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Analysis of the Relationship Between Tax Burden and Labor Force Participation Rates in OECD Countries

OECD Ülkelerinde İşgücüne Katılım Oranı ile Vergi Yükü Arasındaki İlişkinin İncelenmesi

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ABSTRACT

The labor force participation rate has become a vital indicator for economies, especially after the industrial revolution. Because of the mass production after the industrial revolution, the necessity of raw materials increased, which also brought a rise in labor demand. Thus, the labor force participation rate and its determinants have become essential subjects for policymakers. The purpose of the study is to find out and evaluate the effect of the tax burden on labor force participation rate in Organisation for Economic Co-operation and Development (OECD) countries. The selected countries are determined in accordance with the availability of the data. Panel data estimations were implemented to data set, and due to cross-sectional dependency and autocorrelation problems, the GLS period SURestimation method and cross-sectional covariance methods were used. The findings revealed that tax burden has a negative and significant impact on the labor force participation rate.

JEL Codes: E24, H21, J21

Keywords: Labor force participation rate, OECD, period SUR model, tax burden

ÖZ

İşgücüne katılım oranı zaman içerisinde ülke ekonomileri için çok büyük önem arz etmeye başlamıştır. Özellikle Sanayi Devriminin gerçekleşmesiyle yaygınlaşan kitlesel üretim hammadelere olan talebi arttırmış ve dolayısıyla isgücüne olan ihtiyaç son derece artış göstermiştir. Dolayısıyla işgücüne katılım oranı ve onun belirleyicileri politika yapıcılar için önemle üzerinde durulan bir konu haline gelmiştir. Bu çalışmanın amacı OECD ülkelerinde vergi yükünün işgücüne katılım oranı üzerindeki etkisini tespit etmektir. Vergi yükü ve işgücüne katılım oranı arasındaki ilişkiyi tespit edebilmek için çalışma da literatür ile uyumlu 28 OECD ülkesi için 1990–2017 yıllarına ait makro veriler kullanılmıştır ve ülke seçimleri, verilerin ulaşılabilirliğine göre yapılmıştır. Analiz yöntemi olarak panel veri analizi kullanılmış olup, otokorelasyon ve yatay kesit bağımlığı sorunlarının üstesinden gelmek için GLS Period SUR modeli ve PCSE cross-sectional covariance metodu kullanılmıştır. Sonuçlar vergi yükü ile işgücüne katılım oranının ters orantılı olduğunu göstermektedir.

JEL Kodları: E24, H21, J21

Anahtar Kelimeler: İşgücüne Katılım Oranı, Vergi Yükü, OECD, Period SUR Modeli

Introduction

The industrial revolution led to a change in the dynamics of economies and raised the importance of supply-side economics. Some indicators, especially the labor force participation rate (LFPR), have become vital indicators for economies. The development of mass production, after the industrial revolution, brought new requirements such that the necessity of raw materials increased, which led to a rise in labor demand. This situation forced governments to initiate and implement labor market policies to increase the LFPR. These policies are still among the most essential tools of government in the world because although labor force participation may not directly reflect the production process's effectiveness, it obviously has a significant impact on an economy's production capacity.

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Taxation policies are the primary revenue source for tax collectors, but they also create a burden for taxpayers. Thus, both employers and employees may suffer from taxation policies. For example, income taxes can induce a decrease in wages earned by laborers because of the employer's attempt to compensate for these taxation policies, and, some types of taxes on goods such as value-added taxes could be the reason for the decline in output due to increase in the cost of production (Gillman, 2011). Therefore, tax rates have a substantial impact on people's purchasing power and welfare since taxes lead to a decline in households' disposable income. In addition, taxes could change the decision of people about the labor-leisure decision.

According to the neoclassical perspective, labor supply curves come from the labor-leisure decisions of the laborers. The labor-leisure decision theory provides an analysis of the effects of changes in economic conditions and government policies on the incentives and willingness of households to work. There are two impacts of taxes on the decision process, which are substitution and income effects. If wages fall, net income falls after taxation, the opportunity cost of more work rises, and it induces an increase in the leisure choices of individuals. This process is called the substitution effect of taxes on the labor-leisure decision. On the other hand, individuals are willing to protect their purchasing power against the decrease in wages for stable consumption at the same level. Therefore, they prefer to work more. This situation is the income effect of taxes on the labor-leisure decision**.**

In this context, this study examines the taxation effect on the LFPR with other control variables and investigates whether tax burden could lead to unwillingness for laborers to work, and via this way, change in LFPR. To analyze this relationship, LFPR, tax burden, gross domestic product, consumer price index (CPI), real minimum wage, average schooling years, and birth rate fertility are used for 28 OECD countries for the years between 1990 and 2017.

The study is designed as follows: the second section includes a literature review with different perspectives on the LFPR. The third section provides data, methodology, and the empirical results of the study. The last part is the conclusion.

Literature Review

There are several studies in the literature about the impact of taxation on labor force participation. Labor force participation is an essential indicator for the countries' economic development, especially supply-side economists pay attention to this indicator. Despite the extensive literature in this field, it cannot be said that there is a common view that has been reached on the relationship between tax burden and LFPR.

Scott et al. (1977) implemented a survey about the labor force status (LFS) of the rural population and subgroups. Findings showed that the wage rate had a positive influence on the LFS of all subgroups. On the other hand, medical care opportunities were an essential variable for LFS. Hausman (1981) examined the labor supply decisions of married men in the light of the effects of taxation and transfer payments by using income taxes, social security payroll taxes, and aid to families with dependent children in addition to progressive taxes. Results showed that the wage effect is less effective than the previous research and that taxation has a significant impact on the labor supply (LS) of husbands. In terms of the wives, their wage rate is less effective compared to their husbands in terms of working hours. Macurdy (1983) examined the intertemporal model of the LS and consumption with the integration of uncertain future and income taxes into model. His analysis reached a range from 0.31 to 0.7 elasticity for the uncompensated wage substitution and −0.28 to −0.16 for the income elasticity. Contrary to Hausman (1981), results showed that the substitution and income effect of married prime-age men are more significant and vital in terms of the hours of work in the intertemporal LS model with tax. Blundell (1995) also searched the effectiveness of tax reforms on working hours and LFPR. In the study, subgroups were determined as married women and single parents. The analysis is related to tax reforms in the United Kingdom, which were implemented in the 1980s. Taxation is found to be an important indicator for married women to decide whether to work or not work. Furthermore, wage has a positive impact on married women's LS and also negative wage elasticity in the LS of prime-age men. Thus, especially, taxation policies have an impact on the LS decision of women. Kleven and Kreiner (2006) provided the theory and measurement of the marginal cost of public funds in terms of explaining labor force participation responses. In this study, results showed that, in the case of non-convex budget sets, taxes and transfer reforms induce an increase in discrete participation, which is related to creating first-order effects on government revenue.

In a further study, Yuldashev and Khakimov (2011) examined the effect of income taxes on LFPR in three transition economies: Bulgaria, Serbia, and the Russian Federation. Labor-intensive countries are less sensitive to changes in income taxes in terms of LFPR. Changes in wages have a positive relationship among the transition countries. On the other hand, sensitivity to changes in wages for women is more than that of men to LFPR.

Some of the studies conducted their analysis based on the age intervals with cohort effects, which represent people who share similar historical and life experiences such as the same generations in a specific place. Grigoli, Koczan, and Topalova (2018) searched for the cohort effect on the LFPR with a seemingly unrelated regression (SUR) model. Joining the new cohorts of women shifts the participation rate upward, but the new generation of men is almost ineffective in increasing the participation rate. On the other hand, the LFPR of older workers (aged 55 and over) (OLFPR) is lower than that of other cohorts, and this low participation could lead to a decline in LFPR. Favreault et al. (1999) and Laun (2017) also searched the LFP of older workers. Both studies showed that low taxes on wages and income tax credits raise OLFPR.

Despite almost all studies on the LFPR include gender differences, at least as one of the variables, some of them directly lean on the female LFPR. Bloom et al. (2007) examined the influence of fertility on female LFPR. They implemented unbalanced panel data analysis to obtain empirical results. Birth rate fertility has a significant and negative impact on the female LFPR in every age group, but, especially between the age groups of 35 and 39, its impact reached its maximum. Furthermore, Giovanis et al. (2018) searched the relationship between savings and the female LFPR. According to the results, only interest rates (negative) and gross domestic product (GDP) growth (positive) are significant and have an effect on the savings of the countries. In other respects, the primary independent variable, which is LFPR, is insignificant in all models. Sarsılmaz (2018) investigated the determinants of female LFPR in Turkey for the period of 2013–2015 using probit, Generalised Structural Equation Model (GSEM), and mediation

techniques. She concluded that education is the key factor affecting women's participation in labor force. A very recent study by Aydın and Levent (2022) analyzed 17 OECD member countries for the effects of tax wedge on female LFPR for the period 2000–2019. According to the econometric analysis including causality, they conclude that the tax wedge is effective on LFPR only in the long term.

On the other hand, some of the studies aimed to find the determinants of the LFPR. Yamak et al. (2012) conducted their study to present the determinants of the LFPR in Turkey. Annual disposable income, education level, age, household size, and marital status are detected as the main determinants of the LFPR. In a further study, Kızılgöl (2012) tried to present the determinants of the LFPR of married and single women. The most critical determinant of the LFPR of all groups is the education level. Household size, living location, household expenditures, household income, property ownership, child quantity, and age are found as other determinants. Ari and Yıldız (2018) examined the relationship between LFPR and transfer expenditures (which can be thought of as negative taxes) in Turkey from 1988 to 2017. Johansen cointegration and Granger causality test results revealed that there is a one-way positive causality relationship from the transfer expenditures to the labor participation rate.

Some researchers were concerned with the impact of macroeconomic variables on labor force participation. Duval et al. (2010) examined the impacts of downturns and peaks on the LFPR. The sample was determined to be 30 OECD countries over the period 1960–2008. They gathered data on the difference between the observed GDP growth rate and the unobserved potential growth rate, and downturns were classified into moderate, severe, and very severe downturns. Moderate downturns are not statistically significant, but severe and very severe downturns have an essential and inverse impact on the LFPR. The impact reached its maximum when a very severe downturn existed. Perez-Arce and Prados (2021) provided a comprehensive review of the literature on the causes of the decline in LFPR in the USA. Among many factors such as culture and wage inequality, compared to male LFPR, female LFPR declines more due to taxation.

Similarly, Van Zandweghe (2017) examined the cyclical fluctuations of the LFPR in accordance with the increase or decrease in cyclicality. To reach the results, panel data analysis was used in the study, and data were classified into year intervals, which are 1962–1983 and 1984–2016. Results showed that, since 1980, the LFPR has become more cyclical. This increase reflects prime-age workers' cyclicality. Thus, results also show that the decline in worker cyclicality leads to partial balance. On the other hand, findings present that real wage rigidities are a promising explanation for the change in the different cyclicality of different demographic groups.

Additionally, Shahid (2014) examined the relationship between the LFPR, gross fixed capital formation, and GDP. Data were gathered from the Pakistan Bureau of Statistics for the 1980–2012 period. According to vector error correction model results, GDP has a positive and significant relationship with the LFPR but the gross fixed capital formation is insignificant. Mocan (2019) used microdata from the European Social Survey to investigate the impact of taxes on labor force participation and hours worked by second-generation immigrants who reside in 26 European countries. His results showed that taxes affect the LS decisions of men more than those of women.

There are several studies conducted for the LFPR with different methods, samples, and variables. However, there is no commonly accepted result for the effect of taxes or other variables on labor force participation. This study uses a combination of the different macrovariables that are compatible with the literature.

Empirical Analysis

Data

In order to analyze the impact of the tax burden on the LFPR in the OECD countries, the data for the period 1990–2017 are taken from OECD, World bank, and United Nations databases. The main variables of the empirical analysis are tax burden and LFPR. In addition, in line with the literature, GDP, CPI, real minimum wage, average schooling years, and birth rate fertility are used in the analysis as control variables.

Even though the world is globalizing day by day, it is still not possible to reach data from all countries due to several reasons such as prohibitions and recording problems of data (Messner, 1992). Because of the data accessibility problems, the listwise deletion method is used. The listwise deletion method means that if any data for a specific country is missing in the data series, all of the data for that specific country are removed from the analysis (Allison, 2001). Thus, our analysis includes unbalanced data. By the listwise deletion method, Austria, Denmark, Finland, Sweden, Switzerland, Italy, Iceland, Colombia, and Norway are excluded from the analysis.

Table 1 shows the variables used in the study and their presentations throughout the empirical analysis, also including their expected impacts in line with the literature. Tax burden is expected to negatively affect the LFPR, whereas the control

Table 1.
Data Presentations and Their Expected Signs

	Variable Types	Expected Sign	Content of the Data
Labor force participation rate (LFPR)	Dependent variable		Labor force /Working-age population
Tax burden (TAXB)	Independent variable	Negative	Tax revenue/GDP
Real minimum wage (RWAGE)	Independent variable	Positive	US dollars (in thousands)
Consumer price index (CPI)	Independent variable	Positive	Annual CPI rate
Gross domestic product (GDP)	Independent variable	Positive	Annual GDP in US dollars (in thousands)
Average years of schooling (SCH)	Independent variable	Positive	Average completed schooling years of the population
Birth rate fertility (BRF)	Independent variable	Positive	Birth rate per woman

variables are expected to have a positive relationship with the dependent variable.

Method and Results

In order to investigate the relationship between tax burden and LFPR in OECD countries, different versions of models were regressed by including and excluding the control variables. Among these, the following four models provided the best results in terms of statistical significance:

Model 1: $LFPR_{it} = a_i + B_1TAXB_{it1} + B_2CPI_{it2} + B_3SCH_{it3} + B_4BRF_{it4} + u_{it}$

Model 2: $LFPR_{it} = a_i + B_1TAXB_{it1} + B_2GDP_{it2} + B_3CPI_{it3} + B_4SCH_{it4} + B_5BRF_{it5} + u_{it}$

Model 3: $LFPR_{it} = a_i + B_1TAXB_{it1} + B_2RWAGE_{it2} + B_3CPI_{it3} + B_4SCH_{it4} + B_5BRF_{it5} + u_{it}$

Model 4: $LFPR_{it} = a_i + B_1TAXB_{it1} + B_2RWAGE_{it2} + B_3GDP_{it3} + B_4CPI_{it4} + B_5SCH_{it5} + B_6BRF_{it6} + u_{it}$

Before proceeding to estimation of the models, the following tests are performed:

1) cross-section dependency test,
2) panel unit root tests, and
3) Durbin–Watson statistics.

First, the cross-section dependency test, namely, Pesaran's CD test, is performed to determine the presence of the cross-dependency between cross-sectional units, which can be shown as follows:

$$CD = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=t+1}^{N}\tilde{p}_{ij}\right)$$

where the null hypothesis is that there is no cross-sectional dependency in the analysis. In the equation, *N* and *T* represent the cross-sectional units and time periods, respectively. On the other hand, $\hat{\rho}_{ij}$ is the sample estimate of the pair-wise correlation of the residuals. According to the results shown in Table 2, all models include cross-dependency.

Secondly, as all data should be stationary in panel data analysis, Levin–Lin–Chu (LLC) panel unit root test is implemented to search for the detected unit root in the series and reveal the data's stationary status. Levin–Lin–Chu test is the modification of the augmented Dickey–Fuller unit root test (Levin et al., 2002) and has become an applicable test as a second-generation unit root test in the first category by taking a difference from the means of the series to decrease the effect of correlation (Yerdelen, 2017). According to LLC unit root test results in Table 3, all data are stationary at the level and do not include trends.

Finally, to detect any possible autocorrelation problem in the models, Durbin–Watson statistics is used. This statistic is one of the proper methods to determine the presence of autocorrelation (Gujarati, 2004). It can be seen from Table 4 that all models include autocorrelation problem. The Durbin–Watson test statistics in the Table are close to 0, which represents a positive serial correlation.

In panel data analysis, if there is a correlation between units and the model including violation of the homogeneity assumption, SUR models are an available way for accurate analysis (Yerdelen, 2012). Seemingly unrelated regression models are also appropriate for cases where residuals may be dependent even if variables seem to be independent (Zellner and Huang, 1962). In addition, the panel-corrected standard error (PCSE) model is also suggested to correct correlation and cross-dependency problems among the units (Beck and Katz, 1995). As cross-dependency has been detected for the variables in this study, the generalized least squares (GLS) period SUR model and PCSE methods are used for estimation.

The results of the four models are presented in Table 5. In model 1, birth rate fertility (BRF) and schooling (SCH) have positive and statistically significant coefficients of 2.812 and 0.922, respectively, whereas CPI negatively affects LFPR (−0.045). The coefficient of the tax burden is negative and also statistically significant (−0.187), approving the hypothesis of this study and being parallel to the findings of Blundell (1995), Favreault et al. (1999), Hausman (1981), Macurdy (1983) and Mocan (2019).

In model 2, GDP is added to the variables used in model 1. The results with respect to tax burden, CPI, SCH, and BRF are in line with the results of model 1. Additionally, parallel to the study by Shadid (2014), GDP is found to affect the LFPR positively and significantly. This indicates that the substitution effect of a GDP increase overcomes the income effect and leads people to prefer to work more.

Table 3.
Unit Root Test (LLC Test) Results

Variables	Statistic	Probability	Status
LFPR	−2.526	.006***	Stationary
TAXB	−3.931	.000***	Stationary
SCH	−3.472	.000***	Stationary
RWAGE[1]	−2.075	.019**	Stationary
CPI	−8.805	.000***	Stationary
BRF	−3.591	.000***	Stationary
GDP	−3.929	.000***	Stationary

Note: **Significant at 5%, ***Significant at 1%; [1]Real wage was not stationary at the level; therefore, the logarithm of the series is used. The results in the table show that real wage in logarithm is stationary.
LFPR = labor force participation rate; TAXB = tax burden; SCH = average years of schooling; RWAGE = real minimum wage; CPI = consumer price index; BRF = birth rate fertility; GDP = gross domestic product; LLC = Levin–Lin–Chu.

Table 2.
Cross-Section Dependency Test (Pesaran CD) Results

Models	Statistic	Probability	Result
Model 1	6.209	.000	There is cross dependency
Model 2	6.516	.000	There is cross dependency
Model 3	6.427	.000	There is cross dependency
Model 4	6.531	.000	There is cross dependency

Table 4.
Durbin–Watson Test Results

Models	Durbin–Watson Test Statistics
Model 1	.161
Model 2	.187
Model 3	.161
Model 4	.193

Table 5.
Estimation Results for All Models

	Model 1	Model 2	Model 3	Model 4
Dependent variable: LFPR				
Constant	48.505	40.280	45.141	39.761
TAX	−0.187***	−0.157***	−0.193***	−0.152***
RWAGE			0.423*	0.047
GDP		0.312***		0.314***
CPI	−0.045***	−0.038***	−0.039***	−0.038***
SCH	0.922***	0.886***	0.882***	0.882***
BRF	2.812***	2.677***	2.789***	2.666***
R^2	0.432	0.417	0.431	0.415
Adjusted R^2	0.428	0.412	0.427	0.409
Prob (F-stat)	.000***	.000***	.000***	.000***
Durbin–Watson	1.832	1.843	1.830	1.847

Note: *Significant at 10%; **significant at 5%; ***significant at 1%.
RWAGE = real minimum wage; CPI = consumer price index; BRF = birth rate fertility; GDP = gross domestic product; SCH = average years of schooling; LFPR = labor force participation rate.

Gross domestic product is replaced with real wage (RWAGE) in model 3 as a variable for income. Similar to models 1 and 2, tax burden and CPI are negatively related to LFPR, while SCH and BRF are positively related to LFPR. The effect of real wage is greater than that of GDP, with a positive and statistically significant coefficient of 0.423.

Finally, all variables are included in the regression in model 4. Real wage loses its statistical significance when used together with GDP, while GDP is still significant at 1%. The results for tax burden, CPI, SCH, and BRF are approximately the same as the other models.

In summary, the estimation results confirm the expected signs of the variables except for CPI. Thus, an increase in CPI inflation was expected to increase the LFPR, thinking that people would prefer to work more as their purchasing power declines with inflation. However, the results indicate an increase in CPI decreases LFPR. This situation could be explained by the domination of the substitution effect over the income effect for CPI.

The main hypothesis of this study is confirmed by the statistically significant and negative coefficients of the tax burden. An increase in tax burden decreases LFPR with an average of −0.172.

Conclusion and Recommendations

This study examined the impact of the taxes on LFP in terms of the labor-leisure decision. To reveal this effect, six other control variables were used in the analysis, which are GDP, average schooling years, CPI, real minimum wage rates, and BRF. Data were selected according to their usage in the literature. These variables were integrated into four models to understand their impact on the LFPR.

Data obtained according to their accessibilities belongs to 28 OECD countries between 1990 and 2017 years. To implement accurate analysis, nine OECD countries were excluded from the analysis because of the lack of data. Panel data analysis was implemented in all models. Period SUR models and PCSE cross-sectional covariance methods were used in the analysis to solve the autocorrelation and cross-dependency problems.

Results revealed that the tax burden and LFPR have an inverse relationship in all models. It means that a high tax burden prevents households from joining the labor force in the OECD countries. This impact changes between 15 and 20 as a percentile in four models. Thus, results clearly showed that taxation policies matter for LFPR.

In some studies related to female LFPR, results showed that birth rate fertility has a negative impact on female LFPR. Since women in the prime age group may want to take care of their children themselves, they may prefer to leave work. This study considers not only the female LFPR but also society's whole LFPR, so it includes both men and women. Thus, in line with the literature, BRF has an essential role in the LFPR because our data cover 27 years, so some newborns have become part of the workforce in this year interval. Hence, BRF was used in the analysis, and the results showed that BRF positively impacts the LFPR.

On the other hand, an average schooling year is one of the most critical conditions for the labor force. According to the results, average years of schooling have a positive impact on the LFPR, and also, it is one of the primary determinants of the LFPR.

The surprise variable of the analysis was inflation since an increase in inflation means a decrease in purchasing power of households. Thus, we expected a positive relationship with the dependent variable of CPI. However, results showed an inverse relationship between CPI and the LFPR, even if it has the weakest impact among the independent variables. This situation could be due to the domination of the substitution effect over the income effect for CPI.

The study expected that the increase in GDP triggers an increase in the LFPR. In all models, our expectations are promoted by the results since the GDP has a positive and significant impact on the LFPR in all models.

Empirical results revealed that joining the workforce decision is sensitive to taxes. The analysis showed that policymakers have to pay attention to tax rate setting, and they have to find optimal tax rates. Since incorrect tax rate decisions could be harmful to the economy in terms of current and potential production capacities,

human resources will decline with high tax rates. Even though high taxes seem like a high revenue source for the government, leisure could become an attractive choice for labor. Thus, it could be harmful to the output level and to the whole economy. As a result, if governments want to raise the LFPR, they should adopt pronatal policies. In addition to this policy, the analysis reveals that the necessary infrastructure for education should be prepared. Further research on the effect of taxes on LFPR should focus on different kinds of taxation such as personal income taxes and specifically income tax brackets. Such an analysis would make it possible to recommend more effective policy recommendations.

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Extended Summary

Purpose of the Research: There are different results in the literature regarding the relationship between tax and labor force participation rate (LFPR). In some studies, the effect of tax on the labor force participation rate is not statistically significant, while in others, it has a significant but low effect; moreover, some studies have shown that it has a critical effect on LFPR. The aim of this study is to reveal whether the tax burden has a significant effect on the LFPR with macro data and if tax has a significant impact on LFPR, to try to show its impact.

Research Questions: Does the tax burden have a significant effect on the LFPR?

What is the impact of the effect of the tax burden on the LFPR?

Methodology: In order to determine the relationship between the tax burden and the LFPR, 7 variables from 28 OECD countries between 1990 and 2017 were used in accordance with the literature. The year and the number of countries were chosen according to the availability of data. At the same time, the listwise deletion method was applied in order to perform effective analysis. In line with this method, Austria, Denmark, Finland, Sweden, Switzerland, Italy, Iceland, Colombia, and Norway were excluded from the dataset. The data used in the analysis are LFPR, tax burden (TAXB), real minimum wage (RWAGE), gross domestic product (GDP), CPI, BRF, and SCH.

Four models were established to analyze the data. Installed models were:

Model 1: $LFPR_{it} = a_i + B_1TAXB_{it1} + B_2CPI_{it2} + B_3SCH_{it3} + B_4BRF_{it4} + u_{it}$

Model 2: $LFPR_{it} = a_i + B_1TAXB_{it1} + B_2GDP_{it2} + B_3CPI_{it3} + B_4SCH_{it4} + B_5BRF_{it5} + u_{it}$

Model 3: $LFPR_{it} = a_i + B_1TAXB_{it1} + B_2RWAGE_{it2} + B_3CPI_{it3} + B_4SCH_{it4} + B_5BRF_{it5} + u_{it}$

Model 4: $LFPR_{it} = a_i + B_1TAXB_{it1} + B_2RWAGE_{it2} + B_3GDP_{it3} + B_4CPI_{it4} + B_5SCH_{it5} + B_6BRF_{it6} + u_{it}$

Panel data analysis was used for the estimation of the models. Furthermore, to make an appropriate analysis against the cross-section dependence, heteroscedasticity, and auto-correlation problems encountered during the analysis, firstly, the GLS period SUR model was implemented because of the problem of heteroscedasticity (Yerdelen, 2012). Afterward, against autocorrelation and cross-section dependence problems, PCSE cross-sectional covariance models were used (Beck and Katz, 1995).

Conclusion: In all models that are used for the analysis, it has been determined that the TAXB has a significant and negative effect on the labor force participation rate. This effect showed the lowest effect at −0.152 in the fourth model and the highest effect at −0.193 in the third model. The RWAGE was found to be significant only at the 10% CI in the third model and it was seen to have a positive effect. Average school year and fertility appeared to have a positive and significant effect in all models. On the other hand, GDP has a positive impact, and also, CPI has a negative but shallow effect.