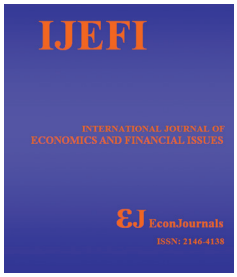

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An Empirical Examination of Unemployment Invariance Hypothesis, Discouraged and Added Worker Effects in Turkey

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ABSTRACT

This paper examines the long run relationship between unemployment and labor force participation rates as a criterion for assessing the validity of discouraged effect or unemployment invariance hypothesis in Turkish labor market for the period 2000Q1-2011Q3. To this end, ARDL bounds testing and Gregory and Hansen cointegration methods are utilized to test for the long run relationship between unemployment and labor force participation rates. The empirical results indicate that there is no evidence of a long run relationship between unemployment and labor force participation rates by using both aggregate and disaggregated data and thus long run unemployment rate is independent of labor force participation rate in Turkey.

Keywords: Unemployment Invariance Hypothesis, Discouraged Worker Effect, Labor Force Participation Rates, Unemployment, Cointegration
JEL Classifications: C22, E24, J60

1. INTRODUCTION

Over the last few years, there has been a growing interest in analyzing the labor market but relatively little attention has been put on studies concerning labor force participation and unemployment, despite the fact that the association between unemployment and labor force participation rate is an important social and economic issue in almost all the countries. The current interest in the behavior of labor force participation rates stems largely from the implications for general economic policy. It is obvious that changes in the participation rates during periods of changing employment have a direct effect on the magnitude of the unemployment rates and thus on the impact of economic policies designed to bring about full employment. Labor force participation seems to be sensitive to cyclical conditions in the labor market and this has led to the hypothesis of a causal link running from unemployment to labor force participation (see, e.g., Layard, 1991; Blanchard and Diamond, 1990; Burda and Wyploz, 1994; Bell and Smith, 2002; Gomes, 2009; Kakinaka and Miyamoto, 2012).

As stated by Österholm (2010) and Emerson (2011), the existence or the lack of association between unemployment and labor force participation rates has important implications for theoretical and empirical studies. While the existence of relationship between the two variables is related to discouraged worker effect that occurs when workers move in and out of the labor force with the business cycle, whereas the lack of this relationship is an indication of unemployment invariance hypothesis[1], which suggests that the long run unemployment rate is independent of the labor force (as well as capital stock and productivity). The discouraged worker effect has been defined as the decision to refrain from job search as a result of poor chances on the labor market.

1 There are two forms of the unemployment invariance hypothesis (Karanassou and Snower, 2004. p. 299): *"(i) the strong invariance and (ii) the weak invariance hypothesis. The former asserts that any change in capital stock, total factor productivity, or labor supply, leads to opposite shifts in the labor demand, wage-setting, and labor supply curves so as to keep unemployment rate at its original equilibrium level. The latter claims that capital stock, productivity, and labor force could impact long run unemployment rate".*

The main purpose of this paper is to investigate the possible long run relationship between unemployment rates and labor force participation rates using aggregate and disaggregated data by gender for Turkey over the period 2000Q1-2011Q3. The remainder of the paper is organized as follows. Section 2 describes data and empirical methodology and that presents the empirical results. Section 3 concludes.

2. DATA AND EMPIRICAL ANALYSIS

This study examines the relationship between unemployment and labor force participation rates in Turkey following the empirical analysis of Österholm (2010), Emerson (2011), Kakinaka and Miyamoto (2012). Those authors investigate the relationship between two variables for Sweden, the United States and Japan, respectively. They find that there is a long run relationship between the two variables, supporting discouraged worker effect rather than unemployment invariance hypothesis. Unlike the previous studies, this study takes structural break into account and makes use of unit root and cointegration tests with a structural break. This study intends to contribute to the existing literature by considering effects of a structural break on the empirical analysis.

2.1. Data

Seasonally adjusted quarterly data on unemployment (u_t) and labor force participation (lfp_t) rates for the period 2000Q1-2011Q3 are obtained from Turkish Statistical Institute -TUIK. In addition to aggregate rates, empirical analysis is also conducted on unemployment and labor force participation rates by gender to see how robust the results are. The time series plots of the data are presented in Figure 1, depicting the evolution of the data in question over the last decade. The major characteristics of Turkish labor market are a declining trend of labor force participation up to the last quarter of 2005 and an increasing trend of unemployment rate since 2001, due to rapid industrialization and urbanization. In Turkey, there has been a large increase in the active working population, but a very modest rise in the demand for labor. As a result, labor force participation rates have constantly decreased by the early of 2008 and work in the informal sector has grown during the last decade. There is a widespread view that despite the high rate of economic growth in the last years, the Turkish economy has failed to create employment areas to reduce unemployment rates.

2.2. Unit Root Tests

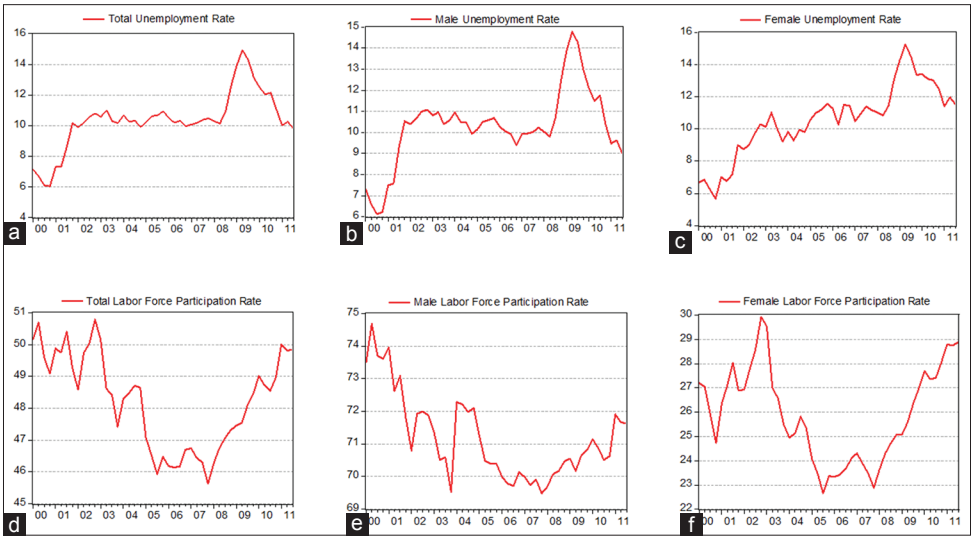
This study begins with tests of unit roots in respective variables using alternative methodologies: The Augmented Dickey-Fuller test with GLS de-trending (Elliot et al., 1996), KPSS test (Kwiatkowski et al., 1992) and Perron (1997) unit root tests with an endogenous break. As is well known, the first test has a unit root under the null whereas the KPSS test has stationarity under the null hypothesis. The results of unit root tests are reported in Table 1.

All the unit root test results suggest that variables are non-stationary in levels and stationary after first-difference, regardless of aggregation level. Thus, we can check the existence or lack of a long run relationship between the variables in cointegration procedures.

2.3. Cointegration Tests

Having established that all series are unit root process, it is rational to test the issue of whether there is a long run relationship between unemployment and labor force participation rates. In the light of this evidence, one may pursue tests of cointegration using two-step procedure of Engle-Granger (1987, EG) or the maximum likelihood procedure of Johansen and Juselius (1990). However, a limitation of conventional cointegration tests such as EG (1987) and Johansen and Juselius (1990) is that they do not consider the effect of a structural break in long run relationship between the variables. Hence, we also employ the Gregory and Hansen (1996, GH) cointegration tests. GH (1996) offer three different models to consider three different kinds of structural change in the long-run relationship: The level shift model (change in the intercept, C), the level shift model (change in the intercept with linear trend, C/T), the regime shift (change both in the intercept and slope, C/S). The first model, level shift model (Model C), contains an intercept and a level shift dummy as follows:

Figure 1: (a-f) Aggregate and disaggregate unemployment and labor force participation rates in Turkey



$$y_{1t} = u_1 + u_2\phi_{1\tau} + \alpha^T y_{2t} + \varepsilon_t, t = 1\ldots, n \quad (1)$$

The second model (C/T) includes an intercept and a trend with a level shift dummy:

$$y_{1t} = u_1 + u_2\phi_{1\tau} + \beta t + \alpha^T y_{2t} + \varepsilon_t, t = 1\ldots, n \quad (2)$$

The third model is the regime shift (C/S) model that allows for changes in both intercept and slope:

$$y_{1t} = u_1 + u_2\phi_{1\tau} + \alpha_1^T y_{2t} + \alpha_2^T y_{2t}\phi_{1\tau} + \varepsilon_t, t = 1\ldots, n \quad (3)$$

Model C/S includes two dummy variables, one for the intercept and one for the slope. In the context of the analysis, y_{1t} and y_{2t} are the labor force participation and unemployment rates: u_1 and α_1 are the intercept and slope coefficients before the shift: u_2 and α_2 denote the intercept and slope coefficients at the time of the shift. The dummy variable is denoted by $\varphi_{1\tau}$ and is defined by: $\varphi_{1\tau} = 0$, if $t \leq (\eta\tau)$ and $\varphi_{1\tau} = 1$, if $t > (\eta_\tau)$ where the unknown parameter, τ, denotes the relative timing of the change point. The models are estimated recursively allowing the breakpoint τ to vary such that $0.15T \leq \tau \leq 0.85T$, where T is the sample size.

2.4. ARDL Bounds Test

However, given the relatively low power of unit root and cointegration tests especially in the case of structural breaks, we also choose to proceed with the Pesaran's ARDL model. Unlike the conventional cointegration tests such as Engle-Granger, Johansen-Juselius and Gregory-Hansen, the appealing aspect of this approach is that a long run relationship could be established irrespective of the time series properties of the variables in the model. This procedure starts by estimating an unrestricted ARDL model as follows:

$$\Delta u_t = \alpha_0 + \sum_{j=1}^{n} b_j \Delta u_{t-j} + \sum_{j=1}^{n} c_j \Delta lfp_{t-j} + \delta_1 u_{t-1} + \delta_2 lfp_{t-1} + \varepsilon_{1t} \quad (4)$$

$$\Delta lfp_t = \alpha_0 + \sum_{j=1}^{n} b_j \Delta lfp_{t-j} + \sum_{j=1}^{n} c_j \Delta u_{t-j} + \delta_1 lfp_{t-1} + \delta_2 u_{t-1} + \varepsilon_{1t} \quad (5)$$

The bounds test begins by testing for the presence of a long run relationship using the F-test to determine the joint significance of lagged levels of the variables involved. The null of no cointegration defined by H_0: $\delta_1 = \delta_2 = 0$ is tested against the alternative of H_1: $\delta_1 \neq \delta_2 \neq 0$, by means of F-tests. However, the asymptotic distribution of this F-statistics is non-standard, irrespective of whether the variables are I(0) and I(1) or even fractionally integrated. Pesaran et al. (2001) provide two sets of asymptotic critical values for the F-test. The critical values that are tabulated consist of an upper bound on the assumption that all variables integrated of order one, I(1) and a lower bound on the assumption that all variables are integrated of order zero, I(0). The null hypothesis of no long run relationship among the variables could be rejected if the computed F-statistic higher than the upper bound of the critical values.

The results of the cointegration tests are reported in Table 2. On the basis of the results of EG (1987) and GH (1996) cointegration tests, there is no long run relationship between unemployment and labor force participation rates.

Moreover, the second column of Table 2 presents the computed F values for testing the existence of a long run level relationship. The computed F-statistics in Table 2 need to be compared with the critical bounds in Pesaran et al. (2001) or the critical values that account for small sample size provided by Narayan (2005). The calculated F-statistics are smaller than the lower bound of the critical value from Narayan (2005) or Pesaran et al. (2001) whether unemployment or labor force participation rates is the dependent variable, suggesting that there is no long run relationship between unemployment and labor force participation rates.

3. CONCLUSION

This paper provides some evidence of the lack of a long run relationship between labor force participation and unemployment rates in Turkey. The cointegration tests suggest that there is no long run relationship between unemployment and labor force participation rates. It is observed that there is no cointegration relationship in the variables irrespective of gender.

The empirical results are robust and continue to prove when using the data by gender. The empirical findings of this study, contrary

Table 1: Unit root test results

Unit Root Tests	All		Male		Female	
	U_t	LFP_t	U_t	LFP_t	U_t	LFP_t
Level						
ADF-GLS	−2.407[a]–2.678[b]	−1.240[a]–1.269[b]	−2.511[a]–1.986[b]	−2.180[a]–1.566[b]	−2.026[a]–0.883[b]	−1.639[a]–1.612[b]
KPSS	0.087[a]	0.205[a]	0.086[a]	0.195[a]	0.096[a]	0.178[a]
	0.527[b]	0.334[b]	0.391[b]	0.523[b]	0.743[b]	0.187[b]
Perron	−2.064	−2.396	−2.085	−2.779	−2.170	−2.465
	(2011:01)	(2007:02)	(2011:01)	(2007:03)	(2010:03)	(2007:01)
First Differences						
ADF−GLS	−4.407[a]–4.010[b]	−2.180[a]–1.566[b]	−4.016[a]–3.475[b]	−7.063[a]–5.430[b]	−6.596[a]–6.455[b]	−5.068[a]–−4.860[b]
KPSS	0.062[a]	0.156[a]	0.065[a]	0.054[a]	0.053[a]	0.097[a]
	0.165[b]	0.334[b]	0.173[b]	0.193[b]	0.149[b]	0.276[b]

[a]With Trend, [b]Without Trend. TB denotes the break date. ADF-GLS critical values for levels at 1% and 5% significance are−3.770, −3.190 (with trend); −2.616, −1.948 (without trend), respectively. KPSS critical values for levels at 1% and 5% significance are 0.216, 0.146 (with trend); 0.739, 0.463 (without trend), respectively. Perron (1997) critical values for IO2 model at 1% and 5% significance are −6.32, −5.59 respectively. Figures in brackets are break dates

Table 2: Cointegration test results

Variables	EG (1987)	ARDL Test		G-H (1996) Test ADF* Statistics		
	ADF	F (u|lfpt)	F (lfpt|u)	C	C/T	C/S
All	−2.363	3.810	1.955	−2.095 (2008:04)	−2.740 (2004:04)	−2.107 (2009:02)
Male	−2.256	2.661	3.784	−2.539 (2009:02)	−3.853 (2008:04)	−2.728 (2009:02)
Female	−1.745	2.075	1.381	−2.317 (2008:04)	−2.851 (2004:01)	−2.463 (2008:04)
C.V						
%1	−4.103	I (0) 7.560	I (1) 8.685	−5.13	−5.45	−5.47
%5	−3.449	5.220	6.070	−4.61	−4.99	−4.95
%10	−3.122	4.190	4.940	−4.34	−4.72	−4.68

Figures in brackets are break date. The critical values for the ADF test are from MacKinnon (1996). The critical values for the F-statistics from Narayan (2005: 1988), unrestricted intercept and no trend for the number of variables, k=1. The critical values for the G-H test are from Gregory and Hansen (1996: 109), respectively

to the results of Österholm (2010), Emerson (2011), Kakinaka and Miyamoto (2012), support unemployment invariance hypothesis, implying that the long run unemployment rate is independent of the labor force.

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