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EFFECTS OF ECONOMIC INDICATORS ON EMPLOYMENT PHENOMENA

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Abstract

The objective of this article is to analyze long-and short-term interactions of employment levels in Turkey with growth and general price levels using appropriate time series analysis methods. In this article, the stationary status of variables was investigated and analyzed. To understand long-term relationships, cointegration analysis was employed and general to specific models and vector auto regression was used for short-term dynamic interactions of variables. Moreover, to determine the power of variables to affect other variables as a result of applied shocks, impulse-response and variance decomposition analyses were conducted. The results show that in years when economic growth positively affects on employment in the short-term, it does not have the same effect on the long-term and when general price levels reflected high values, employment realizes high rates.

Key Words: *Hendry model, employment problem, short-long term relations, causality.*

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Ekonomik Değişkenlerin İstihdam Üzerine Etkileri

Özet

Bu makalede amaç; Türkiye'de istihdam düzeyinin, ekonomik büyüme ve fiyatlar genel seviyesi ile uzun ve kısa dönem etkileşimlerini uygun zaman serisi analiz yöntemleriyle incelemektir. Bu amaca yönelik olarak değişkenlerin durağanlık durumları incelenmiş, uzun dönem ilişkilerin incelenmesi amacıyla eş bütünleşme analizine başvurulmuş; değişkenlerin kısa dönem dinamik etkileşimlerinin tespiti için genelden özele modelleme yöntemi ile VAR modeli kullanılmıştır. Ayrıca değişkenlerin, uygulanan şoklar sonucu diğer değişkenleri etkileme güçlerinin tespit edilmesi için etki-tepki ve varyans ayrıştırması analizleri yapılmıştır. Makalede, fiyatlar genel düzeyinin yüksek olduğu yıllarda istihdamın yüksek gerçekleştiği sonucuna varılırken kısa dönemde ekonomik büyümenin istihdamı olumlu yönde etkilerken uzun dönem için aynı etkiden bahsedilemeyeceği sonucuna ulaşılmıştır.

Anahtar Kelimeler: *Hendry modeli, istihdam sorunu, kısa-uzun dönem ilişkisi, nedensellik.*

1. INTRODUCTION

Unemployment in Turkey is considered as an extremely critical problem. When the structure of current employment and, particularly, underemployment rates are analyzed, this problem goes beyond official unemployment rates. The capacity for the Turkish economy to create employment has become a very critical social problem. Similar to developed countries, the unemployment problem maintains its importance despite the structural harmonization policies adopted by developing countries and draws attention to studies related to the labor market.

Classical and neo-classical economists did not pay necessary attention to the subject of employment. The economic crises emerged at a time when the validity of the classical and neo-classical assumptions that the economy would enjoy continuous and complete employment equilibrium were not discussed, and was assessed as a temporary divergence from the equilibrium position. These crises turned into chronic events and, in particular, the damage that the 1929 Great Economic Depression incurred on the economies of developed countries justified the criticisms of the deficiencies of classical and neo-classical thought. The literature on classical economics showed the existence of numerous, diverse views on employment. Behind the emergence of classical employment theory was the general Keynesian theory that disproved the thoughts of the classical theory. Thus, Keynesian theory became the focus of economists' extensive analysis

and discussions related to the structure of the classical system. The starting point of classical employment theory is the production function providing three viewpoints. The first is the theory of demand and supply of labor. Accordingly, the equilibrium level for employment as determined by the intersection of the demand and supply curves must be at full employment. The second view is related to the effective demand level in the economy. The third view is the theory of general price levels (Wallace and Paul, 1992).

The classical economists' view that full employment is automatically and mandatorily attained in an economy in which all resources are utilized is based on J.B. Say's Law of Markets. Wages play a regulatory role in establishing full employment because they represent the price of labor used in production activity, regulating employment and establishing equilibrium. Classical economists argue that when the price mechanism is efficient in commodity and factor markets, the economy automatically achieves full employment. Moreover, an economy that achieves full employment automatically achieves maximum income levels. Long-term full employment depends on two factors. The first one is *interest rate*,—making savings supply equal investment demand. The second factor is *level of wages*. Wages prevent disequilibrium in the economy, indicating that they are determined as the intersection of labor demand and supply curves. None of the explanations use the notion that classical employment equilibrium is equivalent to full employment equilibrium. Yet, classical economic theory concludes, noting that supply is created at the level of full employment, supply creates its own demand, and goods and services that are produced are consumed.

The Marxist theory of employment derives from the labor theory of value. By arguing that there is an excess labor market supply, it suggests that unemployment is a natural result of the capitalist system. The excess labor supply is called the labor force in reserve. Marxist theory asserts that economic crises and rapid structural and technological changes create unemployment which leads to further growth of the labor force in reserve. From a Marxist perspective unemployment denotes the relationship between the population and the economic system. If the capital accumulation has a positive impact on labor demand, an increase in the latter is seen, if the impact is negative, then we observe a fall in labor demand.

Keynes (1936) does not accept that an economy with full employment can remain continuously at equilibrium. Employment theory consists of two important concepts—the total supply and total demand concepts that determine a national economy's employment level. Based on these two basic concepts, Keynes emphasized total demand and assumed that total supply as a constant. Keynes also emphasized the importance of

effective demand to modern employment theory. Effective demand is the amount of money actually spent to purchase goods and services in a society; therefore, it becomes equal to the sum of gained incomes in that society. In other words, effective demand equals national income. The level of total demand that determines the short-term employment level is equal to total supply, and is called effective demand, which purports to be realized demand. Total supply and total demand are directly related to modern income and employment theories. The fundamental notion put forward by the general theory is that total supply and total demand together determine income and employment (Wallace and Paul, 1992). Keynes rejected the notion that prices and wages determine employment, as classical models claimed. Instead, Keynes stated that total demand for goods and services produced in an economy is the basic factor that determines employment. He claimed that the state can intervene using various policies and can influence production volumes and employment. The objective of the general theory is to construct an alternative theory that explains how employment is determined in a complex industrial society. According to Keynes, liquidity preference and the amount of money are the factors that determine interest rates. Liquidity preference establishes a link between interest rates and the amount of money and shows how much money people want to hold at different interest rates. Within the economy, Employment depends entirely on income and spending levels. High income results in high spending and an increase in the total demand in the economy. For the economy to function at a certain employment level, requires the realization of consumption and investment spending for that level. When this condition is not fulfilled, effective demand is inadequate resulting in a decrease in income and employment to the level that corresponds with this effective demand. Consequently, modern employment theory depends on effective demand, which in turn, depends on consumption and investment spending (Lipsey and Chrysta, 2007). A strong relationship exists amongst employment and economic growth and social integration. Employment should be the central focus when economic and social policies are being defined. When an economy grows, employment (unemployment) is expected to increase (decrease), both numerically and proportionally. However, these expectations cannot be met all the time. During real economic growth, employment may stagnate and the number of unemployed people may even increase.

Monetarists put specific emphasis on price stability. While they defend the position that the free market reaches equilibrium thanks to its internal dynamics, unlike classical economists, they argue that the economy cannot be at full employment all the time. Monetarists prefer policies that aim to prevent high levels of unemployment as a result of high rates of

inflation rather than policies, which target eliminating unemployment. Friedman argues that the negative relation between unemployment and inflation rates is only a short-run phenomenon; in the longer term, the relationship between unemployment and the inflation rate first loosens then becomes independent. Even though the free market mechanism creates short-term unemployment, he argues that in the long-term full employment will be achieved. In the short-term, expected and real price levels differ; for this reason, governments can implement growth policies aiming at lower unemployment. In the longer run, when expected and real price levels equalize, application of growth policies by governments to reduce unemployment would be futile. Supply-side economists refute the idea that the economy can reach a certain level of equilibrium only at a very high unemployment level or that high inflation is necessary to increase production. They argue that inflation can be overcome with the elimination of factors having negative impacts on employment, savings, and capital accumulation. In the neoclassical model, on the other hand, expectations are rational rather than adoptive. According to this theory, government's announcement of its future policies does not have any impact on unemployment, neither in the short nor long-term. The Phillips curve, which suggests a negative relationship between unemployment and inflation rates, is only relevant during short-term surprise scenarios but no longer term.

Labor demand is a function of current real wages and labor supply is also a function of expected real wages for Neoclassic Employment Theory. In the labor market, it is not possible to speak of one equilibrium but of multiple equilibriums. The wage rate equilibrium is influenced by both current and expected price levels. The Neoclassic Employment Theory diverges from Classic Theory in its demonstration of the problem of labor market disequilibrium when current and expected wages differ. The New Keynesian model takes into account expectations with the assumption that they are rational. Based on this assumption, it rejects the neoclassical thesis on the irrelevance of policies. The New Keynesians use the term NAIRU, meaning non-accelerating inflation rate of unemployment rather than the term natural employment. With this, it has been suggested that even in countries where employment reach higher levels, unemployment is possible due to frictional and structural unemployment and that the level of natural unemployment can never be zero. For the structuralist theory of unemployment, linking unemployment to insufficient effective demand is a mistake made in developing countries; furthermore it is not possible to successfully define unemployment in such contexts. Rather than understanding unemployment in terms of insufficient effective demand, the structuralists suggest understanding it to be the result of irrational economic activities within developing countries. They put forward structural reasons

such as low levels of capital accumulation and domestic savings combined with high levels of population growth. While studying the growth and unemployment rate of the American economy Okun (1962) empirically proved the negative relation between unemployment rate and potential revenue in response to the changes labor force participation, working hours and efficiency. (Holmes and Silverstone, 2006). The theoretical background of the relations which Okun has studied derived from the belief that an increasing labor force should mean increasing goods, products and services. To simplify the analysis, it suggests using unemployment rates to calculate the amount of labor for production in a given economy. Okun's equation is regarded as an empirical law and widely applied when converting unemployment data into data on the output gap (Schnabel, 2002). Okun's Law points out the impact of an assessed growth rate on unemployment over time. There have been many exceptions to Okun's Law. These exceptional cases emerge when relations are analysed over the short- and long-term. Therefore, Okun's Law should not be considered as a rule rather a structural feature of the economy.

Fagerberg et al. (1997) found a negative correlation between growth and unemployment rates. Moosa (1997), Lee (2000), Sögner and Stiassny (2002) pointed to a strong and stable relationship. Sögner and Stiassny (2000) investigated structural breaks in fifteen OECD countries by means of Kalman filtering techniques and Bayesian analysis and came to the conclusion that growth rate impacts the unemployment rate in all countries except Italy. Cuaresma (2003) studied the U.S. to observe the relationship between growth and unemployment during economic expansion and contraction. He suggested unemployment responses to economic growth are asymmetric and this response is more marked during contraction than times of expansion. Al-Ghanam (2003) conducted a causality test and found a multi-directional relationship between growth and employment. Silvapulle et al. (2004) investigated whether unemployment increases during contraction periods and found out that unemployment responds more strongly to growth when the economy is contracting than expanding. Adanu (2005) estimated Okun's Coefficient with the Hodrick Prescott and quadratic methods. Holmes and Silverstone (2006) applied the Markov regime-switching approach to the US economy and concluded there is an asymmetrical relationship between growth and unemployment. Huang and Lin (2008) analysed the relationship between the unemployment and growth rates in the U.S. economy by using a smooth-time-varying-parameter. Maley and Molana (2008) estimated the relationship between the unemployment and growth rates for the G7 countries using by using Kalman filtering techniques and argued that the relationship is more marked for Germany. Villaverde and Maza (2009) investigated the growth-unemployment relationship by using

quadratic the Hodrick-Prescott and Baxter-King filtering techniques and concluded that they are inversely related. Charmes (2010) determined that increasing unemployment rates reveal a rigid structure in the face of growth.

Studies that focus on the relationship between growth and employment in Turkey were mostly conducted during the post-crisis periods. Erlat(2000) and Tunalı (2004) showed that growth does not reduce unemployment in the export-oriented period. Yılmaz (2005) conducted a causality test and found out that there is not a causal relationship between growth and unemployment rate in Turkish economy. Onaran and Aydıner-Avşar (2006) came to the conclusion that in some sectors in Turkey, investment is more effective than a low-wage policy to raise employment and in some other sectors, and lower real wages have a higher impact. In order to overcome the limited impact of growth on employment, employment- oriented growth policies should be formulated based on sector-by-sector strategies. Studies that focus on the post-crisis periods argued that increasing unemployment rates reveal a rigid structure in the face of growth (Telli et al., 2006; Yılmaz-Eser and Terzi, 2008). It has been already suggested that the growth-employment relation may vary by country and sector and that the sector and country employment dependency may differ (Duruel and Kara, 2009). Yeldan- Ercan (2011) suggested this rigidity is the result of the dual economic structure, which is characterized by advanced areas enjoying high technology and growth rates as opposed to traditional areas with an informal economy. In other words, the direction and the strength of relationship between growth and unemployment is largely determined by several factors; namely the capital-labor ratio in production and the nature of the growth-whether it is labor or capital-intensive.

In spite of a real output level growth, the lack of unemployment decline indicates a structural transformation in the Turkish economy in the first decade of the Millennium. The introduction of new products and services to the market with lower costs prevented established companies from recovering after the 2001 crisis which increased unemployment. Furthermore, although new industries acquire more gains from the structural transformation of the economy and their need for more skilled labor has increased, the unemployment rate did not reveal a decline, despite a growth in real output. Following this unstable period, the Turkish economy showed growth and a more stable profile. While the economy shrinks in 1999, it displays a growth in 2000 but another decline in 2001 is a result of the impact of the crisis. Turkey experienced higher than expected growth during 2002, 2003, and 2004. Yet, during this period, employment did not follow a similar positive progress and, in fact, unemployment increased indicating that a positive increase in growth is not always similarly reflected in employment. This situation becomes significant for economists and

government authorities who foresaw a decline in unemployment as the economy grew. For this reason, this article will examine the periods between 2000Q1-2013Q1. The negative effect of higher employment efficiency is a key reason for the economic growth that occurred without a corresponding increase in employment after the 2001 economic stagnation. Efficiency led to higher wages, enhanced workers' purchasing power, and increased demand for goods, services, and labor. During this process, inefficient firms exited the market, leaving thousands without jobs, and efficient firms took over and provided employment to the jobless. Therefore, in reality, although an increase in efficiency causes unemployment in the short term, it contributed to employment in the long term. Growth does not always lead to an increase in employment because it is unstable. In Turkey, where the workforce is continuously on the rise, increasing employment is possible by decreasing unemployment and stabilizing growth rates. However, economic growth in Turkey on its own cannot increase employment because of factors such as unstable growth and investment possibilities, rapid population growth, migration from rural places to cities, increases in efficiencies, structural rigidness in the workforce, and political instability.

Within this framework, the second section of this article reviews the econometric literature on long-and short-term relationships among economic indicators. In the third section, the interaction amongst gross domestic product, general price levels and employment levels in Turkey is explored using appropriate time series analysis methods. The final section assesses the findings.

2. ECONOMETRIC METHODOLOGY

Economics stationary concept is used parallel with economic equilibrium. Because most economic theories are based on an assumption of stationary to apply standard inference activities and various stationary variables are needed in econometric modeling. A statistics series is stationary if its variance and mean are constant over time. Spurious regressions with reference to time series forecasts and regression equations are likely to emerge if an economic series is not stationary. Unit root tests are used to determine stationarity, and this article uses the augmented Dickey-Fuller (ADF) test and Zivot ve Andrews (ZA) test for this purpose. The Dickey-Fuller test data generation process is assumed to be an AR(1) (Autoregressive process of order one) process. For an ADF(p) test, then

$$\Delta y_t = \beta_0 + \beta_1 t + \gamma_1 y_{t-1} + \sum_{i=1}^{p} \gamma_{2i} \Delta y_{t-i} + \varepsilon_t \qquad (2.1)$$

equation is achieved. The objective of the Dickey-Fuller equation is to identify autocorrelation effects in the series by inserting lagged difference terms to better determine the effects from shocks (Dickey and Fuller, 1981).

A structural break is one of the issues that have to be taken into account while conducting regression models investigating relations between economic variables. The strength of unit root tests, which neglect structural breaks, weakens and the test becomes inconsistent. A structural break in economic variables can be observed at a breaking point, at a slope or alternatively both at a point and slope, in discontinuous or gradual terms. A time-series variable can be stagnant within some sub-categories across determining trend. These sub-periods may be affected in fixed terms and/or by structural changes in the slope parameter. Conducting unit-root tests without taking such structural changes into account may lead to incorrect results and weaken the strength of the test. The estimated regression line derived from sample data differs from the real regression line in the presence of a structural break, and it weakens the predictions of time-series analysis by conducting a stagnation test. Tests vary in line with the knowledge of structural breaks-whether the time of break is known (or not) and whether the break is single or multiple. Perrron (1989) formulated an alternative unit root test that takes account of structural changes. In this test, as formulated, structural changes in the economy are assumed to be known in advance. Zivot and Andrews (1992) proposed a variation in Perron's test. Perron's test statistics consider the structural break in the economy as external and known in advance. Zivot and Andrews questioned the assumption of externality and proposed to study the case where a break is determined by internal factors, meaning that the time of the breaks is unknown.

$$\Delta y_t = \mu + \alpha y_{t-1} + \beta t + \theta_1 DU_t(\lambda) + \gamma_1 DT_t(\lambda) + \sum_{j=1}^{k} d_j \Delta y_{t-j} + \varepsilon_t \tag{2.2}$$

Cointegration allows an analysis of time series that is not stationary on its own but whose linear combination is stationary. Therefore, the actual notion behind the cointegration rationale is to identify the status of a linear combination time series that is not stationary on its own. Although the X and Y series grow in time, the error term does not grow and takes a value close to zero, indicating that the X and Y series are co-integrated. In other words, the X and Y series move together during a long period. Cointegration analysis, which analyzes the long-term relationship between variables that are integrated at the same level, prevents the potential loss of information and lack of a solution caused by the subtraction operation performed on non-stationary variables to make them stationary (Granger, 1981). An analysis

method was developed to determine whether a long-term relationship exists between two or more time series and that allows direct forecasting of the existence of an equilibrium relationship in economic theory (Engle and Granger, 1987). As for integration at the series level, mechanisms exist that bring them to equilibrium in the long term and that prevent the divergence from the averages to increase. In other words, compared with the coefficient obtained from the regression equation to be constructed after the series is made stationary, the coefficient obtained from the common integration regression equation converges faster to the actual parameter. After the regression equation is forecasted using the least-squares method, the Engle-Granger method sought stationary of the error term of this regression. The two-stage Engle-Granger method determines whether two series have a long-term relationship. If the error terms are stationary then the two times series are co-integrated. For the Engle-Granger method, the variable used as the dependent variable in constructing the cointegration vector has an effect on the results. The Engle-Granger method cannot test for more than one cointegration vector; in such a case, the Johansen cointegration test should be used. The Johansen method differs from the Engle-Granger method; it originates from vector auto regression (VAR) and captures not one but more than one cointegration relationships. The article by Johansen and Juselius (1990) developed the theory, provided the necessary tables, and made forecasts with maximum probability. The Johansen method is used on the same difference stationary time series as the Engle-Granger method, and accounts for short-term dynamic relationships and lag values of variables. The method allows forecasting of a combination of all common integration relationships that can exist between the variable set (Johansen, 1988). The disadvantage to the Engle-Granger method is that it does not reflect short-term developments. Error-correction models are used to manage short-term and long-term changes together. In general, use of error correction models is one way to understand whether a system not in equilibrium will achieve equilibrium in time. A system that achieves equilibrium provides preliminary information on the time needed to reach equilibrium. VAR(p) model for Johansen approach can be written as

$$X_t = A_1 X_{t-1} + A_2 X_{t-2} + ... + A_p X_{t-p} + e_t \tag{2.3}$$

under the assumption of $e_t \sim IIDN(0, \sigma^2)$. While X_t is k*1 dimension data matrix and A_i is parameter matrix and $\Gamma_1 = -(A_{i+1} + ... + A_p)$ for $i = 1,2,.., p-1$ and $\Pi = -(I_k - A_1 - A_2 ... - A_p)$, vector error correction model(VECM) is equal to

$$\Delta X_t = \Gamma_1 \Delta X_{t-1} + \Gamma_2 \Delta X_{t-2} + ... + \Gamma_p \Delta X_{t-p} + 1 + \Pi X_{t-1} + e_t \quad (2.4)$$

VAR parameters can be determined by using estimated VECM parameters

$$A_1 = \Gamma_1 + \Pi + I_k \quad , \quad A_i = \Gamma_i - \Gamma_{i-1} \;\; i = 2,.., p-1 \quad , \quad A_p = -\Gamma_{p-1} \quad (2.5)$$

Models developed to support certain ideas that might not provide healthy information on actual economic situations and interactions among economic variables. One of the most important alternative methods proposed to obviate the deficiencies in traditional econometric methods is the Hendry modeling method (Darnell and Evans, 1990). The purpose of the Hendry method is to go from a wide ranging general model that consists of all variables and their lagged values as envisioned by economic theory to the narrowest possible model that is in harmony with the data set satisfying certain criteria. In this model, at the stage in which the lag number is determined, one should pay attention to not decreasing the degree of freedom too much. In contrast, going back long enough to explain the dynamic economic process is necessary. During the modeling process, the model is re-parameterized to the extent possible using variables orthogonal to one another that have explanatory power from an economics perspective. Simplifying the model enables the determination of its smallest version compatible with the data set. Analysis of the model's error terms and forecasting power helps identify its weak points (Pagan, 1987). If the model derived from the equation is consistent with at least one theory and the explanatory variables used in the model are at least weak externally, then when the model is used to forecast different periods, identical parameters for each period and random error terms indicate that the most appropriate model is achieved (Hendry and Richard, 1982). Although regression analysis addresses dependent relationships among variables, this dependency does not always imply a causality relationship. Assuming two time series X_t and Y_t, for X_t to be the cause of Y_t, the predicted future values of Y_t calculated from X_t should provide more accurate results than the predicted future values of Y_t calculated without X_t (Granger, 1969). When Sims (1980) discovered vector auto regression models as an alternative to simultaneous equation models, the usability of VAR models in economic analyses increased. In VAR models, all observed variables are mostly considered internal. Two variable standard VAR model with two variables can be written as

$$Y_t = A_1 + \sum_{i=1}^{p} B_{1i} Y_{t-i} + \sum_{i=1}^{p} B_{2i} X_{t-i} + e_{1t}$$

$$X_t = C_1 + \sum_{i=1}^{p} D_{1i} Y_{t-i} + \sum_{i=1}^{p} D_{2i} X_{t-i} + e_{2t} \quad (2.6)$$

Each variable is forecasted using its own lagged values and the lagged values of other variables. Second, in a vector auto regression model, use of theory is important only in selecting variables. Thus, the parameters for this model are not formed using structural interpretation and no guarantee can be made that the result of the applied forecasts will be in accordance with the theory. Identified model deficiencies are corrected until the appropriate model is identified. Thereafter, the model may be used in forecasting, for causality, or for structural analysis (Lutkepohl, 2007).

3. INTERACTION OF ECONOMIC INDICATORS WITH EMPLOYMENT

Employment level is determined using the short-term production level. If production increases rapidly, enterprises employ more people. Yet, production depends on effective demand, which is divided into consumption and investment and analyzed separately. The size of the portion of effective demand allocated from national income for consumption depends on the distribution of national income. Money allocated for investment is determined by two factors; namely, efficiency and the cost to borrow the money needed for investment. The efficiency of an investment should be evaluated not only during the first or second year but also throughout the life of the relevant operation, and the potential results achieved. Efficiency attained in the future depends on sales volume and the price at which these sales are made. The relationship of employment (EMP) with gross domestic product (GDP) and general price levels (WPI) is analyzed using quarterly data from 2000:Q1–2013:Q1. The data used in this article are taken from the Central Bank of Turkey and from the Turkish Statistical Institute. Time series analysis techniques are employed to empirically analyze long-term equilibrium. These techniques provide information on whether equilibrium is achieved and whether the system returns to equilibrium in the long run aftershocks are applied and deviations continue. However, although short-term shocks may affect the variables used to analyze long-term equilibrium, the variables must have the characteristic of returning to their previous equilibrium levels after the influence of these shocks has ended. In particular, this framework tests the stationary of the identified macro-economic variables. In order to eliminate seasonal fluctuations, EMP, GDP

and WPI are seasonally adjusted using moving average method. To stabilize the variance and purify small fluctuations, the logarithmic value of the series is used. The concept behind the cointegration rationale is to search for linear combinations of times series which are not independently stationary. Johansen method, based on a vector autoregressive model (VAR), is performed to analyze cointegration relationships. Therefore, before the method is applied, the number of lag coefficients suitable to the minimum AIC principle was found to be k = 7, as shown in Table 1. Because the study period includes financial crises in Turkey, the series are examined in terms of whether they have structural breaks. The existence of cointegration is sought in Table 2 since all series are integrated at the first-order difference stationary by Augmented Dickey Fuller (ADF) and Zivot-Andrews (ZA) test.

Table 1. VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	135.7439	NA	5.50e-07	-5.8997	-5.7792	-5.8548
1	307.8572	313.6286	3.91e-10	-13.1492	-12.6674	-12.9696
2	326.0702	30.7597	2.61e-10	-13.5586	-12.7155	-13.2443
3	349.0171	35.6953	1.43e-10	-14.1785	-12.9741*	-13.7295
4	364.0626	21.3979	1.12e-10	-14.4472	-12.8814	-13.8635
5	373.8910	12.6677	1.13e-10	-14.4840	-12.5569	-13.7656
6	388.0600	16.3730	9.68e-11	-14.7137	-12.4253	-13.8606
7	406.0365	18.3759*	7.22e-11*	-15.1127*	-12.4629	-14.1249*
8	414.8052	7.7944	8.48e-11	-15.1024	-12.0913	-13.9799

While the model is created, linear deterministic trend is taken into account by using Schwartz criteria. As Table 2 shows, one cointegration relationships were found in the trace test and in the eigen test. According to the long-term equilibrium equation obtained using the normalized cointegration vector, 1% increase of economic growth decreases employment approximately 0.12% and a percent change occurring in general price levels increases employment approximately 0.72%. To ensure that the normalization has been performed correctly for the obtained results, weak exogeneity test is done. The likelihood ratio (LR) test indicates that the result of cointegration vector is to be valid.

$$EMP_t = -0.122829GDP_t + 0.727327WPI_t - 0.018292@Trend \quad (3.1)$$

Co-integrated series means that there is a long term stability relations. However, in the short term may be an imbalance between series. The resulting error term is handled as an error correction term or stabilizing error term and can established a balance between short term and long term. The short-term dynamics of the co-integrated series examined by error correction mechanism. β_1 refers the error correction or adjustment coefficient in Table 2. The signs are found negative as expected and significant. It can be said that there is a long run causality from WPI and GDP to employment. After restrictions for coefficients of GDP and WPI examined by Wald test, coefficients of each variables are found linear. Owing to the fact that GDP and WPI cannot cause employment, it is determined that there is no short run causality between these variables and EMP.

Table 2: Long-Term Equilibrium Model

Trace Test			Maximum Eigen Test		
Eigen Value	Trace Statistics	Critical Value (%5)	Eigen Value	Max. Eigen Statistics	Critical Value (%5)
0.565	63.086*	42.915	0.565	37.494*	25.823
0.312	25.591	25.872	0.312	16.851	19.387
0.176	8.740	12.517	0.176	8.740	12.517
Vector error Correction Model					
Coefficient (β_1)		Std. Error		t-Statistic	
-0.317399*		0.099245		-3.198147	

* means significance at 5%

Besides the long term model a long-term model, in order to forecast a short-term equilibrium model, Hendry's general-to-specific modeling method is used. According to the AIC criteria the suitable lag coefficient of the model is determined as seven. The forecasted general model is subject to a simplification process to attain a model most suitable under the acceptance criteria. Thus, to protect the explanatory power of the model, each stage of the three-stage simplification process is tested using an F-test and the simplest interpretable model compatible with the theory is attempted. By simplifying, we find the smallest short-term model consistent with the dataset. This approach ends by testing the model's error terms and forecast power and making comparisons with competing models through rounded and unrounded tests.

Table 3: Obtained Special Model; Determined Variable (EMP)

β_1 *	β_2 **	β_3 *	β_4 *	β_5 *	β_6 *	β_7 *	β_8 *	β_9 *	β_0 *
-0.29	-0.24	-0.18	-0.21	0.13	0.10	-0.40	0.37	0.10	-0.01
(0.05)	(0.08)	(0.10)	(0.09)	(0.03)	(0.04)	(0.15)	(0.10)	(0.02)	(0.00)
F-stat: 14.390, Adjusted R2: 0.732, H.K.T.: 0.005 D.W.: 2.290									

*, ** respectively mean significance at 5% and 10%.

Coefficients related to restricted regression equations appear in Table 3. We find that the imposed restriction while switching from the general to specific models is valid. While cointegration coefficient is presented as β_1, the obtained model can be written as

$$D(EMP)= \beta_0 + \beta_1 *(EMP(-1)-0.122829*GDP(-1)+0.727327*WIP(-1)-$$
$$0.0182*@TREND- 11.540151)+ \beta_2 *D(EMP(-2))+ \beta_3 *D(EMP(-3))+$$
$$\beta_4 *D(EMP(-6))+ \beta_9 *D(GDP)+ \beta_5 *D(GDP(-1))+ \beta_6 *D(GDP(-3))+$$
$$\beta_7 *D(WIP(-1))+ \beta_8 *D(WIP(-7))$$

According to the special model, changes in employment levels depend on the GDP levels first and third periods ago, general price levels first and seventh periods ago and the employment level second, third and sixth periods ago. According to the results obtained, GDP and WPI have positive and significant effect on EMP. The model is significant with respect to economics, statistics, and econometrics.

Table 4: Diagnostic Tests

	F-statistic	Prob.	Obs*R^2	Prob. Chi
Breusch-Godfrey	0.634	0.720	10.283	0.173
Heteroskedasticity	0.738	0.642	5.583	0.589
Jarque-Bera	0.840		Prob: 0.656	

The ARCH-LM, Ramsey Reset and Breusch-Godfrey LM test results indicate that the special model in Table 3 has neither statistical nor econometric problems. The obtained special models residuals as seen in Table 4 are normally distributed. There is no serial correlation or ARCH effect. Due to Cusum and Cusum SQ tests, in Figure 1, parameters are stable and there is no structural break in the model.

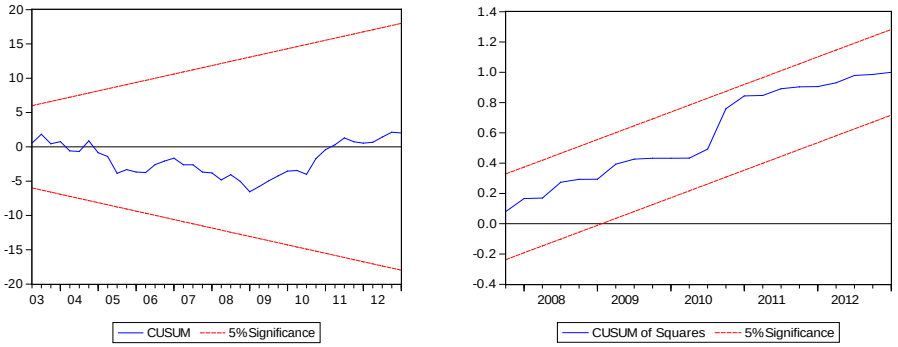

Figure 1.
Cusum Test Results

Short-term relationships are evaluated with respect to structural and policy analysis. From among the previously noted applied methods, the general-to-specific modeling method targets structural analysis by determining the dynamic interactions among the variables In contrast, the vector autoregressive (VAR) model and its continuous impulse-response and variance decomposition analyses are used for policy-making. The economic variables used for this purpose usually indicate a continuous interaction with each other. The analyses utilizing these variables have difficulty to differentiate variables as internal or external. The Granger causality test facilitates such an analysis.

Table 5: Granger Causality Test Results

Null Hypothesis	F-Statistics	Probability
D(GDP) does not Granger Cause D(EMP)	2.81942	0.0251
D(EMP) does not Granger Cause D(GDP)	0.49235	0.8093
D(WPI) does not Granger Cause D(EMP)	3.02198	0.0182
D(EMP) does not Granger Cause D(WPI)	0.34764	0.2646
D(WPI) does not Granger Cause D(GDP)	2.66248	0.0322
D(GDP) does not Granger Cause D(WPI)	3.04010	0.0177

The results in Table 5 show that the causality flow diagram between variables is from GDP to EMP and to WPI, and from WPI to EMP and to GDP. The VAR equation forecasted using the appropriate lag (k = 6) determined with respect to the AIC criteria. After deciding the most appropriate lag value and VAR model as shown in Table 6, the

autocorrelation and heteroscedasticity tests are performed to determine whether the model is the best.

Table 6: VAR Model

	D(EMP)		D(GDP)		D(WPI)	
D(EMP(−1))	0.042	(0.165)	-0.149	(0.375)	0.159	(0.083)
D(EMP(−2))	-0.332	(0.175)	0.052	(0.398)	-0.081	(0.088)
D(EMP(−3))	0.027	(0.181)	0.203	(0.411)	-0.094	(0.091)
D(EMP(−4))	0.086	(0.184)	0.020	(0.417)	0.037	(0.093)
D(EMP(−5))	0.097	(0.176)	0.104	(0.400)	0.022	(0.089)
D(EMP(−6))	-0.232	(0.150)	-0.001	(0.341)	0.006	(0.076)
D(GDP(-1))	0.072	(0.088)	0.032	(0.201)	-0.033	(0.044)
D(GDP(−2))	0.018	(0.088)	-0.435	(0.200)	-0.005	(0.044)
D(GDP(−3))	0.051	(0.073)	-0.208	(0.166)	0.003	(0.037)
D(GDP(−4))	-0.06	(0.076)	0.436	(0.172)	0.034	(0.038)
D(GDP(−5))	-0.079	(0.083)	-0.320	(0.188)	-0.095	(0.042)
D(GDP(−6))	-0.173	(0.089)	-0.033	(0.202)	-0.036	(0.045)
D(WPI(−1))	-0.101	(0.294)	-0.157	(0.666)	0.613	(0.148)
D(WPI(−2))	-0.211	(0.342)	0.048	(0.776)	-0.194	(0.173)
D(WPI(−3))	-0.125	(0.249)	-1.195	(0.565)	0.154	(0.126)
D(WPI(−4))	0.066	(0.251)	1.416	(0.570)	-0.141	(0.127)
D(WPI(−5))	0.170	(0.274)	-0.233	(0.621)	0.075	(0.138)
D(WPI(−6))	-0.106	(0.205)	0.032	(0.465)	0.145	(0.103)
C	0.011	(0.005)	0.021	(0.012)	0.008	(0.002)
R-squared		0. 719		0.818		0.884
Adj. R-squared		0.531		0.698		0.807
Akaike information criterion : -14.61927						

Consequently, by eliminating internal and external differences in the variables, the analysis using a VAR model with the variables that are internal and the variables that contain internal and lagged internal variables, results in a more beneficial analysis of impulse-response and variance decomposition functions. An impulse-response function is constructed to analyze the effect of a one standard deviation shock on the variables employed based on the forecasted VAR model for employment during the various periods. The impulse-response functions are analyzed to assess the term effects of a positive one-standard-deviation shock on the variables in question on the basis of the forecasted VAR model.

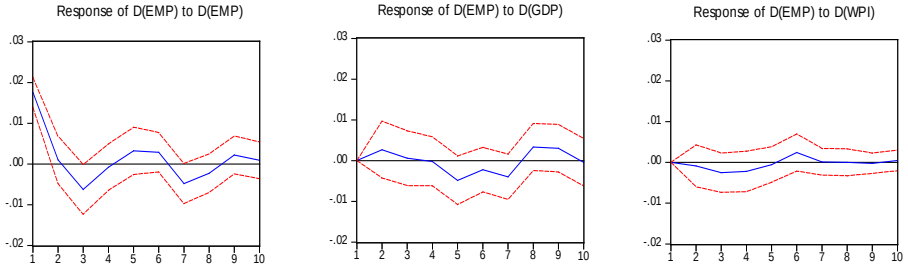

Figure 2.
Response to Cholesky One S.D. Innovations ± 2 S.E.

Figure 2 shows that a positive shock to the GDP demonstrated a decrease in the employment in the second period till seven period. Employment persisted around an average. Confronting a one-standard-deviation shock in WPI, employment decreased in the second period and acquired a negative value. It displayed a sudden increase in the sixth and seventh period. However, the long term, GDP and WPI ascended from zero to negative in the periods shown in Table 7.

Table 7. Impulse-Response Function for Employment

	Period				
	1	2	3	4	5
EMP	0.017613	0.000996	-0.006272	-0.000775	0.003201
	(0.00184)	(0.00292)	(0.00304)	(0.00284)	(0.00289)
	6	7	8	9	10
	0.002852	-0.004796	-0.002307	0.002199	0.000885
	(0.00241)	(0.00245)	(0.00237)	(0.00233)	(0.00226)
	1	2	3	4	5
GDP	0.000000	−0.002672	0.000571	-0.000222	-0.004854
	(0.00000)	(0.00348)	(0.00337)	(0.00300)	(0.00297)
	6	7	8	9	10
	-0.002234	- 0.003977	0.003324	0.003016	-0.000435
	(0.00274)	(0.00278)	(0.00289)	(0.00292)	(0.00291)
	1	2	3	4	5
WPI	0.000000	-0.000881	−0.002520	−0.002233	−0.000538
	(0.00000)	(0.00257)	(0.00241)	(0.00248)	(0.00218)
	6	7	8	9	10
	0.002400	0.000126	-2.33E-06	-0.000242	0.000456
	(0.00227)	(0.00164)	(0.00164)	(0.00125)	(0.00127)

Table 7 shows the development over ten periods of the response of employment to a one standard deviation shock delivered to GDP and WPI. A one standard deviation shock to GDP has a negative effect on employment, whose effect reached its maximum at the end of the second period, after which it began to decrease. The effect is insignificant, approximately, during the first period. From the third to fourth period, the shock caused employment to show a positive effect, which reached its maximum at the end of the fourth period and then decreased after the fourth period. After the sixth period, this effect became insignificant and continued in this way until the end of the period. A one standard deviation shock to general price levels had a negative effect on employment until the fifth period. The effect is insignificant in the first period. The expectation that general price levels increase employment was valid only in sixth and seventh period. Later, the effect was not in line with economic expectations. However, employment's effect on itself reversed direction in third and fourth period. This response decreased until the seventh period and continued in this manner until the end of the period.

Table 8: Variance Decomposition Function for Employment

Period	1	2	3	4	5
EMP	1.0	97.5	96.0	94.7	89.2
WPI	0.0	0.2	1.9	3.2	3.1
GDP	0	2.3	2.1	2.8	7.7
Period	6	7	8	9	10
EMP	87.2	84.8	83.0	81.7	81.6
WPI	4.2	3.9	3.7	3.6	3.7
GDP	8.6	11.3	13.3	14.7	14.7

To determine the extent to which changes in WPI and GDP affect the EMP, a variance decomposition function is analyzed. Table 8 shows that the changes in employment are derived from employment itself during the first period. This rate gradually decreased and reached 81.6% at the end of the tenth period. The important effect of GDP on the EMP is determined in the seventh period. Nonetheless, the effect on WPI is low in the first period but increases as the periods extend. At the end of the tenth period, GDP explained by 14.7%, and general price levels explained by 3.7% of the changes in employment level. Variance of employment decomposition function shows that, although the effect from GDP decreases in the short-term, it increases steadily in the long term and are at a significant level. Although the effect on WPI increases in the long term, it does not significantly affect the EMP.

4. CONCLUSION AND SUGGESTIONS

Unemployment is the exclusion of labor, which is the main and (in contrast to capital) non-accumulated factor of production, from employment. Employment, on the other hand, is a significant economic activity, which denotes employment of labor in accordance with the prevailing level of technology for income-generation purposes. Elasticity of employment varies between countries dependent on their social and economic structures. Unemployment in Turkey is an extremely critical economic problem, and many prior thoughts were formed on unemployment. This article analyzed the effects of income and prices on employment in Turkey, where income and prices are, according to Keynesian employment theory, the two primary factors that affect employment, thus, analyzing the stationary status of variables. Cointegration analysis was employed to determine long-term relationships, while the general-to-specific modeling method and the VAR model was used to determine the dynamic, short-term interactions among variables. Furthermore, to determine the variables that affect the power of other variables that result from applied shocks, impulse-response and variance decomposition analyses were conducted. The another variable analyzed for its effect on employment was the income, as shown in Hendry modeling, whose positive effect during the study period was in line with economic expectation.

The results of the analysis show that general price levels moved in a direction opposite to economic expectations. The impulse-response and variance decomposition functions concluded that, contrary to Keynes' claim, general price levels in Turkey had no effect on employment in the expected manner but had the opposite effect on employment and at a low rate. Inflation takes place when in a given economy the general price level continuously rises above a certain value. The Phillips Curve suggests a trade-off between unemployment and changes in wages. In Turkey, as the price index displays declining trend, employment gains a structural character. The article points out that in the years when WPI stood at lower levels the EMP variable reflects a small value; whereas in times when WPI was high the EMP had a high value. This result does not correspond with the opinions of those who propose that growth can be realized in a stable economic environment where inflation has declined and an increase in employment has taken place. Therefore, it can be said that asymmetrical factors may be operating in the domain of monetary policy.

In economies with increasing growth-rates, the problem of unemployment is not expected. The absence of the expected increase in employment despite economic growth, however, suggests the weakening of the correlation between economic growth and employment. The Phillips

Curve demonstrates a negative correlation between economic growth and unemployment. In other words, new employment opportunities are expected as a result of economic growth. In Turkey, growth rates have shown an increase since 2000 because of the increased liquidity, the sustained financial discipline, the inflation having been controlled, the influx of foreign capital into the domestic economy, the higher rates of foreign trade deficit and the lowering of labor costs which give a competitive price advantage within the framework of an export-oriented growth strategy. Since the factors that have contributed to economic growth have not targeted job creation or have such impacts, there has been no increase in employment.

In today's global economy to achieve a competitive edge, higher production rates with a reduced workforce are the ideal sought after. Rather than increased employment, the new technologies are adopted to improve a country's economy. While the employed sector has been contributing to production and to the accumulation of capital, capital-intensive and knowledge-intensive production processes downsize labor forces and create unemployment. Newly adopted regulations on job-security have also not promoted employment. For this reason, in Turkey the process of growth has been taking place with no increase in employment. This assessment indicates that unemployment cannot be solved by economic growth, but only that growth should be also employment-friendly. Thus, it is possible to say that the economic growth in the Turkish economy is a capital-intensive growth and that the capital-labor ratio has been weighted in favor of capital. In Turkey, unemployment rates have been steadily increasing because of the substitution of labor-intensive production with capital-intensive production. The structural transformation in Turkey cannot enable the transfer of employment from labor-intensive sectors, which provide higher employment capacity, to high-technology sectors.

While employment in the agricultural sector has been decreasing due to the migration from rural areas to cities, the labor-force participation-rate has increased more than the rate of employment created by economic growth.

In addition to this, the factors that contributed to undermined the impact of economic growth on employment in Turkey are the increased demand for qualified labor and decreased demand for unskilled labor with increased technology, abundance of labor in some sectors with the corresponding scarcity of labor in other areas, the presence of unemployment hysteresis that contributes to the rise in the natural rate of unemployment with the consequence of permanent unemployment, informal labor, increased population growth, education policies, an incomplete process of

industrialization, political instability and factors caused by a demand for labor.

In order to increase the positive impact of economic growth on employment, macroeconomic policies that tackle the structural aspects and demographic conditions of unemployment should be implemented. The differing effects of economic growth among the different sectors in creating possible employment within these sectors are important for the structural growth within them. For this reason, growth-oriented policies should be based on sector-specific ones. Labor force policies, which correspond to national needs and requirements, should be formulated. The regulation of capital markets is needed to prevent speculative movements and long-term investment by foreign capital should be encouraged.

In this framework, it is suggested for the future research to use employment investment levels related to employment in the analysis instead of using general price levels as a variable that affects employment. Moreover, instead of directly involving general price levels in the analysis, using real wages allows for an indirect analysis of the effects of general price levels seems more impressive. Finally, due to the results obtained from the analysis, it is observed to be necessary to include movements of income, industrialization indices and education levels as variables that affect employment in the future studies, since these variables are in the line with economic expectations and expected levels.

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