TÜRKİYE'DE İŞSİZLİĞİ BELİRLEYEN FAKTÖRLERİN AMPİRİK BİR ANALİZİ

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Özet: Bu çalışmada, Türkiye'de işsizliğin belirleyicileri, Johansen eş-bütünleşme yöntemi yardımıyla, 2000:Q1-2011:Q1 dönemi verileri kullanılarak araştırılmıştır. Elde edilen bulgulara göre; değişkenler arasında eş-bütünleşme olduğu belirlenmiştir. Reel kesim güven endeksindeki artışlar beklenildiği yönde işsizliği azaltırken; özel sektor toplu iş sözleşme sayısındaki artışların işsizliği artırıcı yönde etki ettiği tespit edilmiştir. Hata düzeltme modelinde, hata düzeltme teriminin (EC_{t-1}) katsayısı negatif ve istatistiki olarak anlamlı çıkmıştır. Buna göre, uzun dönem denge değerinden sapmaların her dönem yaklaşık % 23'ü ortadan kalkmaktadır.

Anahtar Kelimeler: İşsizliğin Belirleyicileri, Johansen Eş-bütünleşme Analizi, Türkiye.
JEL Kodları: E24, C1, O5

AN EMPIRICAL ANALYSIS OF THE FACTORS DETERMINE UNEMPLOYMENT IN TURKEY

Abstract: In this study, determinants of unemployment for Turkey have been investigated with the help of Johansen Co-integration Method for the period 2000:Q1-2011Q1. According to the findings, a co-integration relation has been founded between variables; increases in confidence index of real sector decrease unemployment rate as expected but increases in the number of collective bargaining agreements for private sector have an increasing impact on unemployment. And according to Error Correction Model's result; the error correction term coefficient (EC_{t-1}) is negative and statistically significant as expected. Eventually approximately 23% deviations from the long-run equilibrium value eliminate in each period.

Keywords: Determinants of Unemployment, Johansen Co-integration Analysis, Turkey.
JEL Classification: E24, C1, O5

I.Introductıon

Unemployment is generally defined as the number of people of working age who are willing and available to work at current wages but cannot be employed. According to definition of International Labor Organization (ILO); unemployment occurs when people are without jobs and they have actively looked for work within the past four weeks. There are different types of unemployment; frictional, structural, cyclical and seasonal unemployment.

Frictional unemployment consist of those searching for jobs or waiting to take jobs soon; it is regarded as somewhat desirable, because it indicates that there is mobility as people change or seek jobs. Structural unemployment is due

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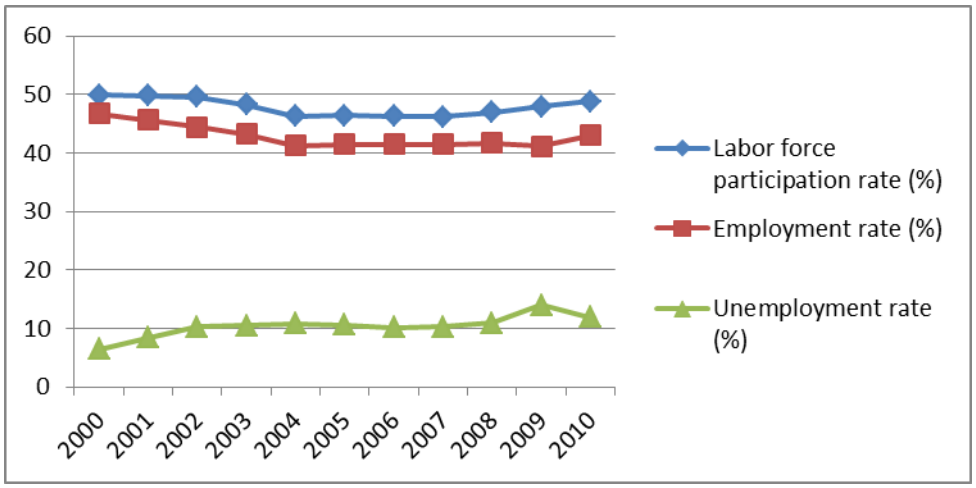
to changes in the structure of demand for labor; e.g., when certain skills become obsolete or geographic distribution of jobs changes (McConnell and Brue, 2005) Structural unemployment is a cyclical as overall unemployment and no more persistent, both in the current and in previous recessions (Herz and Rens, 2011). The other type of unemployment is cyclical unemployment which is caused by the overall recession in the economy. And the seasonal unemployment can be defined as it is due to seasonal ups and downs for demand and jobs.

While unemployment becomes one of the major problems of both developed and developing countries, lots of studies about determinants of unemployment occur in the literature. The unemployment rate in theory is determined by the institutional, policy and macroeconomic factors. Inflation, exchange rate, economic growth, income tax and indirect taxes, technical progress, capital shortage, real wages, nominal wages, population growth, foreign direct investment etc. are seen as the determinants of unemployment and the studies focused on these factors (Downes, 1998, Frenkel and Ros, 2006, Rafiq et al., 2010, Kyei and Gyekye, 2011, Panday, 2003, Bakare, 2011, Amisano and Serati, 2002, Tunalı, 2010). But in this study unlike the others, confidence index of real sector, collective bargaining agreements and producer price index were adopted as the determinants of unemployment and analyzed the effects of these determinants on unemployment for Turkey.

The most important feature of unemployment in Turkey, which has a young and dynamic population, is to have a structural attribute. The share of non-active population (under 15 years) in the economy is 32 per cent of total population. This rate is 14 per cent in EU member societies. Thus unemployment in Turkey is constantly affected by this imbalance (Tatlidil and Xanthacou, 2002). The unemployment problem in Turkey began in the 1950s and reached to high levels along with urbanization and population growth rates in the 1970s. By the year 2000, unemployment has risen even more especially after the 2001 crisis. Figure 1 shows rates on the labor markets in Turkey for the period 2000-2010. When it is looked at labor force participation rate by years, the rate is 49,9% in 2000, it decreased to 46,4% in 2005 and it increased to 48,8% in 2010. Employment rate has also changed over the years; In 2000 it was 46,7% but it has decreased to 41,5% by 2005 and it became 43% in 2010. And the other rate on the labor market is unemployment rate. Unemployment rate in Turkey rose especially after 2001 crisis, it was 8,4% in 2001, and increased to 10,3% in 2002. It became 11% in 2008 and 14% in 2009. But it had a decrease in 2010 and it became 11,9% in 2010.

Figure 1: *Rates on the Labor Market in Turkey (2000-2010)*



Source: TUIK (Turkish Statistical Institute) Statistical Indicators, 2011.

II.Literature

There are many different studies about determinants of unemployment, some of them are just about unemployment as a macroeconomic problem, lots of them are about determinants of unemployment. In this section of study, the studies about determinants of unemployment in the literature and consequences of them are presented.

Bakare (2011) examined the determinants of unemployment in Nigeria. And the results show that there is a significant relationship between unemployment and demand for labor, supply of labor, population, inflation, capacity utilization, gross capital formation and nominal wage rate and private domestic investment in Nigeria and it is concluded that unemployment became a major socio-economic problem in Nigeria and it has reached a crisis proportion.

Kyei and Gyekye (2011) have tried to find the determinants of unemployment for Limpopo Province in South Africa by using Regression, Principal Component and Cluster analysis and the results show that GDP does not have significant relationship with unemployment. Equally striking is the fact that the male and youth population do not have significant with unemployment in Limpopo.

Gatti and Vaubourg (2010) used annual data for 18 OECD countries over the period 1980-2004 and they investigated how labor and financial interact to determine unemployment by estimating a dynamic panel model using the system generalized method of moments (GMM). They found that increased market capitalization as well as decreased banking concentration reduce unemployment if the level of labor market regulation, union density and coordination in wage bargaining is low.

Rafiq et al. (2010) studied determinants of unemployment for Pakistan and they adopted population growth, inflation rate and foreign direct investments (FDI) as the determinants of unemployment. According to consequences of this study population growth contributes to unemployment positively and FDI and inflation rate have negative impact on unemployment.

Aktar ve Ozturk (2009) investigated the dynamic interrelationship among unemployment, FDI, GDP and export (EX) for the period 2000:1-2007:4 in Turkey and they found two counteracting vectors in the system, indicating there is long run relationship. They concluded that FDI did not have any contribution to reduce the unemployment rate in Turkey. Variations in EX have a positive impact on GDP but they are insignificant. Variation in GDP does not reduce the unemployment rate either.

Bassanini and Duval (2006) investigated the determinants of unemployment across OECD countries and estimated that 10% point reduction in the tax wedge, a 10% point reduction of unemployment benefits and a decline in product market regulation by two standard deviations would be associated with a drop in the unemployment rate by about 2.8, 1.2 and 0.7% points, respectively.

Frenkel and Ros (2006) has focused on the role of the real exchange rate in the unemployment performance of Latin America. They analyzed the relation between unemployment and the real exchange rate in Latin America and they have decided that real exchange rate has significantly efficient on unemployment rate.

Baccaro and Rei (2005) examined what kind of support data on OECD countries provide for the deregulatory view of unemployment, according to which variations in unemployment are explained variations in labor market and other institutions. The results show that unemployment is mostly increased by policies and institutions that lead to restrictive macroeconomic policies. The one institutional variable they found to be positively associated changes in unemployment is the union density change variable.

Panday (2003) analyzed the effect of trade policies on earnings in the manufacturing and agricultural sector on the unemployment rate and found that relative trade production to manufactures did not have a significant impact on earnings of the agricultural sector, on manufacturing earnings and on unemployment rate.

Amisano and Serati (2002) analyzed the main determinants of unemployment persistence in four OECD countries in the period 1975-1995. They found the effects of demand shock to be highly persistent in Sweden, Italy and UK, and less long-lasting in USA. And aggregated that shocks play a dominant role in explaining unemployment fluctuations not only in the short-run, but also in the medium/long-run and also in flexible labor markets like the USA.

Downes (1998) in his work "An Economic Analysis of Unemployment in Trinidad and Tobago" found that changes in economic activity and economic growth reduce unemployment, and increases in real wages and real loan rates also impact adversely on the unemployment rate, especially in the long-run.

III.Model, Method And Data Set

In this section, a four-variable model has established to investigate determinants of unemployment;

$$UN = \beta_0 + \beta_1 \ln RKGE + \beta_2 \ln OTIS + \beta_3 \ln TEFE + U_t \quad (1)$$

Where UN, RKGE, OTIS, TEFE are unemployment, confidence index of real sector, collective bargaining agreements for private sector and producer price index (1985=100) respectively. Unemployment (UN) is a dependent variable, whereas, confidence index of real sector, collective bargaining agreements for private sector and producer price index are seen as determinant factors of unemployment. Ln shows logarithms of variables. Previous studies have used exchange rate, inflation rate, foreign direct investment etc. as determinants of unemployment but in this study confidence index of real sector, collective bargaining agreements for private sector and producer price index were used unlike the others.

Unemployment rate indicates the percentage of the total labor force which is unemployed but seeking employment and willing to work. Confidence index of real sector is constructed to provide an indicator of short-term business conditions for economic policy makers and business managers due to the need of early warning indicators in order to foresee financial and economic crisis (Ece et al.,2005). Collective bargaining agreements are defined as a process of negotiations between employees and employers aimed at reaching agreements that regulate working conditions. And producer price index indicates average changes in prices received by producers for their output.

This paper adopted the method of co-integration first found by Engle-Granger (1987), developed by Johansen (1988) and applied by Johansen and Juselius (1990). This method depends on direct investigation of co-integration in the vector autoregressive (VAR) representation and produces maximum likelihood estimators of the unconstrained co-integration vector, but it allows one to explicitly test for number of co-integration vectors. Johansen's methodology takes its starting points in the vector autoregression (VAR) of order *p* given by;

$$y_t = A_1 \; y_{t-1} + \ldots\ldots A_p \; y_{t-p} + B_{xt} + \varepsilon_t , \quad (2)$$

Where y_t is a *k* vector of non-stationary variables *I*(1), x_t is a *d* vector of deterministic variable; and ε_t indicates an innovation vector. This VAR can be written as;

$$\Delta y_t = \pi \, y_{t-1} + \sum_{i-1}^{p-1} \tau_i \; \Delta y_{t-I} + B x_t + \varepsilon_t , \quad (3)$$

$$\pi = \sum_{i=1}^{p} A_i - I, \quad \tau_i = -\sum A_j \ . \tag{4}$$

Where co-integation hypothesis defined as a reduced rank of the matrix π is stated in the form of $\pi = \alpha\beta$. α and β represent the two matrix which have kxr-dimensional and r rank. r is the number of co-integration (rank), β is a co-integration vector showing long-term effects of variables in the equilibrium relations and α indicates speed of adjustment in error correction model. Acordingly an matrix π is estimated from an unrestricted VAR in Johansen method and tested that specified conditions with reduced rank of π rejected or not. And determined by the help of Johansen method's test statistics (λ_{trace} and λ_{mak}) how many rank of the matrix π has. In this context, the data set of the variables used to determine the causes of unemployment in Turkey belong to 2000:Q1-2011:Q1 period. All data were taken from Electronic Data Delivery System (EDDS) published by the Central Bank of the Republic of Turkey (CBRT). And Econometric Views (Eviews 5.1) program was used for all tests and estimates.

IV.Empirical Results And Discussion

Before constructing the Johansen method, it is important to make some process and pre-tests. Firstly the independent variables were transformed into logarithmic form and variables are understood to have seasonal effect deseasonalized by using moving average method. Then checked the univariate time series of variables by using unit root test. Here checked unit roots of variables by adopting the Augmented Dickey Fuller (ADF) (1979) test. ADF Unit Root Test results can be seen in Table 1.

Variables were initially tested with the first-level values and then tested with the levels of receipt of the first differences. Accordingly determined that all variables are integrated in the same order I*(1)*. Therefore the necessary pre-condition for co-integration is provided.

Table 1: *ADF Unit Root Test*

		√alues
Variables	ADF Test	1 %
UNSA	-2.298105 [1]	-4.1864
ΔUNSA	-2.641430 [4]	-2.6079*
lnRKGESA	-3.099799 [1]	-4.1864
ΔlnRKGESA	-5.017380 [1]	-3.5966
lnOTISSA	-2.194864 [4]	-3.6055
ΔlnOTISSA	-5.393007 [3]	-3.6055
lnTEFESA	-3.275432 [1]	-4.1864
ΔlnTEFESA	-2.771466 [4]	-2.6039*

Note: Trend and intercept term is used as test type for UN, RKGE ve TEFE variables, but only intercept term is used for OTIS and the first differences of variables (Δ). The values in square brackets indicates appropriate length of delay according to AIC. And * means 10% critical value.

It is necessary to determine an appropriate number of delay to apply Johansen method. There are many measurements in the literature to determine the length of delay; Akaike Info Criterion, Schwarz Info Criterion, Hannan-Quin Criterion and Recent Forecast Error Criterion are the most commonly used (Johansen, 1995; Enders, 1995). But these criterions are not enough on their own. Also there should not be econometric problems in the length of delay selected with info criterions. According to this, in this model the length of delay is determined as two. In this context the model presented in Table 2. It shows that forecasting of diagnostic test is successfully;

Table 2: *Diagnostic Test Results*

Autocorrellation LM-Test		
LM(1)	Prop.	
16.069	0.448	
LM(6)	Prop.	
7.927	0.951	
LM(11)	Prop.	
9.876	0.873	
White Heteroskedasticity		
Chi-sq	Df	Prop.
159.35	180	0.863
Normality Test		
Jarque-Bera	Df	Prop.
3.733297	2	0.1546
3.864712	2	0.1448
0.533100	2	0.7660
3.058470	2	0.2167

A.Co-integration Analysis

After checking univariate of all time series variables, now co-integration relationship can be tested among these four variables (unemployment, confidence index of real sector, collective bargaining for private sector and producer price index). The purpose of the co-integration test is to determine whether a group of nonstationary series are co-integrated or not.

According to Table 1, all variables are $I(1)$, that means co-integration relation between unemployment and independent variables can be investigated by help of Johansen Co-integration Method. The results of λ_{trace} and λ_{mak} statistics are presented in Table 3. λ_{trace} and λ_{mak} statistics helps to find existence of co-integration and number of vectors. According to the statistics; the null hypothesis (there is no co-integration relation between variables), is rejected against to alternative hypothesis (there is at least one co-integration relationship between the variables). In this case, should be concluded the existence of at least one co-integration relationship at 5% critical value.

Table 3: *Co-integration Test*

Null Hypothesis (H_0)	Alternative Hypothesis (H_1)	Eigenvalue	Trace and Mak Statistics	5% Critical Value
λ_{trace}			λ_{trace} *statistic*	
r = 0	r > 0	0.495017	65.84752	47.85613
r ≤ 1	r > 1	0.395671	37.15185	29.79707
r ≤ 1	r > 2	0.225004	15.99913	15.49471
r ≤ 1	r > 3	0.118416	5.293453	3.841466
λ_{mak}			λ_{mak} *statistic*	
r = 0	r = 1	0.495017	28.69567	27.58434
r = 1	r = 2	0.395671	21.15271	21.13162
r = 1	r = 3	0.225004	10.70568	14.26460
r = 1	r = 4	0.118416	5.293453	3.841466

The co-integration equation is presented in Table 4. According to results of co-integration; variable coefficients are statistically significant and consistent with what we expected in hypotheses. Confidence index of real sector has a significant negative effect on unemployment rate. When there is a 1% increase in confidence index of real sector, unemployment decreases 13.82%. This finding is consistent with economic theory because if the expectations of future in economic life is optimistic, this case will enable the creation of new employment opportunities by providing increase in investment. Collective bargaining for private sector has negative effect on unemployment rate as expected. As mentioned in the theory of classical economics, collective bargainings often raise the cost of wages by increasing worker's wage. Therefore employer may tend to reduce the number of people employed in order to minimize increasing costs.

Table 4: *Co-integration Equation*

	UNSA	lnRKGESA	lnOTISSA	lnTEFESA
Normalized Co-integration Coefficient *(β')*	1.000	13.82501 (2.015)	-1.301450 (0.645)	-2.545455 (0.688)
Adaptation rates coefficient *(α)*	-0.238741 (0.08846)	-0.020973 (0.01947)	-0.020178 (0.08521)	-0.007827 (0.00488)
Co-integration Equation	*UNSA= -13.825lnRKGESA + 1.301lnOTISSA + 2.545lnTEFESA*			

B.Error Correction Model

If there is a co-integration relationship among nonstationary variables, there has to be an error correction representation (Engle and Granger, 1987) which illustrates the dynamic convergence of the system to the long-run equilibrium. A precondition for the existence of co-integration is that all the variables are integrated of the same order. If this is fulfilled, then the residuals from the long-run estimates can be used as the error correction term (EC) to explain the short run dynamic. The error correction variable in a short run dynamic relationship indicates the proportion of the disequilibrium from one period that is adjusted in the next period (Cholifihani, 2008).

Error correction model (vector error correction: VEC) was established in order to investigate the short-run dynamics of variables acting together in the long-run and the results are presented in Table 5. As seen in Table 5; coefficient of error correction term (ECt-1) is statistically significant and negative. If the error correction term is negative, that means deviations in the short-run will be eliminated and series converges to the long-run equilibrium value again among the series moving together in the long-run. Finally error correction term is working. According to the results approximately 23% of deviations from the long-run equilbrium value eliminate in each period.

Table 5: *Error Correction Model Estimation Results*

$\Delta UNSA_t = \beta_0 + \beta_1 \Delta lnRKGESA_{t-1} + \beta_2 \Delta lnOTISSA_{t-1} + \beta_3 \Delta lnTEFESA_{t-1} + \alpha EC_{t-1} + u_t$		
Variables	*Coefficient*	*t-statistic*
$\Delta UNSA_{t-1}$	0.006281	0.03787
$\Delta UNSA_{t-2}$	-0.116483	-0.72243
$\Delta lnRKGESA_{t-1}$	1.095335	0.87997
$\Delta lnRKGESA_{t-2}$	-0,402779	-0.38833
$\Delta lnOTISSA_{t-1}$	-0.340682	-1.53635
$\Delta lnOTISSA_{t-2}$	-0.238798	-1.13794
$\Delta lnTEFESA_{t-1}$	-4.147548	-1.12485
$\Delta lnTEFESA_{t-2}$	3.257143	0.90700
EC_{t-1}	-0.238741	-2.69886
Invariable term	0.132437	0.77543
$R^2 = 0.49$ $\quad \overline{R}^2 = 0.35$ $\quad F = 3.51$		

V.Conclusion

In this study, determinants of unemployment in Turkey have been investigated with the help of Johansen Co-integration Method by using the data 2000:Q1-2011Q1 period. According to the findings a co-integration relationship

has been identified among variables. Increases in confidence index of real sector reduce unemployment rate as expected, but increases in the number of collective bargaining agreements raise unemployment rate. When it is looked at Error Correction term (EC_{t-1}); it is statistically significant and negative. With reference to this result approximately 23% of deviations from the long-run equilbrium value eliminate in each period.

According to the results of this study; unemployment is effected by the future expectations of real sector and the attitude of the union about worker's wage in Turkey. Optimistic case of real sector's future expectation depends on mostly economic stability; If the economic stability ensured, investments would rise and employment opportunities would increase in parallel with this. Furthermore trade union's tend to targets for increased employment is considered as an important factor in reducing unemployment. But in fact trade unions often tend to deal about wages, it is possible to say this case is created by conjuncture of global economic crisis.

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