Modelling Nonlinear Behavior of Labor Force Participation Rate by STAR: An Application for Turkey

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26 March 2013

Modelling Nonlinear Behavior of Labor Force Participation Rate by STAR: An Application for Turkey

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Abstract

During the economic crisis periods, due to the discouraged worker and added worker effects, we may not gather healthy information from the unemployment rates concerning the labor market. For this reason, it is claimed in the literature that the Labor Force Participation Rate (LFPR) may be a better indicator than the unemployment rate during the economic crises. When the time series data exhibits asymmetry and nonlinearity during the recessions, the LFPR tends to diminish. Following, the unemployment rate may decrease because of the diminishment in LFPR. To add more, it may not reflect the actual aspects of the market. As a result while considering the unemployment rate we should also observe the LFPR. The participation decision of labor in the course of shocks depends on the coherence of the labor market to the fluctuations. On the other hand, during the expansions, the LFPR increases gradually. The behavior and the univariate properties of the LFPR also vary differently considering the gender non-similarities.

Key Words: Labor Force Participation Rate, Asymmetry, Nonlinear Behaviour, STAR Model.

JEL Codes: J21, E24, CO1.

1. Introduction

Concerning the labor market analysis, when economic activity declines, workers become discouraged and tend to leave the labor market. The primary workers become subjected to pressure of loosing their jobs in those times and the secondary workers involve in to the job market. During these times, the inflow of the additional workers and outflow of the discouraged workers may create an equilibrium and remain the LFPR unchanged according to Strand et al. 1964. Because of the discouraged worker effect and additional worker effect, the Labor Force Participation Rate (LFPR)[1] may be a better indicator concerning the job market if the economic activity declines compared to the unemployment rate (see Mincer, 1962, Benati, 2001, Gustavsson et al. 2012.). This observation and the debate let empirical studies to consider the employment rate and LFPR more for judging the success of labor market policy (Gustavsson et al., 2007).

The LFPR is related to the unemployment rate and employment rate, and it is usually compared with these indicators to see if it is a more efficient indicator or not.[2]

[1] It is the ratio of employment and unemployment to active population.

[2] Fatih Özatay who is the former vice president of the Central Bank of the Republic of Turkey claims that unemployment may diminish because of the diminish in LFPR. So it should be considered while evaluating the unemployment rate. (Özatay, 2012). On the other hand, according to Elmeskov et al. (1993), there is a negative relationship between unemployment rate and LFPR for the OECD countries.

There are several papers trying to investigate the relationship between LFPR and the unemployment rate. For instance, Emerson (2011) finds a long-run relationship between LFPR and the unemployment rate for the United States. Kakinaka et al. (2012) explore a cointegration relationship between LFPR and the unemployment rate for the male and fail to reject the null for the female workers over the Japanese economy. They emphasize the discouraged worker effect and claim that if the unemployment rate increases at the same time the LFPR may diminish. Besides, they claim that because of the added worker effect, the young males are keen to be involved in the labor market when the unemployment rate is high. Specially during the recessions, additional workers may enter to the market for compansating the household income loss incurring from being unemployed or because of wage cuts (see Lundberg, 1985 for the added worker effect). During these adverse conditions, when facing with a negative aggregate shock, households may increase their labor supply (Hernandez et al., 2009). At the same time, the presence of high unemployment rate during a recession period may lead unemployed workers to be withdrawn from the labor force whom are known as discouraged workers. Job searching cost may outweigh the employment benefits during the times of recessions (Hartley et al., 1974). In this case, unemployment may be a significant variable effecting the decision of entering to the labor force negatively (Mincer, 1966).

During the business cycles, increasing unemployment also increases the LFPR, but in the longer run, the relationship between LFPR and unemployment disappears according to Nickell (1995). Taking these into account, during the macroeconomic shocks, it is also claimed that the unemployment rate does not reflect the actual situation in labor market. One of the reasons is related with the discouraged workers effect. So the LFPR shows itself in those times (Koop et al.,1999).

In this paper, we analyze the behaviour of LFPR for the quarterly data of Turkish economy for the period 2000: Q1 to 2011: Q12 by benefiting from nonlinear models as a methodology. That seems plausible because when the shocks widen asymmetrically, the linear models may not be adequate. Capturing the nonlinearity and asymmetry in LFPR is meaningful because the unemployment rate does not consider the discouraged workers.[3] The paper is structured as follows. The second part reviews the literature shortly and discusses the macroeconomic variables for some countries and Turkey, and the data and the methodology are given. The third section is devoted for the discussion and the concluding remarks. We included the Appendices within the web adress http://websitem.gazi.edu.tr/site/afsinsahin/files.

2. Data and Methodology

We used the Turkish quarterly data spanning from 2000:Q1 to 2011:Q4. The graphs of the variables are presented in Appendix-A1.[4] Data is gathered from Turkish Statistical Institute (TurkStat). The stationarity properties of the data may offer some insight about the informative level of the variables. The Dickey Fuller tests indicate that the LFPR in Turkey is stationary for total, male and female workers. For different countries, the variables in concern may give mix results or non-stationary evidence. For instance, Gustavsson et al. (2006) claim that the LFPR in Australia, Canada and US are

[3] Özdemir et al. (2011, p 1) claim that the unemployment rates will not be informative during the business cycles. Similarly Murphy et al. (1997) tell that the unemployment rate is not a good informative rate for evaluating the job market.

[4] Following the suggestions of the papers on the subject, we did not seasonally adjust the data, since the effects of seasonally adjusting on the nonlinear structure are not clear in the literature.

not stationary. If LFPR is stationary, than the unemployment rate may be transferred to employment rate in the long-run (Gustavsson et al., 2006, p. 429). They tell that if LFPR is non-stationary, than the unemployment rate cannot be used as an indicator of labor market. Mean reversion is not valid also for the disaggregated LFPRs of sub-populations of US economy according to Gustavsson et al., (2012). If the LFPR is not stationary, then the effectiveness of unemployment rates for the measurement would be problematic (Madsen et al., 2008, p. 167). The response of labor may change depending on employment prospects. It diminishes quickly but increases slowly (Madsen et al., 2008, p. 168). There is a case of mixed evidence for the LFPR concerning the mean reverting properties (Madsen et al., 2008). Consequently they find mixed evidence on unemployment for being a good indicator of joblessness. If there is a case of mean reverting in an unemployment rate, the probability of being a good indicator of joblessness increases. They argue that the unemployment series in US are stationary nonlinear TAR process (Caner et al., 2001).

Özdemir et al. (2011) analyse the total, male and female LFPR for Australia, Canada and USA by multiple structural breaks. They claim that the structural breaks hinder the stationarity of the series. Gustavsson et al. (2006) and Madsen et al. (2008) claim that the LFPR is not stationary and because of this the unemployment rate is not informative. However they claim that by the fractionally integrated method, the series are mean reverting and have structural breaks. They also mention that the unemployment is informative and may explain the movements in employment rates.

LFPR is the univariate variable we tried to model by smooth autoregressive models (STAR). STAR is one of the nonlinear econometric models based on the linear autoregressive model Terasvirta (2004). Balcılar et al. (2011, p. 893) claim that because of the smooth transition consideration property of the STAR models, they are in favor compared to the threshold autoregressive models[5] or the Markov switching models[6]. There is a sharp transition in TAR and Markov switching models, but the transition is smooth in STAR or STR models (Bonga, 2009). To do so, we applied the methodology defined in Terasvirta (2004) and the estimation steps as explained particularly in Kratzig (2005). Rather than using *Jmulti* to estimate the STAR or STR models, there are also traditional programs such as *R, Ox, Matlab* and in some extend by RATS. In this paper we preferred to use *Jmulti* essentially which is much simpler and make the work easier and more systematic.[7] On the other hand, *JMulti* has some restrictions and we should emphasize them. First of all, *JMulti* only allows for the logistic transition function, say the Logistic Smooth Transition Regression (LSTR1 or LSTR2) for modelling the nonlinearity. - One can refer for the LSTAR versus ESTAR for Terasvirta (1994) and its replication for the *RATS* example files. The shape of the transition function is an essential distinction between the ESTAR and LSTAR models (see Öcal et al., 2000, p. 5).

In this paper, the LSTAR form defined in Terasvirta (2004) and Kratzig (2005) is given by equation (1). See also Lundbergh and Terasvirta (2004) for the STAR model definitions. According to Sarantis (2001), the dynamics between the high and low regimes are not the same considering the LSTAR model.

$$y_t = \phi_t + \theta G \; \gamma, c, s_t \;' w_t + \varepsilon_t \,; \;\; \varepsilon_t \sim iii(0, \sigma^2) \,; \; t = 1, \ldots, T. \qquad (1)$$

[5] See Tsay (1989).
[6] See Hamilton (1989).
[7] We used RATS for the estimations in the Appendix.

The first piece of the equation (1) with a parameter $\phi = (\phi_0, \phi_1, ..., \phi_p)'$ inherits the linear part of the system, but the second piece of the equation represents the nonlinear part with the parameter $\theta = (\theta_0, \theta_1, ..., \theta_p)'$. These parameter vectors are $(p+1)x1$. $w_t' = (1, y_{t-1}, ..., y_{t-p})'$ includes the intercept and the first *p* lagged values of the y_t. Note that if the model would be STR model, than there would be $z_t = (w_t', x_t')$ as a $(p+1)x1$ vector of explanatory variables (parameter vectors) with intercept and $x_t' = (x_{1t}, ..., x_{kt})'$. This is the difference between univariate model (STAR) and the multivariate model (STR). Since our model is univariate, we model the labor participation rate with STAR. The general logistic function in (2) represents the transition function and determines the behavior of the nonlinear part.

$$G(\gamma, c, s_t) = \left(1 + \exp\left\{-\gamma \prod_{k=1}^{K} (s_t - c_k)\right\}\right)^{-1} \qquad (2)$$

There are three parameters in the transition function. These are slope parameter (γ), vector of location parameters ($c = (c_1, ...c_K)'$) representing the threshold among the regimes and the time varying transition parameter (s_t). Note that the location parameter is increasing and the slope parameter is positive.- see Lundbergh et al. (2004, p. 486). If *K* = 1 then the specification (1) and (2) are called Logistic Smooth Transition Function (LSTAR1) and if *K* = 2 it is called the LSTAR2 (Terasvirta, 2004, p. 223). The model allows for an extreme transition between 0 and 1 and can be handled as a regime-switching model according to van Dijk et al. (2000, p. 2). The LSTAR models had been extended as multiple regimes STAR (MRSTAR) models.[8]

Since our analysis is univariate, we do not have explanatory variables; therefore we estimate a STAR model rather than a STR model. So the maximum lag determined for the dependent variable (*y*) is the LFPR. However we included seasonal dummy variables and a constant in the model as the deterministic part of the equation. First, we applied common linearity tests and selected the appropriate LSTAR specification. Table 1 presents the linearity test results for the LFPR of the total employment, male employment and female employment. The null hypothesis is to test linearity against non-linearity. At various lag lengths for all the variables, we rejected the null by the *F*- statistics. We have started from the lag length of 8 for the AR part and estimated the equations. The lags for 8 and 7 provided matrix inversion problem for the *p*-values of *F*-tests. We have chosen the appropriate model from several alternatives.

For all the lags by the linearity tests the transition variable is chosen as trend for total, male and female. LSTAR1 type model is chosen as the transition function for all the variables and lags. The meaning of the LSTAR1 is that, there is a monotonic change of parameters through the linear to nonlinear part as a function of the trend in this case. Since the linearity tests indicate the case for LSTAR1 within the document, but we also present the results for LSTAR2 in the Appendix-A2 where the parameters move symmetrically around the middle of the two location parameters. However Terasvirta (2004, p. 224) claims that the LSTAR1 may characterize the asymmetric behavior. Our

[8] See van Dijk et al. (1999) for the argumentation on unemployment rate of the US economy.

aim of the paper fits to this definition, the coefficients are meaningful in economic terms, however some of the parameters are not significant when the case is LSTAR1 and becomes significant when we model LSTAR2. For this purpose we did not interpret the non-significant parameters. Just to show the differences, we presented the LSTAR2 case in the Appendix – A2.

The initial values had been gathered by the grid search. Table 2 gives the initial values for the slope and location parameters. Next we determined the suggested LSTAR1 model by the *p*-values of the F4, F3 and F2 tests which has similar structures by the linearity test. For all the lags the LSTAR1 type nonlinearity had been chosen. However it is interesting to note that when the transition variable trend is used, the value of SSR, gamma (slope) and *c1* increased when the lag decreased.

Since the grid is constructed over c_1, γ because of choosing LSTAR1, the panel (a) of Figure 2a is drawn by surface over these parameters. The panel (b) of Figure 2a is the contour plot of these. These figures are put in Appendix - A3. The sum of residual square (SSR) is plotted as a function of c, γ. The initial one is the maximum SSR and the latter is the minimum SSR. *str_resids*[2] is the square of the estimated residuals. Cross plot *G* (Trend) is the graph of the transition function $G(\gamma, c, s_t) = (1 + \exp\{-\gamma(s_t - c)\})^{-1}$ for the LSTAR versus the transition variable (trend). Linear part ($\phi' z_t$), nonlinear part ($\theta' z_t G(\gamma, c, s_t)$), fitted series ($\phi' z_t + \theta' z_t G(\gamma, c, s_t)$), original series ($y_t$), transition function ($G(\gamma, c, s_t)$) and the transition variable (s_t) are graphed at the bottom of the Figure 2a. The fitted series are the sum of the linear and nonlinear series. Average of the difference between fitted series and the original series is nearly zero.

The parameters c, γ, θ, ϕ are estimated by maximizing the conditional likelihood function automatically by the Newton-Raphson algorithm by benefiting the specification in *JMulti*. Smoothness parameter (gamma) is insignificantly positive and satisfies the restriction, and indicates a smooth transition from low to high periods of labor participation rate. The value of the gamma is higher for female than the male which indicates a sharper transition for the initial. The smoothness depends on or is controlled by the transition variable.[9] Location parameter (*c*) indicates that the labor participation rate switches into the second regime. Location parameter is the threshold between regimes and may take different signs. This signals us that the different magnitudes of the shocks may cause a shift among the regimes. Table 3 presents the results and Table 4 is for the diagnostic statistics. The null of no error autocorrelation is failed to be rejected for Total (2 lags), Male (2, 4, 6, 8 lags) and Female (2, 4, 6, 8 lags). The null of parameter constancy is failed to be rejected for Total (H1), Male (H1, H2) and Female (H1, H3). ARCH-LM test with eight lags does not reject the null of no conditional heteroskedasticity. Besides, the Jarque-Bera test of non-normality is rejected for total and female. The misspecification tests indicate the adequacy of the specifications.

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[9] According to Balcılar et al. (2011, p. 894) if gamma is not significant, then the model should be interpreted as autoregressive model which is linear.

3. Discussion

During the last ten years of Turkish economy, although there was high economic growth rates, the unemployment rate did not diminish sufficiently, the LFPR remained low and the registered number of employment could not be increased as mentioned by Papps (2011, p. 1). According to TurkStat (2012), as of February, 2012, the civilian labor force reached nearly to 54.37 million people. Within the same period, the employed people were nearly 23.34 million and the number of unemployed people was 2.72 million. Besides, the employment rates were not high sufficiently and the unemployment rate was not lower in Turkey compared to growth rate (Table 9).

This slowdown in the increase in the employment rate had been seen majorly as the consequence of the rigidities in the market by the employers and the governmental authorities. Related to this, the flexibility with security is related by the time preferences of the workers which may affect their decisions whether to involve in the job market or not. According to Öztürk (2006, p. 5), women consider flexible time preferences when involved in the labor market. He claims that in Turkey, the LFPR of women is not high and this may be increased by the flexibility in labor market in terms of wages and time preferences.[10]

On the other hand, the governmental subsidies would also be beneficial to increase the efficiency of labor market. Betcherman et al. (2010) claim that the employment subsidies which are aiming to diminish the burden of employers in Turkey lower the informal employment and encourage the registered employment and jobs in poor regions of Turkey. Moreover, World Bank (2006) also claims that the reason for not creating sufficient employment was because of the severance pay.

The behaviour of the LFPR during the economic crisis is an essential research agenda among the economists. When the time series data exhibits asymmetry and nonlinearity during the recessions, the LFPR diminishes. The unemployment rate may decrease because of the diminish in LFPR or it may not reflect the real situation of the market. So while considering the unemployment rates we should also observe the LFPR. During post economic crisis, the LFPRs diminish for the women.[11] The participation decision of the labor in the course of macroeconomic shocks is connected to the coherence of the labor market to the fluctuations. However during the expensions the LFPR increases gradually. The shocks in labor market spreads asymmetrically in most of the theoretical and empirical papers. There are variety of papers considering the asymmetric adjustment costs in labor market. When the economy shrinks there is a high outflow of labor but when the economy expands LFPR does not turn to its old level quickly and there is an asymmetric situation (Madsen, et al., 2008).

The asymmteric behavior of the labor market is also supported in the literature for variety of countries. The unemployment may exhibit asymmetry and nonlinearity. Silvapulle et al. (2004) explain the asymmetry which means that the reaction of

[10] Especially during the post crisis in the countries such as US, the work hours per family have increased because the women also included to the job market more frequently (Stiglitz, 2012, p. 14). We also observed a similar case for Turkey. Following the economic crisis of 2000 and 2008, the women tend to involve in job market with a lag and by the increasing education level of women, LFPR tends to increase for women.

[11] The LFPR of women is low in Turkey and the non-farm activities should be increased by rural development programmes in rural areas. However, women in rural areas do not involve to the non-farm activities compared to men as mentioned by Rijkers et al. (2012, p. 1) and it is not an easy agenda for development programmes.

unemployment rate to output is not similar across different regimes of the economy. Pissarides and Mortenson (1993) measure the asymmetry during the job creation and distruction periods. They claim that the job creation process takes more time compared to the job distruction one. McHugh (2002) claims that the unemployment rate follows an asymmetric behavior and increases when the total demand goes up. However, when the total demand diminishes, the unemployment rate does not diminish as quickly as the first case because of the rigidities in the labor market. Neftçi (1984) denotes that the unemployment data of the US economy exhibits asymmetric behaviour. Delong et al. (1986) provide emprical evidence that the US unemployment is asymmetric during the business cycles. They claim that as a result of the rational expectaitons theory, if there is a case of asymmetry, the linear forecasts would not be optimal.

The asymmetry and nonlinearity are also supported for the LFPR. For instance, Darby et al. (1998) estimate the LFPR for US, Japan, France and Sweden in terms of age and sex for the period 1970 to 1995. They conclude that the adaptation of the LFPR to the shocks may be asymmetric during the high and low regimes. Gustavson et al. (2006) analyse the features of the LFPR for Australia, Canada and US for the monthly data of 1951-2004. They claim that the LFPR series are not stationary by using the panel and univariate unit root tests.

We also estimated the Enders et al. (1998) methodology for Turkey to replicate the original paper. The test results also verified that there is an asymmetry and nonlinearity in LFPR. The LFPR behaves different during the recession and the expansion period of the economy. During the expansion LFPR is bigger than the value of the threshold. The indicator function takes the value one. However in a reverse economic condition, the indicator function takes the value zero. And it can be claimed that the LFPR is lower than the threshold level.- Similar interpretation is conducted for the unemployment rate in Enders (2006, p. 16).- See Appendix-B for the details of the test results.

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Table 1. Linearity Test Results

Variables	**Transition Variable**	**F**	**F4**	**F3**	**F2**	**Suggested Model**	**Optimal Lag Length**
Total	Trend	0.0003	0.4088	0.0228	0.0000	LSTAR1	2
Male	Trend	0.0364	0.6637	0.4884	0.0004	LSTAR1	2
Female	Trend	0.0002	0.0308	0.0651	0.0005	LSTAR1	1

Table 2. STR Grid Search

	Total	**Male**	**Female**
Transition variable	Trend	Trend	Trend
Transition function	LSTAR1	LSTAR1	LSTAR1
Grid *c*	{ 1.00, 46.00, 30}	{ 1.00, 46.00, 30}	{ 1.00, 47.00, 30}
Grid gamma	{ 0.50, 10.00, 30}	{ 0.50, 10.00, 30}	{ 0.50, 10.00, 30}
SSR	13.4019	14.2355	26.7248
Gamma	0.9293	1.7271	2.1235
c1	1.0000	16.5172	13.6897

Table 3. STAR Estimation Results

	TOTAL			**MALE**			**FEMALE**		
Variables	**Start**	**Estimate**	***p*-value**	**Start**	**Estimate**	***p*-value**	**Start**	**Estimate**	***p*-value**
	Linear Part								
Constant	22.3750	91.3337	[0.9528]	14.1729	14.0890	[0.3528]	8.4350	8.1327	[0.5010]
Seas1	-4.0457	-26.5723	[0.9582]	-1.8728	-1.9181	[0.3376]	1.0225	1.0239	[0.4767]
Seas2	8.5181	26.0472	[0.9470]	4.8109	4.8298**	[0.0143]	7.0345	6.9971***	[0.0017]
Seas3	12.1940	56.4346	[0.9547]	4.9769	5.0356	[0.0443]	6.5435	6.4677**	[0.0213]
LFPRt-1	-1.0923	-11.3776	[0.9607]	0.4599	0.4516	[0.2899]	0.5414	0.5540	[0.2401]
LFPRt-2	1.5524	10.2466	[0.9580]	0.3137	0.3232	[0.5023]			
	Nonlinear Part								
Constant	-22.8334	-92.4791	[0.9522]	4.6908	5.2539	[0.8340]	-11.0820	-10.7469	[0.4395]
Seas1	6.1355	29.0213	[0.9544]	2.6863	2.6972	[0.3082]	-0.4901	-0.4905	[0.7799]
Seas2	-4.9923	-22.7658	[0.9538]	-2.4812	-2.4978	[0.2945]	-3.3491	-3.3103	[0.1777]
Seas3	-12.2964	-57.1991	[0.9542]	-3.6908	-3.7300	[0.2266]	-4.9626	-4.8841	[0.1136]
LFPRt-1	2.8787	13.3213	[0.9540]	0.5729	0.5676	[0.3941]	0.5078	0.4939	[0.3576]
LFPRt-2	-2.3606	-11.1956	[0.9543]	-0.6300	-0.6326	[0.3755]			
LFPRt-3									
LFPRt-4									
Gamma	0.9293	0.5944	[0.5465]	1.7271	1.7422	[0.3531]	2.1235	2.1702	[0.2721]
C1	1.0000	-43.1529	[0.9331]	16.5172	16.0242*	[0.0848]	13.6897	13.9693	[0.1223]

Note: ***, ** and * indicate significance of the coefficients at 1%, 5% and 10% levels.

Table 4. Diagnostic Statistics			
	Total	**Male**	**Female**
AIC:	-0.6286	-0.5643	-0.0539
R^2:	0.9304	0.9011	0.9079
Variance of transition variable	180.1667	180.1667	188.0000
SD of transition variable	13.4226	13.4226	13.7113
Variance of residuals:	0.4171	0.4448	0.7635
SD of residuals:	0.6459	0.6669	0.8738

Table 5. Test of No Error Autocorrelation				
Total	***F*-value**	**df1**	**df2**	***p*-value**
2	0.3537	2	28	0.7052
4	8.6628	4	24	0.0002
6	5.0395	6	20	0.0027
8	5.3737	8	16	0.0021
Male	***F*-value**	**df1**	**df2**	***p*-value**
2	0.4677	2	28	0.6313
4	1.9215	4	24	0.1394
6	1.4141	6	20	0.2580
8	1.8222	8	16	0.1461
Female	***F*-value**	**df1**	**df2**	***p*-value**
2	3.9041	2	31	0.0307
4	1.4766	4	27	0.2369
6	1.7192	6	23	0.1616
8	1.6010	8	19	0.1900
Note: The null is no error autocorrelation.				

Table 6. Test of No Remaining Nonlinearity				
Transition variable	**F**	**F4**	**F3**	**F2**
Total(t-1)	0.3210	0.2811	0.6970	0.1612
Male(t-1)	0.0021	0.0082	0.0749	0.1052
Female(t-1)	0.3351	0.2907	0.3804	0.3793
Note: Null is no remaining linearity.				

Table 7. Parameter Constancy Test		
Total	***F*-value**	***p*-value**
H1	1.6427	0.1655
H2	NaN	NaN
H3	NaN	NaN
Male	***F*-value**	***p*-value**
H1	0.9197	0.5478
H2	0.4948	0.8979
H3	NaN	NaN
Female	***F*-value**	***p*-value**
H1	3.1310	0.0114
H2	1.8768	0.1232
H3	3.0467	0.1951
Note: Null is parameter constancy.		

Table 8. Other Tests			
	Total	**Male**	**Female**
ARCH-LM test statistics with 8 lags	9.8293	3.8185	7.178
p-value	[0.2772]	[0.8731]	[0.5176]
F- statistic:	1.6574	0.5306	1.0996
p-value	[0.1519]	[0.8236]	[0.3908]
	Total	Male	Female
Jarqoue-Bera Test Statistic	1.3875	20.5764***	1.6988
p-Value	[0.4997]	[0.0000]	[0.4277]
Skewness	-0.3942	0.9667	-0.2971
Kurtosis	3.3198	5.6452	3.7172
Note: ***, ** and * indicate significance of the coefficients at 1%, 5% and 10% levels.			

Table 9. Descriptive Statistics of the Basic Macroeconomic Variables (2000-2011).

Countries	Statistics	GDP Growth Rate	Inflation Rate	Unemployment Rate	Employment Rate	LFPR
Czech Republic	Mean	3.0619	2.4333	7.1333	65.2667	59.3636
	Std.Dev.	3.3500	1.7839	1.2383	0.6457	0.5045
Estonia	Mean	7.0296	4.2750	10.2833	64.2167	60.0000
	Std.Dev.	4.5917	2.6619	3.7755	3.2730	1.6733
Germany	Mean	2.4797	1.6833	8.6250	67.7083	58.6364
	Std.Dev.	1.3167	0.7056	1.5806	2.7268	0.9244
Greece	Mean	4.0655	3.3333	10.5250	59.1000	53.3636
	Std.Dev.	1.5583	0.8370	2.4208	2.1755	0.9244
Spain	Mean	2.4054	2.9083	12.7500	60.6333	56.2727
	Std.Dev.	2.2333	1.1115	4.5476	3.1376	2.6492
Latvia	Mean	8.1261	5.1167	11.6750	62.4250	58.7273
	Std.Dev.	4.3500	4.3373	4.0748	3.6219	2.0538
Turkey	Mean	5.1777	20.8667	9.7714	69.4364	60.8182
	Std.Dev.	4.6167	19.7166	1.3949	0.9014	0.7508
Japan	Mean	2.4715	-0.3000	4.2917	45.5167	48.3636
	Std.Dev.	0.7917	0.7403	0.4944	1.5791	1.2863
US	Mean	2.0365	2.4727	6.0750	71.0909	65.0909
	Std.Dev.	1.8000	1.1867	1.9987	2.1626	0.7006

Source: Eurostat