration estimation procedures to explore the existence of the long

run association between the rate of unemployment, output gap, gross fixed capital formation, population growth, energy supply, real exchange rate and inflation. We started our analysis with the null hypothesis of no co-integration between the variables used in our model ($r=0$), however, the trace statistic is 196.3749 which exceeds the 95 % critical value of the trace statistic (critical value is 124.24), it is possible to reject the null hypothesis ($r=0$) of no cointegration vector, in favor of the general alternative $r \geq 1$. The findings of Table 4 suggest that we may not reject the null hypothesis of $r \leq 2$ $r \leq 3$ at significance level of 5 %. Thus, these findings suggest the existence of long run relationship between the variables at maximum rank of 1.

Once cointegration has been observed among variables, we need to find out the magnitude and direction of the co-integration. Table 5 summarized Johansen normalization results as follows:

Table 5
Johansen Normalization restriction imposed Results

Variables	Coefficient	Z Value	$p > z $
Ygap	0.0831***	13.65	0.00
	-0.0016		
Kt	0.0016	0.07	0.947
	-0.024		
En	-0.0387***	-6.62	0.00
	-0.006		
Pop	0.4715***	10.11	0.00
	-0.047		
RER	-5.663***	128.5	0.00
	-0.0044		
Inf	0.5663***	-7.78	0.00
	-0.071		

*** significant at 1% level

The results of Johansen normalization revealed that the output gap confirmed a significant long run effect on unemployment. While gross fixed capital formation has no effect on unemployment. The structural behavior of the economy indicated that there is no significant capital formation in the real sector. Therefore, gross fixed capital formation has no relation with unemployment in the long run. Population has positive relation with unemployment, which implies that rising population is exerting negative pressure on the job market and leading to the rise of unemployment in Pakistan.

The uninterrupted energy supply, particularly electricity, at stable prices can significantly influence economic activities and resulting in new job creation, consequently reducing

unemployment. On the other hand, inflation has an inverse relationship with unemployment in the long run in Pakistan, this finding is contradicting with the Friedman theory that inflation and unemployment has positive relation in the long run. The result may be justified on the basis that, Pakistan is a developing country and in the long run it could stills not reach full employment therefore, increasing economic activities may cause inflationary impact but due to economic activities, unemployment may be reduced. Finally, the coefficient of real exchange rate confirmed that increasing economic and political uncertainty witnessed losing confidence of both domestic and foreign investors may hurt the labor market causing unemployment.

Since, the long run relationship has been developed, it is imperative to seek the short run dynamic of unemployment for policy implications. Estimated results of Vector Error Correction Model (VECM) are presented in Table 6.

Table 6
Vector Error Correction (VECM) 1974-2013

Variable	Coefficient	Chi-Square	p> Chi- Square
Ygap	1.83**	292.51	0
Kt	0.06***	32.3	0
En	-0.35***	23.03	0.06
Pop	0.03***	246.4	0
RER	0.91***	20.47	0.015
Inf	-0.46***	23.2	0.006

*** Significant at 1% level

The estimated results indicated that all variables have significant impact on unemployment in the short run. The coefficient of output gap confirmed the existence of Okun's law in Pakistan; however, the coefficient is slightly lower than the value extended by Okun. It implies that 2% increase in output may reduce unemployment by 1% the in short run. This study also found the traces in support existence of Philips curve in case of Pakistan. As one percent increase in inflation during the period of boom may reduce unemployment by 0.46%. In the long run, gross fixed capital formation has no effect on unemployment, while short run dynamics suggested that gross fixed capital formation has significant positive effect on unemployment. It could be likely because trend of capital formation indicated that most of the capital invested in services sector like telecommunication and banking sectors. These may create job opportunities and decrease unemployment but these sectors may not significantly generate employment in the long run as compared to potential of real sector.

Most of the demographers and population economists are of the view that higher population growth rate is a serious concern not only for the developing countries but also for the global economy. Our empirical evidences concluded that population has significant positive effect on unemployment. However, the coefficient of population is 0.03 stressed that the effect of population is not a serious

threat in the short run because 1% increase in population would raise unemployment by only 0.03% but the problem become severe in the long run because 1% increase in population may raise unemployment by 0.47%. Similarly, economic and political uncertainty has positive relation; the magnitude of uncertainty is 0.91 larger than as compared magnitude of uncertainty in the long run i.e 0.56. It is likely because, in the long run the uncertainty element is minimized. Finally, energy supply measured scale effect confirmed that in the short run, firms would either fire labor or stop production due to acute shortage of energy. The coefficient of energy supply indulged that 1% decline in energy supply may raise unemployment by 0.35%.

Conclusion

The findings of this research suggest the existence of the long run association among important macroeconomic variables and rate of unemployment for the economy of Pakistan. It is also observed that scale effect and economic uncertainty have more influential effect in the short run as compared to the long run while population has a large significant effect in the long run. This finding also endorses the initiative by the Government of Pakistan's population control policy through reducing the total fertility rate. There are ample evidences suggesting the existence of the Okun's law in the short run; while, no such significant effect is observed in the long run. Gross fixed capital formation has a significant impact on unemployment in the short run, while it has no significant relation in the long run. The tendency of gross fixed capital formation confirmed our findings because most of the investment witnessed in services sector. This sector may create employment opportunities in the short run but in the long run, real sector may significantly contribute in reducing unemployment. Finally, inflation and unemployment revealed inverse relationship as suggested by Phillips in the short run but our findings did not confirm existence of positive relationship between inflation and unemployment.

On the bases of empirical evidences, we may conclude that the objective of alleviating poverty and reducing income inequality may not be achieved unless government may focus on creating opportunities for private sector to actively participate in economic activities, increase energy supply and initiate some population control program to overcome the problem of unemployment. Therefore, government has to design policies to encourage investment in real sector resulting high and sustained economic growth and reducing unemployment.

References:

- A. A. Haug I. P. King (2011), "Empirical Evidence on Inflation and Unemployment in the Long Run" *Economics Discussion Papers No. 1109*, 58, 1-17.
- Apergis, N., & Payne, J. E. (2009). Energy consumption and economic growth in Central America: evidence from a panel cointegration and error correction model. *Energy Economics*, 31(2), 211-216.
- Ball, L., Jalles, J. T., & Loungani, P. (2015). Do forecasters believe in Okun's Law? An assessment of

- unemployment and output forecasts. *International Journal of Forecasting*, 31(1), 176-184.
- Barnichon, R., & Figura, A. (2010). What drives movements in the unemployment rate? *A decomposition of the Beveridge curve*.
- Cheema, A. R., & Atta, A. (2014). Economic determinants of unemployment in Pakistan: Co-integration analysis. *International Journal of Business and Social Science*, 5(3), 209-221.
- Collins, S. M., Bosworth, B. P., & Rodrik, D. (1996). Economic growth in East Asia: accumulation versus assimilation. *Brookings papers on economic activity*, 1996(2), 135-203.
- Contini, B. (2010). Youth employment in Europe: *institutions and social capital explain better than mainstream economics*.
- DARMA, R., & ARSYAD, M. (2010). Determinants of Unemployment in Indonesia: A Study on Development Program of Rural Employment in Pinrang District, South Sulawesi. 龍谷大学経済学論集, 50(1), 147-159.
- Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society*, 1057-1072.
- Dong, M. (2011). Inflation and unemployment in competitive search equilibrium. *Macroeconomic Dynamics*, 15(S2), 252-268.
- Eita, J. H., & Ashipala, J. M. (2010). Determinants of unemployment in Namibia. *International Journal of Business and Management*, 5(10), 92.
- Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.
- Eriksson, S., & Lagerström, J. (2010). *The determinants and consequences of unemployed workers' wage demands* (No. 2010: 26). Working Paper.
- Friedman, M. (1977). Nobel lecture: inflation and unemployment. *Journal of political economy*, 85(3), 451-472.
- Friedman, Milton (1968), "The Role of Monetary Policy", *American Economic Review*.
- Granger, C. J. (1986). Developments in the study of cointegrated economic variables. *Oxford Bulletin of economics and statistics*, 48(3), 213-228.
- H. B. Jamoussd and , M. Gassab (2011), " Determinants of Graduate Unemployment in Tunisia" *Almalaurea Working Papers No. 16*.
- Harberger, A. C. (1978). On the use of distributional weights in social cost-benefit analysis. *Journal of Political Economy*, 86(2, Part 2), S87-S120.
- Huang, B. N., Hwang, M. J., & Yang, C. W. (2008). Causal relationship between energy consumption and GDP growth revisited: a dynamic panel data approach. *Ecological economics*, 67(1), 41-54.
- Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of economic dynamics and control*, 12(2-3), 231-254.
- Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and statistics*, 52(2), 169-210.
- Kabaklarli, E., Hazel, P., & Buluş, A. (2011, August). Economic Determinants Of Turkish Youth Unemployment Problem: Co Integration Analysis. *In International Conference On Applied Economics-ICOAE* (Vol. 267, p. 272).

- Kraft, J., and Kraft, A., (1978), On the Relationship between Energy and GNP”, *Journal of Energy and Development*, 3, 401-403.
- Kumar and Alok (2010), “Labor Markets, Unemployment and Optimal Inflation”, Chapter 4 in Monetary, Fiscal, and Labor Market Policies in Frictional Economies”, *Lambert Academic Publishing*, pp. 109-137.
- Lal, I., Muhammad, S. D., Jalil, M. A., & Hussain, A. (2010). Test of Okun’s law in some Asian countries co-integration approach. *European journal of scientific research*, 40(1), 73-80.
- Maqbool, M. S., Mahmood, T., Sattar, A., & Bhalli, M. N. (2013). Determinants of unemployment: Empirical evidences from Pakistan. *Pakistan Economic and Social Review*, 191-208.
- Marelli, E., & Vakulenko, E. (2014). Youth unemployment in Italy and Russia: Aggregate trends and individual determinants. *The Economic and Labour Relations Review*, 27(3), 387-405.
- Martin, W., & Mitra, D. (1999). *Productivity growth and convergence in agriculture and manufacturing* (Vol. 2171). World Bank Publications.
- Mishra, V., Smyth, R., & Sharma, S. (2009). The energy-GDP nexus: evidence from a panel of Pacific Island countries. *Resource and Energy Economics*, 31(3), 210-220.
- Msigwa, Robert, and E. F. Kipsha (2013), “Determinants of Youth Unemployment in Developing Countries: Evidences from Tanzania” *Journal of Economics and Sustainable Development* ,4(14), 67-76.
- Nehru, V., & Dhareshwar, A. (1993). A new database on physical capital stock: sources, methodology and results. *Revista de análisis económico*, 8(1), 37-59.
- Okun, Arthur M. (1962), “Potential GNP: Its Measurement and Significance,” American Statistical Association, *Proceedings of the Business and Economics Statistics Section*, pp. 98–104.
- Owyang, M. T., & Sekhposyan, T. (2012). Okun’s law over the business cycle: was the great recession all that different?. *Federal Reserve Bank of St. Louis Review*, 94(September/October 2012).
- Panday, Priniti (2003), “An Empirical Analysis of the Determinants of Earning and Employment: Does Trade Protection Matter?” *Journal of Economic Development*, 28(1), 35-47.
- Phillips, A. W. (1958) “The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957”, *Economica*, 25(2), 283–299.
- Rocheteau, G., Rupert, P., & Wright, R. (2007). Inflation and unemployment in general equilibrium. *scandinavian Journal of Economics*, 109(4), 837-855.
- Sari, R., & Soytaş, U. (2007). The growth of income and energy consumption in six developing countries. *Energy Policy*, 35(2), 889-898.
- Shintani, M. (1994). Cointegration and tests of the permanent income hypothesis: Japanese evidence with international comparisons. *Journal of the Japanese and international Economies*, 8(2), 144-172.
- Trimurti, C. P., & Komalasari, Y. (2014). Determinants of Unemployment: Empirical Evidences from 7 Province in Indonesia. *Scientific Research Journal (SCIRJ)*, 2(8), 5-9.