DOKUZ EYLUL UNIVERSITY
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THE RELATIONSHIP BETWEEN TAX BURDEN AND LABOR FORCE PARTICIPATION RATES IN OECD COUNTRIES

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DECLARATION

I hereby declare that this Master's Thesis titled as "**The Relationship Between Tax Burden and Labor Force Participation Rate In OECD Countries**" has been written by myself in accordance with the academic rules and ethical conduct. I also declare that all materials benefited in this thesis consist of the mentioned resources in the reference list. I verify all these with my honour.

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ABSTRACT

Master's Thesis

The Relationship Between Tax Burden and Labor Force Participation Rates in OECD Countries

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Taxes have a significant impact on society, both socially and economically. Taxes are the primary revenue source of the governments' social policies. At the same time, taxes have an influence on the purchasing power of individuals. However, tax policies not only effective on the income but also create an impact on the labor force participation rate. Since tax policies could change the peoples' labor-leisure decision. Despite, there are several studies in the literature about this subject, there is no commonly accepted view about this relationship.

The aim of this thesis is to determine the impact of the tax burden on the labor force participation rate in OECD countries. To reveal the relationship between taxes and labor force participation rate, macro variables were used, which are related to literature and belongs to 1990-2017 years. The country selection was occurred according to the attainability of the data. Thus, data belongs to 28 of the OECD countries. Panel data analysis was used as an estimation method, and; GLS Period SUR model and cross-sectional covariance methods were implemented because of the presence of cross-sectional dependency and autocorrelation. In all models, the tax burden obtained as statistically significant and has a negative impact on the labor force participation rate. On the other hand, wages were found statistically insignificant in the %1 and %5 significancy levels in all models but in one model significant in the %10 significancy level. Moreover, other variables were detected as statistically significant; gross domestic product, average schooling year, and the fertility rate

has a positive impact on the labor force participation rate, but inflation has a negative effect.

Keywords: Labor Force Participation Rate, Tax Policies, Tax Burden, OECD, Period SUR

ÖZET

Yüksek Lisans Tezi

OECD Ülkelerinde İşgücüne Katılım Oranı ile Vergi Yükü Arasındaki İlişki

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Vergiler toplum üzerinde hem sosyal hem de ekonomik olarak önemli bir etkiye sahiptir. Vergiler devletlerin sosyal politikalarını uygulayabilmesi için temel gelir kaynağıdır. Aynı zamanda vergi politikaları bireylerin alım gücünü de önemli ölçüde etkilemektedir. Ancak vergi politikaları yalnızca insanların gelirleri üzerinde etkili olmamaktadır ayrıca bireylerin işgücüne katılımı konusunda da bir etkiye sahiptir. Çünkü kimi zaman insanlar çalışıp yüksek vergilere katlanmak yerine çalışmamanın çıkarlarına daha uygun olacağını düşünürler. Bu konuda literatürde birçok çalışma bulunmasına rağmen ortak bir sonuca ulaşılamamıştır.

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 1990-2017 yıllarına ait makro veriler kullanılmıştır ve ülke seçimleri, verilerin ulaşılabilirliğine göre yapılmıştır dolayısıyla 28 OECD ülkesine ait veriler kullanılmıştır. 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. Analiz için oluşturulan bütün modellerde vergi yükünün, işgücüne katılım oranı üzerinde negatif etkiye sahip olduğu tespit edilmiş olup, ücretlerin işgücüne katılım oranı üzerinde %1 ve %5 anlamlılık düzeylerinde istatistiksel olarak anlamlı olmadığı anca yalnız bir modelde %10 düzeyinde istatistiksel olarak

anlamlı olduğu tespit edilmiştir. Analizlerde kullanılan diğer değişkenler bütün modellerde istatistiksel olarak anlamlı çıkmış ve işgücüne katılım oranı üzerinde; gayrisafi yurtiçi hasıla, ortalama okul yılı ve doğurganlık oranının pozitif; enflasyonun ise negatif etkiye sahip olduğu belirlenmiştir.

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

THE RELATIONSHIP BETWEEN TAX BURDEN AND LABOR FORCE PARTICIPATION RATES IN OECD COUNTRIES

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ABBREVIATIONS

BRF	Average Birth Rate Fertilities
CPI	Consumer Price Index
ECM	Error Component Model
FLFPR	Female Labor Force Participation Rate
FEM	Fixed Effect Model
GDP	Gross Domestic Product
LFP	Labor Force Participation
LFPR	Labor Force Participation Rate
LFS	Labor Force Status
LLC	Levin-Lin-Chu
LS	Labor Supply
NLI	Non-Labor Income
OLFPR	Older Labor Force Participation Rate
PCSE	Panel-Corrected Standard Errors
REM	Random-Effect Model
RWAGE	Real Minimum Wage
SCH	Average Years of Schooling
TAXB	Tax Burden
TR	Tax Rate

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INTRODUCTION

Especially after the industrial revolution, the labor force participation rate has become a vital indicator for economies. Because of the mass production after the industrial revolution, the necessity of raw materials increased, so it also brought the rise for labor demand. Thus, governments started to implement some policies to increase the labor force participation rate. These policies have become an essential policy among the tools of governments.

Although the labor force participation does not reflect the effectiveness of the production process, it has a significant impact on the number of products. Therefore, researchers try to find determinants of the LFPR.

LFPR variable shows the part of the population currently working and seeking employment in the economy. Thus, this variable has an important effect on the production capacity of the economies because more workers produce more products. To reach the production targets, determining the indicators of LFP is crucial for the countries.

Tax is the money that the state collects directly or indirectly from the citizens according to be spent on public services. Tax rates have an essential impact on the purchasing power and welfare of people since taxes lead to a decline in the disposable income of the people with other words in their purchasing power for consumption. Therefore, taxes could change the decision of the peoples' about the labor-leisure.

On the other hand, taxes are not the only determinant for the LFPR; there are also several different determinants of the LFPR. These determinants changes in accordance with the aim of the studies. For example, while some studies focused on the micro variables, some of them occurred via macro variables. Since labor-leisure decision changes vary from person to person and country to country. Thus, to explain this crucial relationship, various studies were needed.

There are several studies in the literature related to the relationship between taxes and the LFP, especially regarding the difference between genders and its' other determinants. Also, several discussions are related to the effects of taxation policies on the LFPR.

This thesis aimed to find out whether a relationship exists between the tax burden and LFPR in the OECD countries. The second aim of the study is to find the power of the impact and its' direction in case if the relationship is found among the labor force participation rate and tax burden.

To reveal this relation in this study, the tax variable was collected as a tax burden and the main independent variable. Since tax burden data includes tax payments of all of the economic actors in the economy. Thus, data provided to reveal the tax impact on the labor force participation rate via an extended perspective because it reflects the loss of income for both individuals and corporations. Thus data can reveal the bilateral effect at the same time. Hence, this data reflects the effect of taxation policy on the LFPR.

Furthermore; gross domestic product, consumer price index, real minimum wage, average schooling year, and birth rate fertility were used in the analysis as control variables.

This thesis was designed as follows; the second chapter includes literature review, the third chapter explains the labor markets in terms of the macroeconomic perspective to the labor market and labor market theories, the fourth chapter examines the types and classifications of taxes, the fifth chapter includes empirical models and methodology of the thesis, chapter sixth is related to data and results of the analysis, and lastly, chapter seven concludes.

CHAPTER ONE
LITERATURE REVİEW

1.1 EMPIRICAL LITERATURE

There are several studies in the literature about the impact of taxation on labor force participation. LFP is an essential indicator for the countries to economic development; especially, supply-side economists pay attention to this indicator. Thus, to reveal the impact of taxes on labor supply participation, they conducted several studies. However, in spite of the extensive literature in this field, it can not be said that there is a common view that has been reached. Even controversy occurred between the researchers, such as Hausman-Macurdy controversy, which represents the inverse results of the substitution and income effect of the taxes on working hours.

In terms of the contents of studies, some of them related to the substitution and income effect of the taxes on LFP. Moreover, some researchers examined the effect of microdata, such as age groups, marital status, race, etc. while several studies examined the issue in terms of macro indicators of the economies.

Scott et al. (1977) conducted their study about the labor force status (LFS) of the rural population and subgroups. They implemented a survey to four county's rural areas, which are Mississippi, Georgia, Louisiana, and Texas, in 1973. These counties were selected due to their rural intensive population and different community characteristics such as race and sex. In the study, wedding status, health conditions, income, wage, number of children, schooling, and costs of child-care were used to determine labor force status as variables. Probit regression estimations revealed that wage has a substantial and positive influence on the LFS decision of all subgroups. Furthermore, accessibility of medical-care opportunities also one of the most critical determinants for the rise in the labor force participation rate.

Another critical study belongs to Hausman, who wrote an essential study related to taxation and labor supply, which is one of the milestones of the relationship between taxation and labor supply. In his research Hausman (1981) examined the LS decision of the married men in the light of the effect of taxation and transfer payments. In addition to progressive taxes, he also added his analysis the income taxes, social

security payroll taxes, and aid to families with dependent children(AFDC). In other respects, he considered the deadweight loss. Tax laws could be the reason for the nonlinearity in the budget sets, so he showed in his analysis nonlinear budget sets and described these sets as convex and non-convex budget sets. He reached to the usage of the convex budget set, which is more proper than the non-convex. He used the University of Michigan Panel Survey on Income Dynamics data in his analyses and estimated them. He searched the impact of transfer payments and taxation on the labor supply of married men and their wives, and female heads of the family. To analyze, 1085 data were collected from the University of Michigan Panel Survey on Income Dynamics for married men and their wives, which belong to the year 1975. Moreover, 119 prime-age female heads data also were collected whose children under eighteen years old and available for AFDC payment. Results showed that for husbands, the income effect is significant. On the other hand, the wage coefficient is almost zero and not the only estimation almost zero, but also standard error obtained as too small. Thus wage effect is less effective than the previous researches. To sum up, taxation has an essential impact on the labor supply of married men, besides it leads to deadweight loss. For wives, results reveal that wage is more ineffective than comparing to their husbands from the point of the hours of work. In the case of female heads of families, the labor supply decision of the female heads changes with taxes due to their impact on the wages and virtual income, which income reflects the average tax rates up to the current tax bracket.

On the other hand, another study belongs to Thomas E. Macurdy. Macurdy (1983) examined the intertemporal model of the LS and consumption with the integration of uncertain future and income taxes to model. He collected the data from the Pre-enrollment and the Monthly Labor Supply Files of the Denver Income Maintenance Experiment between 1972-1975. The data belongs to 121 married men, and data was obtained as monthly. This study examined the two procedures which are created to analyze period-specific preferences until a monotonic transformation. These procedures are static labor supply model with taxes and life cycle factors, and the second model is related to analyze parameters of the preference function via the usage of the marginal rate of substitution function. Analysis reached to 0.31 to 0.7 elasticity

range for the uncompensated wage substitution and -0.28 to -0.16 for the income elasticity.

On the 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 the working hours and LFPR. For analyzing the hours of work that is effected by taxation, he separated the sample into two categories, like married women and single parents. The analysis is related to tax reforms of the United Kindom, which were implemented in the 1980s. Income Tax, National Insurance, Family Income Supplement, Supplementary Benefit, Rent Rebate, Rent Rebate/Housing Benefit were used in the analysis as variables. Data were collected from the United Kingdom Family Expenditure Survey data set. Non-parametric (kernel) regression was implemented. Results showed that taxation is an important indicator to work or not work decisions of the married women, so taxation is a vital indicator for LFPR. Furthermore, the work presented the wages have a positive influence on the labor supply of married women, also negative wage elasticity in the LS of prime-age men. Thus, especially, taxation policies have an impact on the LS of women.

Furthermore, Kleven and Kreiner (2006) wrote their work on the purpose of providing the theory and measurement of the marginal cost of public funds in terms of explaining the labor force participation responses. United Kingdom, Italy, Denmark, France, and Germany were chosen as samples due to their economic, characteristics, and racial differences. Microdata obtained from Immervoll et al. (in press) which are earnings and effective tax rates. The age interval of individuals was determined between 18-59 those who worked for a year. 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. Thus, the marginal cost of public funds becomes higher and essential.

In a further study, Yuldashev and Khakimov (2011) examined the effect of income taxes on LFPR in three transition economies that are Bulgaria, Serbia, and the Russian Federation. Heckman estimation method was used to analyze the data in their study. Data was chosen as, for Serbia 4043 male respondents and 3694 female

respondents, for Bulgaria 1909 men and 1752 women and for Russia 2304 men and 2585 women to reveal the effect of income taxes on LFPR. They gathered the data from different micro-data sources of countries that belong to 2002. The results showed that labor-abundant countries, so which countries have high LFPR, are less sensitive to changes in income taxes in terms of LFP. Furthermore, the study reached that changes in wages have a positive impact on the transition countries. On the other hand, sensitivity to change in wages for women is more than men's to labor force participation.

Although the basic theory of taxation and labor supply lean on the neoclassical LS model, which is related to substitution and income effect, some studies expanded this field. For example, some of these studies are conducted their analyzes based on the cohort effects, which represent the people who share similar historical and life experiences such as the same generations in the specific place. One of the studies for the cohort effect belongs to Grigoli, Koczan, and Topalova (2018). They searched the cohort effect on the LFPR. In the analysis, 17 OECD country's data was used due to the availability of data between 1985-2017 years. They obtained the data from the employment database of OECD, and data were chosen according to LFPR by gender and age-groups. Seemingly Unrelated Regression (SUR) model was implemented. Results showed that joining of the new cohorts of women shifts the participation rate upward, but the new generation of men is almost ineffective on the participation rate. Since it can be said that working seen as an obligation for men, not a choice. In other respects, the participation of older people to the labor force is less than the other cohorts, and this low participation could induce a decline in the total participation rate.

Favreault, Toder, and Ratcliffe (1999) also searched the LFP of older workers in her study. The sample of the study includes older people who born between 1920-1932 years. Multinominal logit model used to analyze the data of this sample. To analyze the models, the data obtained from the Survey of Income and Program Participation (SIPP) data matched to Social Security Administration Summary Earnings Records (SERs) and Master Beneficiary Records (MBRs). Data were gathered as the duration of current work spell, wage, family asset income, Monthly Social Security benefit, the tax rate on earnings, Gender/marital status, Education, Non-Hispanic white, married times (spouse age -own age) and pensions. Results

showed that low Social Security benefits and low taxes on wages raise the old worker LFPR.

Despite almost all of the works about the labor force participation rate includes sex differences, at least as one of the variables, some of them directly lean on the FLPR. Bloom et al. (2007) examined the influence of fertility on FLFPR. They implemented the unbalanced panel data analysis to obtain empirical results. The sample was selected as women who are in the 15-64 age interval. Total fertility rate, female life expectancy, capital to the working-age population, urban population, average years of schooling male/female, and abortion index were used as variables in the analysis, which belong to 1960-2000 years. Results showed that the fertility rate has an essential and inverse influence on the FLFPR in every age group, but especially between the age group 35-39, impact reached its maximum.

Furthermore, Özdamar et al. (2018) searched the relationship between savings and the FLFPR. Previous studies showed that the savings of females are more than men. For econometric analysis, panel data analysis used. Data was selected as; savings, FLFPR, GDP growth, inflation rate, foreign debts, and interest rate, which belong to 31 countries over the period 1991-2014. According to results, only interest rates (negative) and GDP growth (positive) are significant and have an effect on the savings of the countries. In other respects, the primary independent variable, which is FLFPR is insignificant in all models.

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. In this study, logistic regression analysis was implemented to reach empirical results. Data was collected from TUIK, which belongs to the 2008 Household Budget Survey for rural-urban areas and male-female. According to results, annual disposable income, education level, age, household size, and marital status are detected as the main determinants of the LFP. LFPR has a negative relationship with the annual disposable income; only men who live in the urban, annual disposable income has a positive impact on the LFPR. Furthermore, a raise in the education level induces a rise in the LFPR. Moreover, both married and unmarried, household size and age have a positive relation between LFPR, only people who are in the 45-54 age interval are unwilling to join the labor force.

In a further study, Kızılgöl (2012) tried to present the determinants of the LFPR of married and single women. Work years determined as 2002-2008 years. Data were collected from Household Budget Surveys of TUIK, and panel data analysis was used to estimate logit models. Results showed that the most critical determinant of the LFPR of all groups is the education level. Thus, the increase in the education level leads to a rise in LFPR. On the other hand, household size, live location, household expenditures, household income, property ownership, child quantity, and age detected as other determinants.

Some researchers were concerned with the impact of the macroeconomic variables on labor force participation. Duval, Eris, and Furceri (2010) examined the impacts of downturns and peaks on the LFPR. The sample was determined as 30 OECD countries over the period 1960-2008. They obtained the data according to the availability of them and gathered as the difference between the observed GDP growth rate and the unobserved potential growth rate, and downturns classified into moderate, severe, and very severe downturns. Results showed that moderate downturns are not statistically significant, but severe and very severe downturns have a significant and negative impact on the LFPR. Notably, the effect reached it's maximum when a very severe downturn existed.

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

Additionaly, Shahid (2014) examined the relation between the LFPR, gross fixed capital formation, and GDP. Data was gathered from the Pakistan Bureau of Statistics in the study, which data belongs to the 1980-2012 year interval. Johansen Co-integration test implemented to estimate data. According to results, the vector error correction model shows that GDP has a positive and significant relationship with the LFPR but, gross fixed capital formation is insignificant.

As it is seen in Table 1, there are several studies conducted for the labor force participation rate with different methods, samples, and variables. However, there is no commonly accepted result for neither effect of taxes nor other variables on the labor force participation. Thus, this thesis has conducted a combination of the different macro variables which are compatible with the literature.

Table 1: Summary of Liturature Review

Authors	Approach	Summary of Findings
Scott, L. C., Smith, L. H., & Rungeling, (1977)	Probit Regression	The wage has a positive influence on the LFS of all subgroups. On the other hand, medical care opportunities obtained as an essential variable for labor force status increase in LFP.
Hausman J. (1981)	Labor supply model estimation with convex and non-convex budget sets	The wage effect is less effective than the previous researches. Taxation has a significant impact on the LS of husbands, and also it leads to deadweight loss. For wives, the wage is more ineffective than comparing to their husbands in terms of working hours. In the case of female heads of families, the labor supply decision of the female heads changes with taxes due to their impact on the wages and virtual income,
Thomas E. Macurdy (1983)	Intertemporal labor supply model estimation	Analysis reached to 0.31 to 0.7 elasticity range for the uncompensated wage substitution and -0.28 to -0.16 for the income elasticity
Blundell, R. W. (1995)	Non-parametric (kernel) regression	Taxation is an important indicator to work or not work decisions of the married women. Furthermore, wage has a positive impact on the labor supply of married women, also negative wage elasticity in the labor supply of prime-age men.
Favreault, Ratcliffe and Toder (1999)	Multinominal logit model	Low Social Security benefits and low taxes on wages raise the old worker LFPR
Kleven and Kreiner (2006)	Extensive and intensive margins of labor supply	In the case of the non-convex model, tax and transfer reforms lead to an increase in dispersed participation, which is related to creating first-order effects on government revenue. Thus, the marginal cost of public funds becomes higher and essential.
Bloom et al. (2007)	Unbalanced panel data analysis	BRF has a significant and negative impact on the FLFPR in every age group, but especially between the age group 35-39, impact reached its maximum
.Duval, Eris, and Furceri (2010)	Linear regression models	Moderate downturns are not statistically significant, but severe and very severe downturns have an essential and inverse impact on the LFPR. The impact reached it's maximum when a very severe downturn existed
Yuldashev and Khakimov (2011)	Heckman Estimation method	Labor-intensive countries are less sensitive to changes in income taxes in terms of LFP. Changes in wages have a positive relationship among the transition countries. On the other hand, sensitivity to change in wages for women is more than men's to LFPR.
Kızılgöl (2012)	Panel Data analysis	The most critical determinant of the LFP of all groups is the education level. On the other hand, household size, live location, household expenditures, household income, property ownership, child quantity, and age detected as other determinants
Yamak et al. (2012)	Logistic regression analysis	Annual disposable income, education level, age, household size, and marital status are detected as the main determinants of the LFPR.
Shahid (2014)	Johansen Co-integration	GDP has a positive and significant relationship between the LFPR but, gross fixed capital formation is insignificant.
Van Zandweghe (2017)	Panel data analysis	After 1980, the LFPR has become more cyclical. This increase reflects the prime-age workers' cyclicality. Thus, results also show that the decline in older worker cyclicality leads to partial balance. On the other hand, the real wage rigidities are a promising explanation for the change in the different cyclicality of different demographic groups.

Grigoli, Koczan, and Topalova (2018)	Shift-share analysis	Joining of the new cohorts of women shifts the participation rate upward, but the new generation of men is almost ineffective on the participation rate. On the other hand, the OLFPR is less than the other cohorts, and this low participation could lead to a decline in LFPR
Özdamar et al. (2018)	Panel data analysis	Interest rates(negative) and GDP growth(positive) are significant and have an impact on the savings of the countries. On the other hand, the primary independent variable, which is FLPR is insignificant in all models

CHAPTER TWO
LABOR MARKET

The labor market is the intersection point of labor supply and demand, which points determine the value of labor. Hence, the labor market refers to the connection point of employers and employees. In the labor market, employers represent the demand part of the market, which demands the workers and labor force for their firms. In other respects, households represent the supply side of the market, which are the suppliers of the labor force. The market economy includes some critical components; one of them, and the vital one is the labor market. Since the labor market has a significant impact on the production process.

In this thesis, the labor market was examined in the two categories, which are the macroeconomic perspective to the labor market and labor market theories.

2.1 THE MACROECONOMIC PERSPECTIVE TO THE LABOR MARKET

Labor market theories, from the point of macroeconomic perspective, interested in the unemployment rate, participation rate to the labor force, income level, and GDP, which variables are influenced by the relation between money market, good market, labor market, and international trade.

2.1.1 Labor Force Participation Rate

The labor force participation rate is the ratio of the civilian non-institutional population who are 16 years and elderly that is working or actively searching for job (Hipple, 2016: 1). This ratio calculated with the division of Labor Force into the population in which the population is legally located in the labor force. This ratio reflects the attractiveness of the community to work.

2.1.2 Unemployment

The unemployment rate refers that the ratio of unemployed population to the labor force (OECD, 2019).

Unemployment is the macroeconomic problem, and this situation also has an impact on the whole life standards of the people due to the decline in their purchasing power and living standards. Economic policies affect this problem, and these policies also could be helpful for the solution to this problem, at least policies could provide to decrease in the compelling level of the problem.

2.1.3 Natural Rate of Unemployment

This type of unemployment represents the average unemployment rate, which is occurred by economic fluctuations (Mankiw, 2016: 300). Determining this ratio could be hard, so still, in the literature, there are several discussions about the term.

On the other hand, in 1975, Franco Modigliani talked about "NAIRU," which is the non-accelerating inflation rate of unemployment. This term means that, in the specific rate of unemployment, the unemployment rate has no impact on the inflation rate. Therefore, if the unemployment rate stays below the NAIRU, the inflation rate increases otherwise decrease. Consequently, some of the economists claim that there is a relationship between the natural rate of unemployment and NAIRU

2.1.4 Types of Unemployment

2.1.4.1 Cyclical unemployment

Changes in partial aggregate demand lead to cyclical swings in the unemployment rate (Tobin, 1980: 24). Therefore, cyclical unemployment occurs in the absence of sufficient aggregate demand for goods and services in the economy. Since the demand for goods and services provides the production of products, and also it leads to more job opportunities. Otherwise, production decreases due to this situation, and the firm owner decided to work with the less worker, so job opportunities decrease.

Furthermore, this situation leads to sticky prices. Thus, wages could not reach the equilibrium level and lead to the presence of unemployment.

Cyclical unemployment also called Keynesian unemployment. Keynesian's claimed that the problem of the lack of labor demand is solvable via government policies which are existed due to lack of job opportunities.

On the other hand, monetary policies also could be a solution to this problem. For example, expansionary monetary policy raises the quantity of money via a decrease in the interest rates, so it leads to a rise in the non-governmental spendings and a decline in unemployment.

2.1.4.2 Seasonal unemployment

Seasonal unemployment represents the change in the rate of unemployment in accordance with the temporary needs of human resources for jobs which are existed in the specific period and for the particular job types. The demand for labor boosts this type of unemployment (Ehrenberg and Smith, 2011: 521).

Some industries are a clear example of that type of unemployment, such as the agriculture and tourism industries. In the harvest period, the unemployment rate decreases due to the need for the workforce in the farms.

On the other hand, especially in the summer periods, tourism revenues of the countries increase. Suppose the country has tourism opportunities such as the sea, historical places, etc. the natural revenue of the country increases. Hence, as the return of this condition, the tourism sector needs more workers. However, at the end of this period, again, unemployment will increase because there will not be any necessity for more manpower.

Seasonal unemployment seems like a type of structural unemployment in terms of dependency on labor demand.

2.1.4.3 Frictional Unemployment

Unemployment is existed not only because of the market fluctuations or other macroeconomic situations but also it could be due to the preferences of workers and

their abilities. On the other hand, the requirements of jobs could change, or they can include different specific abilities which abilities are not matching with the workers. Hence, due to these reasons, the job search process could take a long time. This problem called frictional unemployment (Mankiw, 2016: 305). These conditions could induce a rise in unemployment and the unemployment rate.

In some periods, frictional unemployment could be unavoidable. Since technology changes with time and also countries' production types, process, demand and etc. can be changeable. Therefore, requirement abilities that are necessary for starting to job also change. Therefore the mismatch problem exists. Hence the job search process could be longer, and some of the workers could be involved in the unemployment rate. This situation also called a sectoral shift. Sectoral shift not only occurs in the change in the economic system but also occurs in the unexpected fires of workers due to the failure of the firms.

2.1.4.4 Real Wage Rigidity and Structural Unemployment

Wage rigidities are another reason for unemployment. Wage rigidity means that the wages could not reach the equilibrium point, which point represents the labor demand equals the labor supply. This equilibrium point called a market clear point. If wages stay above this point, it leads to the excess labor supply, so the unemployment rate raises. Wage rigidity leads to a decrease in the chance to find a job, so it creates unemployment.

This type of unemployment, which is the result of wage rigidity, called structural unemployment. On the other hand, structural changes in the production processes in the economy also cause a raise in structural unemployment. For example, if the demand changes due to a new type of product, which product is produced with new techniques, labor demand also changes. This situation leads to a mismatch between workers and firms because of the insufficient abilities of the workers for the new techniques of production process, so this mismatch leads to an increase in unemployment.

There are three main reasons for the wage rigidity, which are efficiency wages, minimum wage laws, and monopoly power of unions.

2.1.4.4.1 Minimum Wage Laws

The government can lead to wage rigidities due to its minimum wage laws. These laws block wages to reach the equilibrium point. Minimum wage laws mean that the firms have to pay the minimum wages to workers in which firms are forced by the government. Therefore, if the government sets wages at a higher level than the equilibrium level, this level will induce an increase in the cost of the firms, so the unemployment rate raises because the firms could prefer the firing their workers.

2.1.4.4.2 Unions and Collective Bargaining

The monopoly power of unions could be another reason for wage rigidity. Since the wage is not determined in the equilibrium point because of the unions due to their willingness to protect their unionized workers. Thus, collective bargaining could lead to higher wages than the equilibrium point. Therefore, this high level of wages can lead to a decrease in the amount of hired workers by the firms and also a fall in job opportunities. Consequently, this situation could be the reason for the structural unemployment via an increase in the costs of the firms.

2.1.4.4.3 Theory of Efficiency Wages

Efficiency wages are the other reason for the wage rigidity. Since theory says that, if wages reach a high level, this level leads to an increase in the productivity of workers. Therefore, it occurs an opportunity cost for firms, which is the trade-off between high wages and efficiency. Hence decreasing the wages could be hard for the firms. Therefore, efficiency wages could be the reason for wage rigidity and structural unemployment.

2.2 LABOR MARKET THEORIES

2.2.1 Labor Supply

The total of employees and unemployed people in a country is called labor supply. There are several factors of the LS, such as demographical status, productiveness, income level, etc. Thus, labor supply is an essential subject for the economies, and especially supply-side economists pay attention to this phenomenon.

2.2.2 Classical Model

The classical model based on the ideas of Adam Smith. The model pays attention to the full employment and the equilibrium between LS and the demand for labor.

According to the classical model, LS is based on the utility maximization of the households, so it means that the opportunity cost of the work in terms of the households.

In the classical model, labor supply directly related to the real wage, which is W/P. The real wage has two impacts. They are income effect and substitution effect.

Income effect**:** Rise in wages leads to more consumption opportunities for individuals. Therefore they could choose more leisure.

Substitution effect**:** Leisure could become more expensive for individuals due to a rise in wages. Hence, it induces a rise in labor supply.

To sum up, the net effect is the main determiner of the labor supply. The classical model of the labor market is based on the domination of the substitution effect, so it reveals that when real wages increase, labor supply also increases. The classical model was created by supply-side economists.

2.2.3 Neoclassical model

The neoclassical labor supply model generally used to analyze the labor-leisure decision of the laborers. The theory provides to analyze the effects of the changes in

the economic conditions and government policies on the work incentives and willingness. In the model, “C” represents the consumption and, “L” represents the hours of leisure.

2.2.3.1 Utility and Indifference Curves

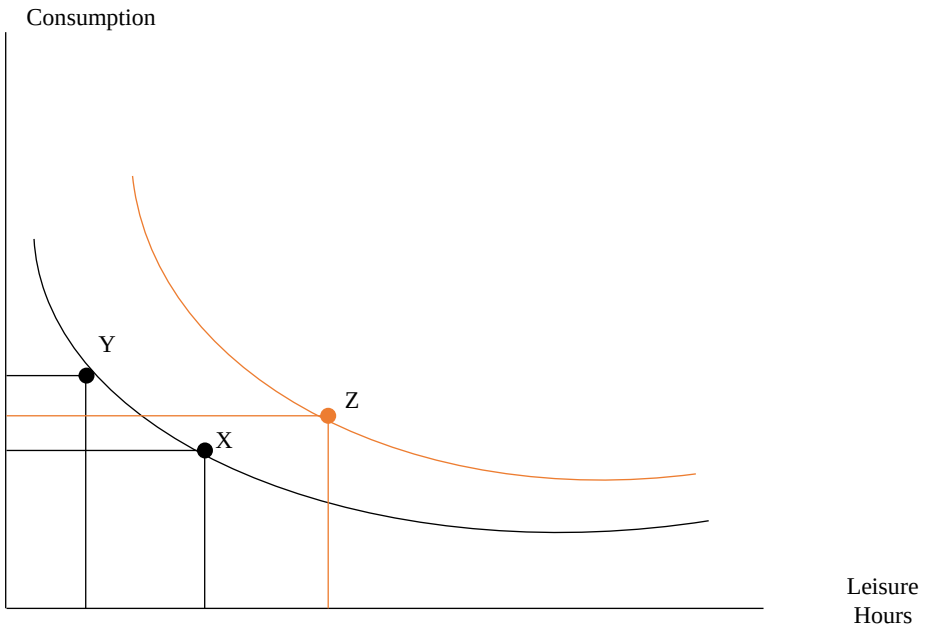
Utility which is obtained by consumption of the goods and leisure, represented in the utility function, which function is

U = f(C,L)

"U" is gathered as an index which is obtained by the transformation of the consumption and leisure to the utility. In the function, when U is increasing, also the happiness of the individuals increasing. Indifference curves show that the combinations of this utility function. The utility level stays constant on the curve at each point, but the quantity of goods changes, which are consumption and leisure.

In figure 1, Points X and Y yield the same utility level. On the other hand, point Z yields more utility.

Figure 1: Indifference Curves



Source: Borjas, 2004: 28

There are some features of the indifference curves which are;

1. Indifference curves are downward sloping. According to the theory, on the indifference curve, the individual has the same level utility due to curves are downward sloping. It means that, at the constant utility level, persons have to give up one of the good to increase the other one.

2. To expand the utility, the indifference curve has to slide upward; otherwise, the utility does not change at the same indifference curve.

3. There is no intersection point between indifference curves

4. They should be compatible with the convexity assumption to examine the labor-leisure decision.

2.2.3.2 Differences in Preferences across Workers

Indifference curves show that the trade-off among leisure and consumption, which are occurred by the different preferences of the individuals in the same utility level. This trade-off could be changeable according to the preferences and tastes of different workers. Since sometimes leisure could be more attractive for some peoples and also for the other individuals' work could be attractive. These intertemporal differences reflect the different choices, such as some people prefer leisure, and other people prefer the work under the same economic conditions.

Generally, economic models neglect this critical situation in the analyses, which are the tastes, with other words, preferences of the individuals. Despite the fact that this condition is critical to analyzes, the observation process and measurement of tastes could be arduous.

2.2.3.3 Budget Constraint

Income level of the individuals determines the consumption constraints of the goods and leisure. Some parts of the income of individuals include the non-labor income such as property income, lottery prizes, etc. This part of the income replaced as “V” in the equation. On the other hand, h represents the hour and w represents the hourly wage rate. The budget constraint can be written as :

$C = wh + V$

So, in the equation, expenditures on goods represented by “C” and it must be equal to the labor earnings, which is “wh” plus non-labor income “V”.

According to the equation, the wage rate is vital for the labor-leisure decision. The assumption is the wage rate is constant for persons, so it means that all of the workers gain the same wage per hour regardless of the total work time.

According to the assumption, there are two options for spending time for individuals, which are work and leisure. In equation “T” represents the total hours per week. So ;

$T=h + L$

Therefore budget constraint is:

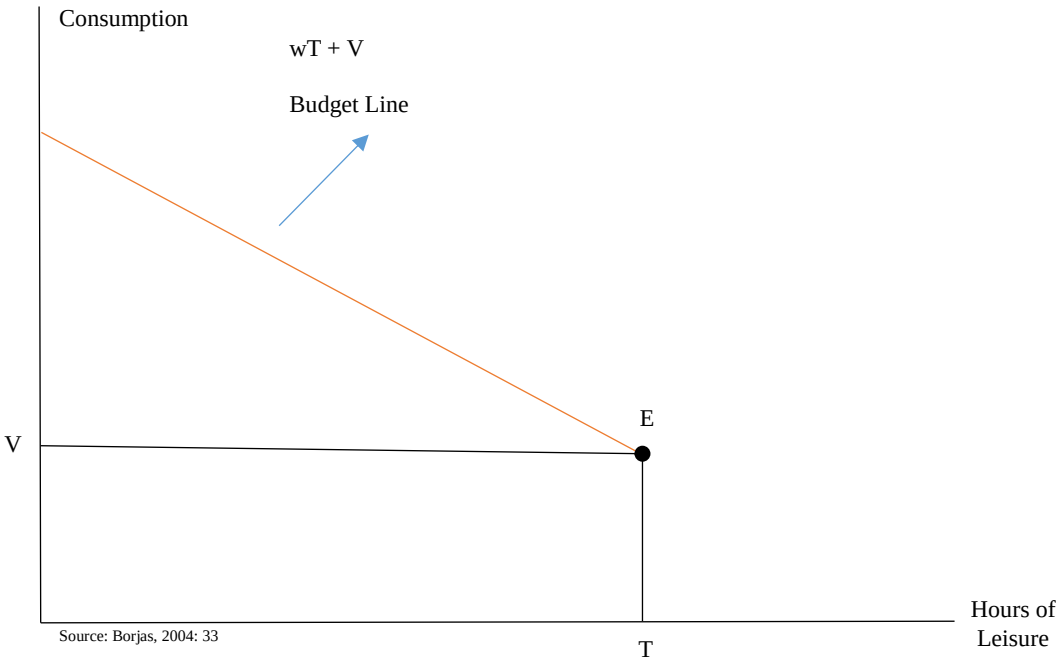
$C = w(T - L) + V$

Or

$C = (wT + V) – wL$

The slope of the equation is the negative sign of the wage rate. In figure 2, point E represents the endowment point. This point means that even if individuals decide not to work, at this point, they can still consume any good at the V level. On the other hand (wT +V) is the maximum good, which can be purchased with the maximum work level.

Figure 2: Budget Constraint

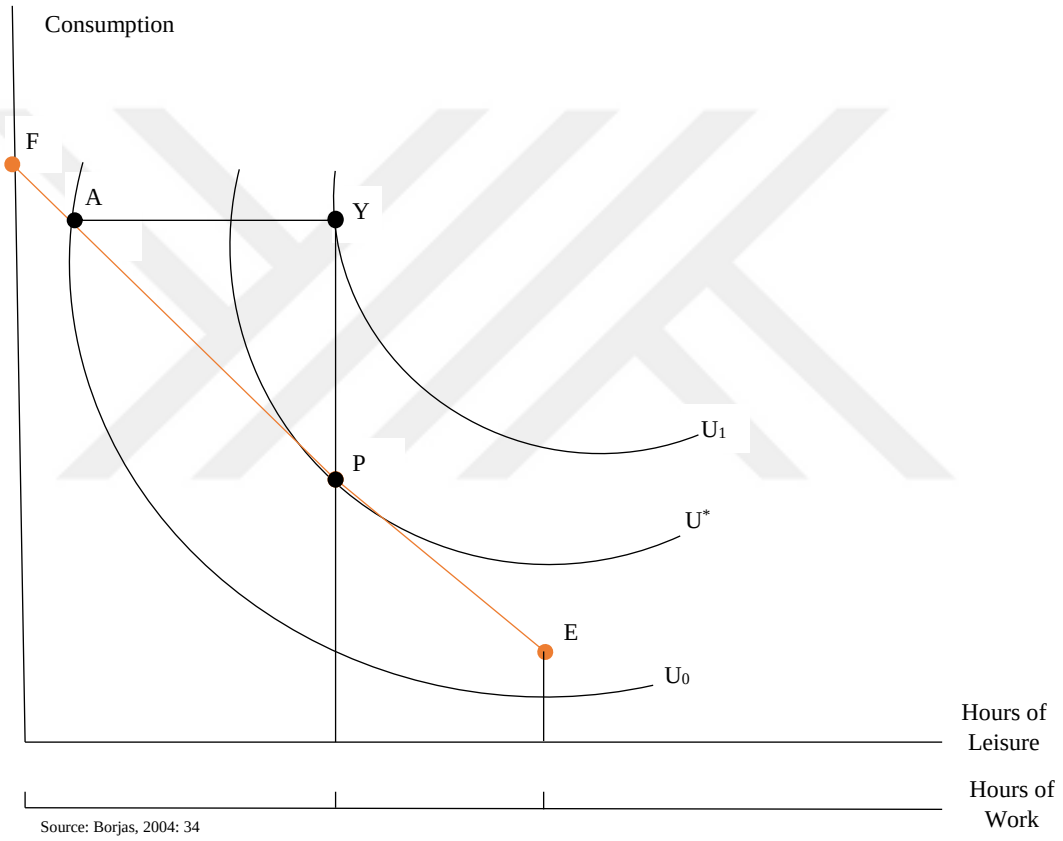


Source: Borjas, 2004: 33

2.2.3.4 The Hours of Work Decision

Another important assumption is related to the work hour decision behavior of individuals. This assumption is directly related to the willingness of the individuals to maximize their utility. Assumption says that the individuals choose as high as possible utility levels.

Figure 3: An interior Solution to the Labor-Leisure Decision



Source: Borjas, 2004: 34

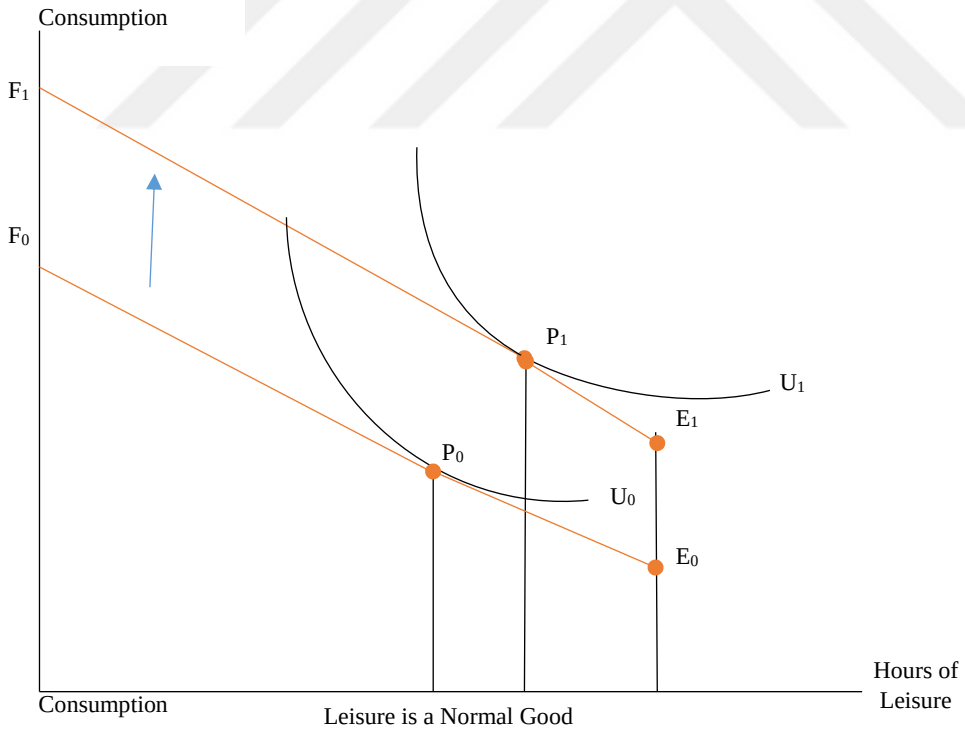
In figure 3, Point p represents the optimal combination point of the consumption and leisure to utility maximization. At point P, U* represents the maximum utility level for individuals where indifference curve tangent to the budget line. This solution is called the interior solution.

2.2.3.5 Change in Non-labor Income

Change in the non-labor income has a significant impact on the decision of workers in which is the labor-leisure decision. The change in the non-labor income could be affected by the workers' stock portfolio, dividends and etc.

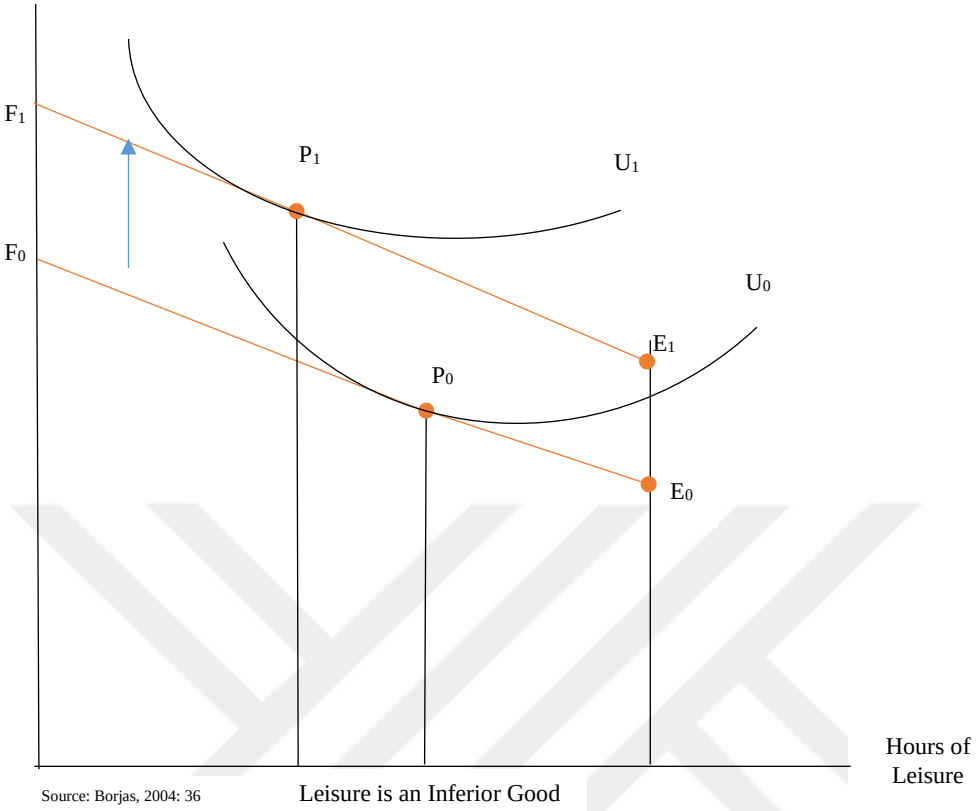
The efficiency of the NLI changes according to the kind of leisure when the wage is constant. In theory, leisure could be both normal good and inferior good. If leisure is a normal good, a rise in the NLI creates the chance to reach higher indifference curves for the individuals. This increase creates new opportunities for individuals in terms of consumption. On the contrary, if leisure is an inferior good, it leads to an inverse effect, which is when non-labor income increases, the demand for leisure decreases. Effect of the non-labor income on an hour is called an income effect.

Figure 4: Non-Labor Income Effect, if Leisure is a Normal Good



Source: Borjas, 2004: 36

Figure 5: Non-Labor Income Effect, if Leisure is an Inferior Good



Source: Borjas, 2004: 36

In figure 4, leisure is considered as a normal good. Therefore, if non-labor income increase also willingness to decide to the leisure time increase. On the other hand, in the second graph (Figure 5), as leisure is considered as an inferior good when non-labor income increase also hours of leisure decrease.

2.2.3.6 Change in Wages

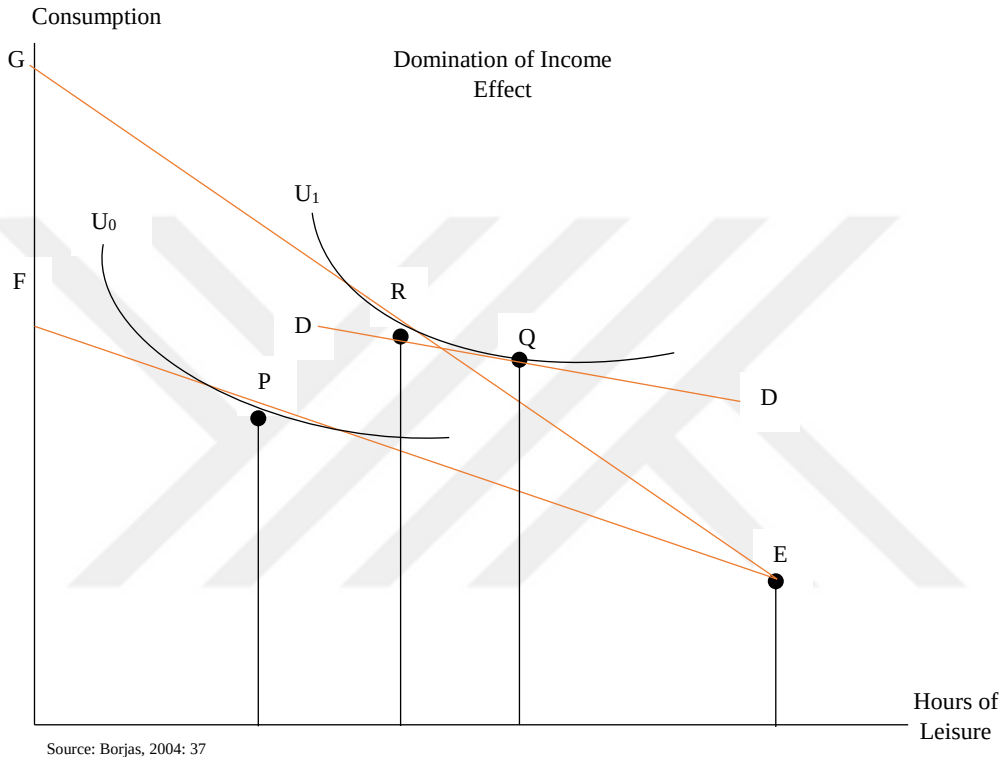
Under the constant real income assumption, the increase in wage rate creates both substitution and income effects. In terms of the income effect, an increase in wages lead to a rise in income. Thus, this rise in income gives much consumption opportunities to people. Hence, people have a chance to choose more leisure with the same level of consumption or more, if leisure is a normal good.

Furthermore, from the point of the substitution effect, a rise in wages induce a raise in the opportunity cost of less work. Since attractive wages lead to more losses

in people's income if people do not work. Therefore people choose more work if wage increases.

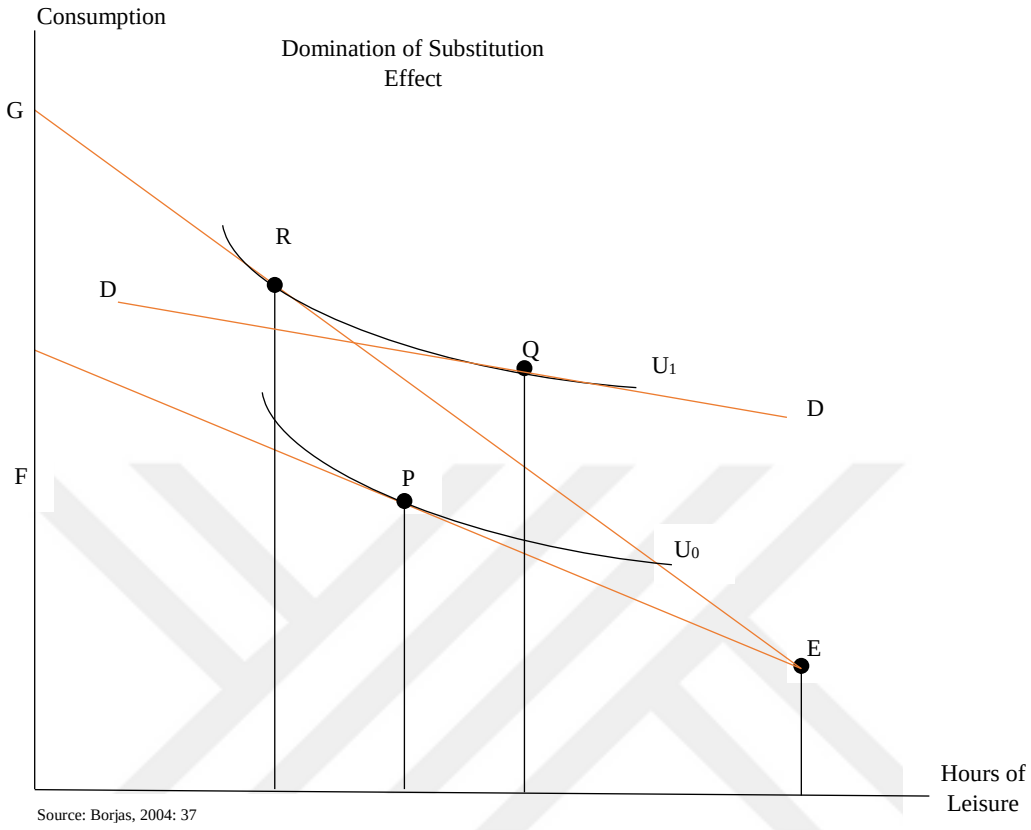
As a result, the net effect of the wages determines the preferences of people, in terms of the decision of more work or more leisure.

Figure 6: Income Effect of a Wage Change



Source: Borjas, 2004: 37

Figure 7: Substitution Effect of a Wage Change

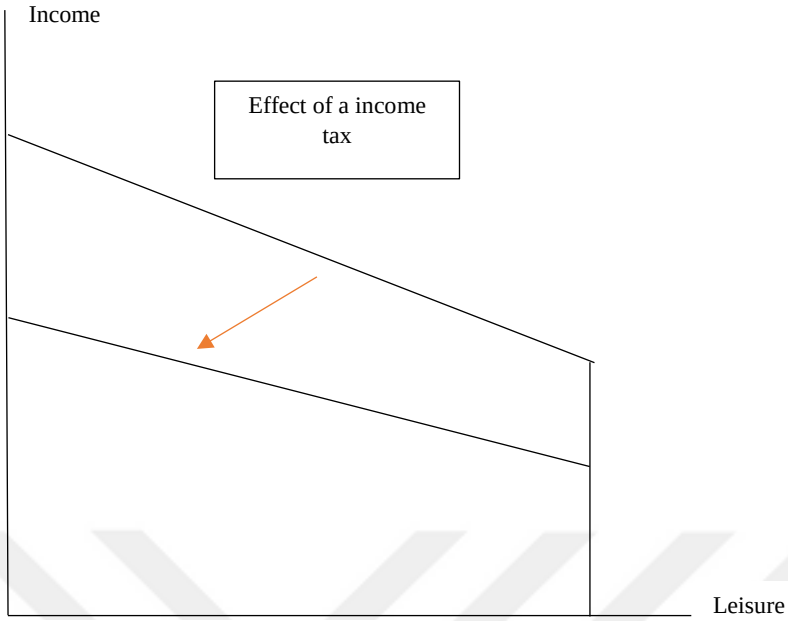


To sum up, if the income effect dominates (Figure 6), an increase in the wage rate leads to a decrease in the hours of work. Otherwise, if the substitution effect dominates (Figure 7), an increase in the wage rate increases the hours of work.

2.2.3.7 Change in Tax Rates

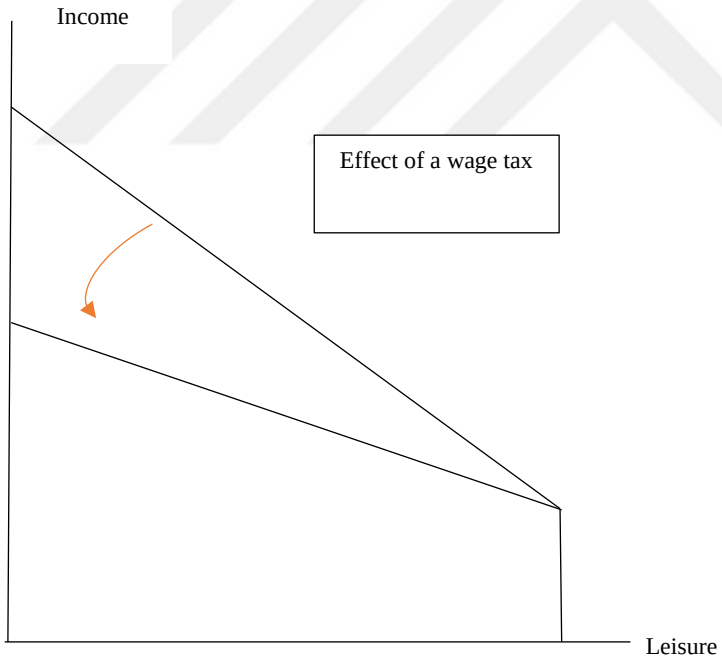
Taxation also has an effect on the labor-leisure decision, and also on the labor supply. Since taxes, which are obtained from individuals, lead to a decrease in income, so this situation leads to a change in labor-leisure decision.

Figure 8: Income Tax Effect on a Budget



Source: Landsburg, 2010: 67

Figure 9: Wage Tax Effect on a Budget



Source: Landsburg, 2010: 65

The integration of tax to the equation leads to a change in the figure. Since the budget constraint of the individuals and their purchasing power changes with taxes. Therefore their decisions about labor-leisure also change.

New figures (Figure 8 & Figure 9) represent the effect of taxes on the labor-leisure decision. There are two impacts of taxes on the decision process, which are substitution and income effect.

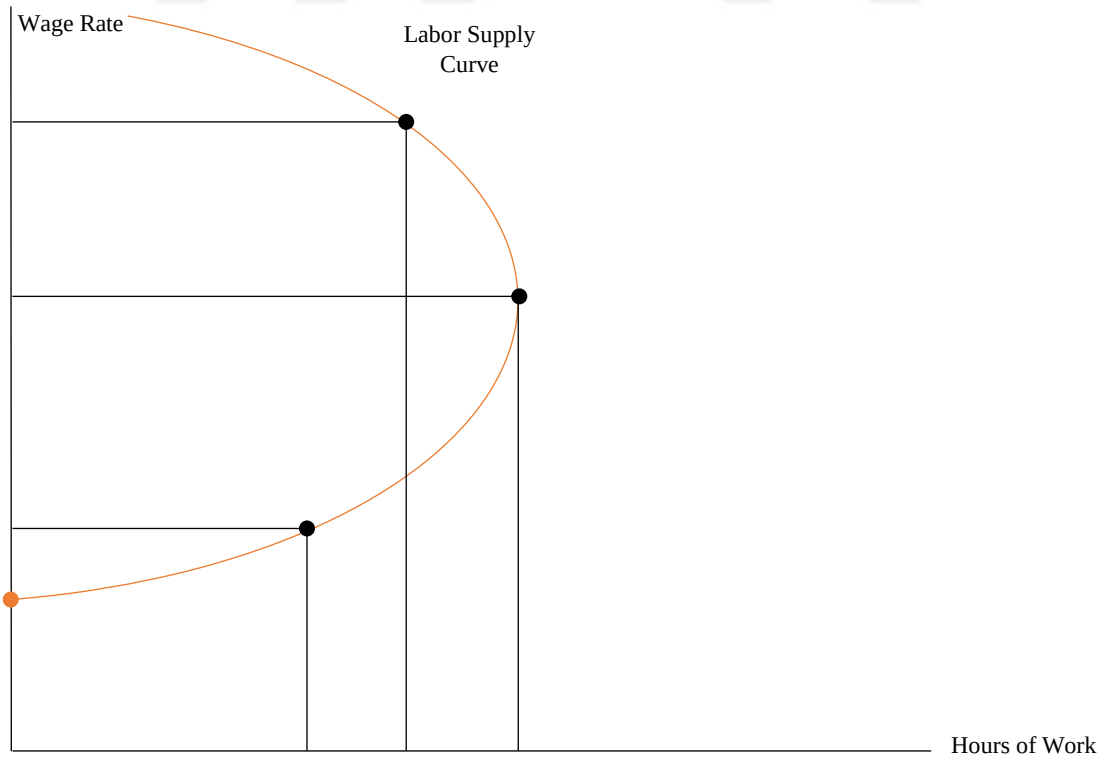
For example, if wage falls, net income falls after the taxation, the opportunity cost of the more work raises, and it induces an increase in the leisure choice of individuals. This process is called a substitution effect of taxes on the labor-leisure decision.

On the other hand, individuals are willing to protect their purchasing power against to decrease in wages for stable consumption at the same level. Therefore they prefer more work. This situation is the income effect of taxes on the labor-leisure decision**.**

2.2.3.8 Labor Supply Curve

The envisaged connection among the work hours and wages is called as labor supply.

Figure 10: Labor Supply Curve



Source: Borjas, 2004: 44

Relation between Optimal Hours of Work and the Wage Rate

In figure 10, the upward-sloping part of the curve represents the domination of the substitution effect, so when the wage rate rises, hours of work rise in this part of the graph. On the other hand, the backward-bending part shows the domination of the income effect. Hence when the wage rates increase, hours of work decrease.

Formulation, which is provided to the calculation of the changing ratio between hours of work and wage rates, called labor supply elasticity. Formulation is

$$\sigma = \frac{Percent\ change\ in\ hours\ of\ work}{Percent\ change\ in\ wage\ rate} = \frac{\frac{\Delta h}{h}}{\frac{\Delta w}{w}} = \frac{\Delta h}{\Delta w} \cdot \frac{w}{h}$$

2.2.4 Keynesian Model

Another model about the labor market is the Keynesian model. This model is the opposing view of the neoclassical labor market model. According to the Keynesian model, the labor market not stays in balance. Although the main assumptions of the Keynesian model are related to the classical employment model; in the absence of the money illusion and perfect competition, assumptions of the classical model are not features of the Keynesian model. Keynes had two observations about labor supply (Keynes, 1936: 8-13) which are:

1) LS could include Money wages as a function of them like real wages.

2) Although LS is the function of real wage, workers have to bargain their workforce to gain money

In the Keynesian model, money wages function is a necessity for the presence of involuntary unemployment. Keynes said that wages and labor prices are not flexible but sticky. Therefore, this situation could lead to the involuntary unemployment problem. In that case, the government should intervene the market to implement a regulation (McCallum, 1989: 174).

2.2.5 Monetary Model

In the monetary model, labor supply is related to real wages, not with the nominal wages (Vega and Russell, 1997: 8).

Monetary model leans to Milton Friedman's ideas, who is called the father of monetarism. This model considers expectations.

According to Milton Friedman, current inflation could not be predictable for employees because they evaluate the inflation rate via the last period of inflation data (Taylor, 2001: 125).This situation called adaptive expectations. If unexpected inflation increases, real wage also decreases, so employment rises because of the increase in labor demand of the firms'. Therefore, it means that there is an inverse relation among inflation and unemployment in the short term. However, in the long-run, there is no relationship between inflation and unemployment rate. This irrelevancy called an accelerationist hypothesis (Vega, 1998: 18). Since, to hold stay constant, the inflation rate at the given level, unemployment has to stay at its steady-state level. Inflation is sustainable at this level. However, if any intervene occurs to the market to keep the unemployment rate under its steady-state level, this situation induces accelerating inflation.

On the other hand, the monetary model includes the natural rate of unemployment. This term means that the steady-state level of unemployment, it is not concerned with the steady-state level of inflation. According to Friedman, "natural" does not mean that there is no change in the unemployment rate. Some policies, which are implemented by the government or other market forces such as minimum wages, unions and etc. , have an impact on this rate. Therefore these changes lead to a change in labor supply.

2.2.6 New Classical Model

New Classical's theories related to the classical perspective in terms of the market mechanism of the labor market. According to this perspective, problems are solvable in the market via its mechanisms. According to the new classical's, only unexpected changes in the output level has an impact on the money supply. New Classical's ideas lean on the three fundamental perspectives which are

1- Markets continuously clear.

2- Individuals do not make any mistake when they evaluate the economy (Rational expectations).

3- Real variables are decisive on economic policies and decisions.

2.2.6.1 Markets Continuously Clear

According to the market clear assumption, the market always stays at the equilibrium level in all periods. Since prices and wages are determined in the systematical process at the market, so they suddenly reach the market clear point where supply equals the demand.

2.2.6.2 Rational Expectations

Rational expectation means that individuals learn the market fluctuations, so they use this knowledge when they do their expectations. On the other hand, people not only use previous period knowledge but also they use current period information (Muth, 1961: 315-316).

According to the rational expectations hypothesis of New Classical's, there is no possibility to wrong expectations. However, due to imperfect information problems, expectations could be wrong.

As a result, due to these expectations, there is no need for any intervention by the government or other market forces.

2.2.6.3 Aggregate Supply Hypothesis

Aggregate supply hypothesis of new classical’s based on the two assumptions.

The first one is related to the decisions of employees and corporations, which decisions lean on the optimization of behavior.

The second one is related to relative prices. According to this assumption, the labor supply and production of firms depend on relative prices.

Fundamentally, the locus of the New Classical’s aggregate demand hypothesis is the labor supply.

According to this idea, labor supply depends on the current real wages because assumption says that workers have an idea about the current or expected real wages

(Snowdon, Vane, and Wynarczyk, 1996: 194). Therefore, the decision-making process realizes via this knowledges and occurs among the decision of work or leisure.

For example, if the actual real wage less than expected real wage, people prefer more leisure because they will gain more money in the future, so the opportunity cost of working today is high. Otherwise, if the current real wage is higher than the expected real wage, working is more suitable for workers today.

2.2.7 New Keynesian Model

The main target of the New Keynesian's is to find a solution and answer to how nominal rigidities prevent the market equilibrium? (Ball, Mankiw, and Romer, 1988: 5). Another aim of them is to make the traditional Keynesian model a more valid model.

According to New Keynesian's, wages and prices are not entirely flexible, because the contracts and imperfect competition in the market lead to sticky prices and wages.

Expected and unexpected increase or decrease in the money supply affects the output in the short-run. However, in the long-run, New Keynesian ideas similar to the New Classical's ideas in terms of rationality. It refers to firms and workers are rational in the long-run period, and their aim is maximizing their profit.

New Keynesians mooted some models to explain nominal and real stickiness in the market, such as implicit contracts, efficient wage theory, insiders-outsiders theory, hysteresis effect, and menu cost.

The open-end contract carries a high cost for the firms. Since the determination of the obligations, one by one leads to some problems and increases the costs. Due to these costs, firms and workers prefer long term contracts. This type of contract protects workers from economic fluctuations. Therefore, these contracts, which are a sort of guarantee for workers, but lead to stickiness in the market.

Another reason for sticky prices and wages is efficient wages. The theory says that high wages provide high efficiency. Therefore if firms prefer the give low wages, they lose the efficiency of their workers so due to this reason costs increase. Therefore,

generally, firms do not willing to give low wages to their workers, and this situation leads to stickiness in the market.

Furthermore, the insiders-outsiders model is another reason for the stickiness. Since firms are willing to avoid the cost of the new workers. It means that new workers, who are outsiders, create new costs for the firms such as training costs, job interviews, search in the labor market, firing costs and etc. These reasons prevent the change in wages, so stickiness occurs.

Moreover, Hysteresis effects mean that the unemployment level could not turn back to its previous low level after the temporary shocks because of the effect of shock continuous in the market.

Lastly, as a reason for the stickiness, menu cost is another reason. Firms prefer the changing of their prices intervally rather than suddenly changes. Since these alterations induce the presence of the new costs for corporations such as paper, ink and etc, therefore, these costs are the reason for constant prices and wages for a while even if market conditions change. As a result of these reasons, stickiness occurs in the market.

To sum up, the New Keynesians explain the market conditions in terms of sticky wages and prices. Besides, they evaluate the labor market in light of stickiness.

CHAPTER THREE
TAXATION

3.1 GENERAL INFORMATION

Taxes are collected as money depending on the sovereign power of states, to provide the governmental services, public debts and etc. This implementation is applied to realize social, economic, and political targets.

Generally, the aims of taxation are separated into two categories as fiscal and non-fiscal targets.

The first target is the fiscal aim. This target was realized throughout the historical development process of the world. The government has some roles for society, who live in the sovereign borders of the government, such as protection, justice, infrastructure, health and etc., To achieve these goals, the government implements taxation policies. These policies called fiscal policy.

The main aim of taxation is to provide revenue for government expenditures (Sanford, 1978: 80). At the beginning of the industrial revolution, the taxation policy of almost all of the countries leaned on the perspective of welfare, which depends on land ownership. Therefore indirect taxes gained significant importance in the taxation policies (Cope, 1977: 3-4). Thus, the first and the oldest aim of taxation is the counterbalancing of government budget deficit and public needs (Turhan, 1982: 32).

Classical thought says that taxation should not change people's preferences and must not include any impact on welfare.

On the other hand, the regulatory feature of tax is important. Since even if the only aim of taxation policy is increasing the revenues, it brings social results (Pelin, 1945: 145).

As well as the classic aim of taxation, taxation also regulates the demand on internal sources via the creation of revenue to the government (Sanford, 1978: 80-81). On the other hand, as a non-fiscal aim of taxation, it can be used as a part of protective policy such as taxation on import products for the protection of domestic products.

Taxes have a significant impact on both the redistribution of income and gross domestic product. The government decides on the taxation policy, and this decision may induce an increase or decrease in income redistribution inequality.

3.2 TYPES OF TAXES

Taxes are generally classified into three types according to their effect and implementation on the income groups, which are progressive, proportional, and regressive taxes.

Progressive taxes represent the high tax rates for high-income groups and low tax rates for low-income groups. Thus, as the income level of the individual increases, the tax rate increases.

Proportional taxation refers to every income group is responsible for the same amount of tax or the same tax ratio. Hence, these taxes represent constant taxes.

Regressive taxes are the opposite of progressive taxes, so low-income groups face high tax rates, and high-income groups face low tax rates.

3.3 CLASSIFICATION OF TAXES

3.3.1 Direct & Indirect taxes

Generally, this type of tax classification usually used as the general classification because all other classifications carry the specific features. However, direct and indirect tax classification is a general and basic classification of the taxation systems. On the other hand, these terms are not certain because of their meanings can change according to time and region.

3.3.2 Direct Taxes:

Direct taxes refer to tax revenues in which the government receives revenues from individuals, households, or corporations. Direct taxes include income taxes and property taxes.

The basic principle of direct taxes is directly related to income and wealth. It means that, if households gain more income or wealth, they pay more taxes.

On the other hand, this system could lead to some problems such as labor-leisure decision may be negatively affected, and people may choose to work less, due to a decrease in income.

Direct taxes include some advantages. One of them is a fair payment. This system is fairer than the other taxation approaches of the government because people pay taxes according to their revenue, so this situation leads to equality among the people.

Furthermore, tax payments are determined clearly and transparently in this implementation, so tax payments are not uncertain. Hence, people easily know how much money lose from their income due to tax payments. Since taxes were determined before the payments of the individuals.

Moreover, this type of tax prevents the waste of time, saving loss and revenue loss for the government, due to the non-existence of the additional transaction cost in while taxes are gathering.

Types of direct taxes are listed and explained below.

3.3.2.1 Income Tax

Implementation of the income taxes firstly began in 1799 in England to finance the French war, which war is called Napoleon Wars. In recent years (Newman, 1968: 15-17), generally, developed countries use this taxation method as an important source of their revenue.

Income taxes include a year period, and it is obtained according to the total annual income of the taxpayers.

3.3.2.1.1 Personal Income Tax

This kind of income taxation includes some disadvantages. For example, although different individuals may gain the same total revenues throughout their lifetime, their annual income may vary in some periods (month or year). Thus, this

situation causes differentiation in the tax burden of individuals, leading to income inequality.

3.3.2.1.2 Corporate Income Tax

Corporate income taxes are obtained from companies and enterprises. Companies pay these taxes according to their revenue. Generally, this tax is determined at a constant rate. However, in some countries such as Austria, Belgium, England, and etc. , it could be two or three different rates according to business sizes (Akdoğan, 2016: 269).

3.3.2.2 Wealth Tax

Savings of individuals are taxed by governments due to reach target tax revenue and protect the financial stability against changes in socioeconomic conditions. Wealth represents the sufficiency to tax payment. Thus, the government could prefer the taxation of wealth and wealth transfers. The taxation idea of wealth provides the fair taxation of the individuals, and it can also provide the government's financial necessities. Therefore this kind of tax policy is preferable by the government.

Implementation of the taxes on wealth lean on the old times, even, the idea of this type of taxation is older than the idea of taxation on income. Since the phenomenon of inheritance has existed since ancient times, naturally, it occurred ideas that are in the light of the taxation of these inheritances.

Wealth gives an advantage to people who have it. This means that if individuals have great wealth, his/her decisions could be different according to other's decisions, and they can feel more independent and safer themselves than the others; they also have different alternatives in terms of their spendings to consumption, investment and etc.

Therefore, these advantages, which are obtained by wealth, can lead to inequality among the individuals, so for an equal taxation system, income taxes could be supported by wealth taxes (Sanford, 1978: 155). As a result, these benefits can be seen as an advantage of the wealth taxes to the fair economic system.

On the other hand, this type of taxation includes disadvantages because of the difficulty of determining the wealth of the individuals. The determination process could be problematic, and it can create unfair tax revenue.

3.3.2.3 Estate and Inheritance Tax

Estate tax represents the taxation of wealth transfers at the time of death.

On the other hand, inheritance tax is a tax on the revenues which are earned through inheritance from estate. This type of taxation is one of the oldest tax implementations in the world because of the private property phenomenon. Since, if there is a presence of private property in any country, this phenomenon compels the government to protect these private properties. Thus, the government obtains tax revenue for this protection.

These types of taxations have both advantages and disadvantages, like other taxes. Individuals can not complain due to these taxes because they did not show any effort to obtain this wealth (Sanford, 1978: 169). Otherwise, if this tax is obtained by the government when people alive, there are some problems that could exist in the gathering process of the tax.

On the other hand, the implementation of these type of taxations is necessary for society. Since although individuals who have great assets, expend the considerable effort to reach high welfare levels, society also has a significant impact on this welfare. For example, someone's inventions can lead to an increase in other people's welfare.

There are also negative ideas about estate taxes due to their disadvantages. According to Adam Smith, estate taxes could be the reason for the decrease in capital, which capital is the source of the sustainable efficiency of the labor. Since, if an essential portion of the wealth passes to the government, people can prefer more leisure to avoid this loss, and they can also decrease their investments or work hours**.**

3.3.2.4 Capital Gains Tax

This type of tax is one of the other types of direct taxes. The government obtains these taxes from the stock market transactions, sales of the precious metals, and etc.

The tax rate varies with the length of time. These time categories are separated into two categories, which are short term capital gains and long term capital gains. If an asset was sold in 36 months, the asset is replaced in the short term period. Otherwise, if it's longer than 36 months, the asset is located in the long term.

3.3.3 Indirect Taxes

The indirect tax system is like a supply chain. Therefore, intermediaries obtain a tax from the individuals to pay the government, so with another words, intermediaries bear the economic burden of the tax. Tax is hidden in the price mechanism, so it leads to a decrease in the reaction of the people due to lack of awareness. This low awareness provides to easily obtaining of tax revenue. Indirect taxes generally reflect the regressive tax abilities, and it also creates tax revenue for the government. On the other hand, this kind of tax implementation applies to everyone in society, so taxes are not evaluated according to the income level of the individuals.

There are several types of indirect taxes. Some of them are; sales tax, value-added tax (VAT), goods and services tax (GST), excise tax, tariffs and etc.

3.3.3.1 Sales Tax

Sales tax generates revenue that is obtained by the sale of goods and services for the government. Revenue is obtained at the place of the seller by the retailer, and the retailer transfers this tax to the government. This type of tax creates liabilities for companies and enterprises. Sales Tax very similar to value-added tax in terms of its aim and characteristics.

3.3.3.2 Specific Tax

Specific tax refers to the constant amount of tax on every goods and services which are sold in the market. Therefore tax revenue depends on sales. The cost of the goods does not influence the specific taxes due to the implementation process of these taxes. Since tax imposes as a tax on the per unit, so it is also called a per-unit tax.

Specific taxes have advantages. For example, the calculation of the tax revenue is easy because taxes are imposed as a constant value on each product, and the government has the ability to know that how much of the goods were sold in the market.

On the other hand, the specific tax also includes the disadvantages reason why this type of tax could be a regressive tax. Since tax implementation applies to all of the income groups, so this implementation can lead to some problems for low-income groups and creates inequality among the different income groups.

Furthermore, this type of taxation includes all of the goods which are located in the market, so tax can decrease the aggregate demand in the market.

3.3.3.3 Value Added Tax

The production process of the goods includes different production stages until the good becomes the final good. Value-added tax is applied to every stage of the production process as a tax to generate income for the government. This tax is obtained by the firm’s labor force, machines, and imported goods

3.3.3.4 Goods and Services Tax

This tax is known as a value-added tax in some countries because the structure of this taxation is very similar to value-added tax in terms of the implementation process of taxes. This tax is obtained from all of the sale stages of the goods and services, and this term, which is the sale stage, reflects the fundamental difference between value-added tax and goods and services tax. Since goods and services taxes

are obtained in the sale stages of the products by the government, but value-added tax is obtained in the supply chain process.

3.3.3.5 Property Tax

Private properties are very attractive for tax collectors throughout the history of the world. Thus, property tax is one of the oldest taxation policies in the world. This type of taxation is used in several countries in which countries have rules for private properties. Property tax is an important income source for the governments to realize their social and other goals, such as build a school, retirement payments, payments of benefits and etc.

There are several reasons for the usage of properties as a part of the taxation policy.

One of them, private property is one of the important indicators of ability to pay for taxes. For example, flat owners generally willing to stay at their homes, so this situation gives more opportunities to flat owners to spend their money on their other tastes or preferences. Thus they are more suitable for tax collection than the other people who have no property, and naturally, their ability to pay for taxes more than the other individuals.

On the other hand, again, in terms of the ability to tax payment, the government certainly knows that the people's ability to pay taxes through their assets, so it helps the government for tax collection.

Lastly, the mobility of the real properties is less than the other goods which are the subject of taxation policies. This low mobility prevents tax evasion.

Due to these reasons, property tax always attractive and suitable tax for tax collectors. This kind of taxation policy always has a place in government tax policies.

3.3.4 Differences Between Direct and Indirect Taxes

There are several differences between direct and indirect taxes. These differences are;

Direct taxes are obtained from individuals via governmental institutions, which are tax collectors. However, indirect taxes are transferred from the intermediaries to the government. It means that indirect taxes are generally implemented to goods and services, so tax revenues are collected by the government after the sale of them, via intermediaries,

The gathering process of direct taxes could be problematic for tax collectors. Since, if there is a lack or weakness in the power of the rulers, who are tax collectors, this weakness could prevent the collection of these taxes. However, indirect taxes more invisible than direct taxes, so the consumer does not understand whether is he/she pays tax or not. Thus tax evasion becomes almost impossible.

Moreover, direct taxes could be helpful for the regulation of inflation, but indirect taxes trigger inflation.

Furthermore, direct taxes may have a negative effect on the savings, but indirect taxes may boost the savings because they lead to a rise in the price level of goods and services.

Lastly, the implementation and impact of the direct taxes may vary for different income groups in terms of liability to tax payment, so the responsibility of the different groups' changes. However, indirect taxes affect all of the people.

3.4 Tax Burden

Tax burden not only refers to a certain amount of tax but also refers to the relationship between income revenue and wealth, which are included by taxes. The tax burden refers to a ratio between purchasing power and tax amount.

3.4.1 Total Tax Burden

As a definition, the burden which is created by total collected taxes on the economy. The total tax burden is the ratio of total tax revenues to gross domestic product.

3.4.2 Individual Tax Burden

The individual tax burden is the ratio of individual tax payments to GDP per capita. The individual tax burden is separated into two classes, which are subjective and objective tax burdens.

Subjective tax burden leads to pressure on people. This type of tax depends on the income level of taxpayers, special issues, tastes, preferences and etc.

The objective tax burden is determined according to people's purchasing power.

The objective tax burden is more realistic than the subjective tax burden.

3.4.3 Tax Burden In Terms of Income Groups

This kind of tax burden is determined according to the income group of the taxpayers who have the liability to pay tax to the government or governmental institutions.

3.4.4 Sectoral Tax Burden

This type of tax burden explains the relationship between tax payments of sectoral units and their revenues.

3.4.5 Regional Tax Burden

The relationship between tax revenues and income can change according to socioeconomic conditions and regional issues. This type of tax burden called a regional tax burden.

3.4.6 Net Tax Burden

Net tax burden includes factors that are the economy and individuals. In the economy, the net tax burden is calculated as total tax revenue minus expenditures.

Expenditures are occured for the countervailing of benefits which benefits are obtained via spendings.

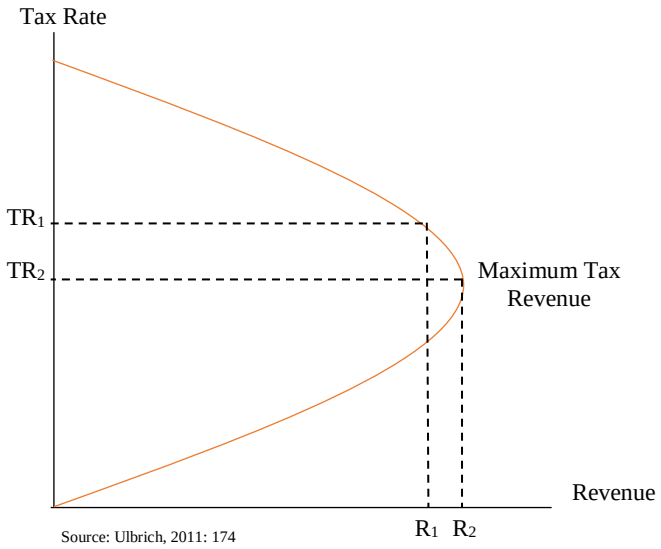
3.5 LAFFER CURVE

Tax rates could be the reason for the bilateral effect on tax revenues. Therefore, an increase in tax rates not only induce an increase in tax revenues but also could be the reason for the decrease in tax revenues. Arthur Laffer, who is the supply-side economist, examined this situation and tried to find an answer to a rise in the tax rates that will increase or decrease tax revenues? (Ulbrich, 2011: 173).

He explained answer of this question and drew a diagram (figure 11), and this diagram called the Laffer Curve. According to his explanation, there is no tax revenue at the zero tax rate point. Until to optimal tax rate point, tax revenues will rise. However, after this optimum point, TR will start to decrease because of the absence of production processes due to high taxes. Lastly, at the 100% point, again, there will be no TR.

Tax rates also have an indirect impact on the LFP due to its' effect on the investors. Therefore, the proper determination of the tax rate is crucial because of its' impact on both tax revenues and decisions about investing.

Figure 11: Laffer Curve



Source: Ulbrich, 2011: 174

CHAPTER FOUR
EMPIRICAL MODELS AND METHODOLOGY

Six variables are gathered to determine the change in labor force participation rate in this study, which are tax burden, real minimum wage, GDP, CPI, birth rate fertility, and average years of schooling.

Literature was taken into consideration in data selection. Eviews 10 econometric analysis program was used to realize empirical analysis. Furthermore, an Unbalanced panel data analysis was used to analyze the data in which data belong to 28 OECD countries between 1990-2017 years.

4.1. EMPIRICAL MODELS

In this study, on the purpose of understanding the impact of the tax burden on LFPR, there are four models used. Which models are:

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

The main Hypothesis of the thesis determined as:

There is an inverse relationship between the labor force participation rate and tax burden

4.2 METHODOLOGY

4.2.1 Panel Data Analysis

As an econometric analysis, time series and cross-sectional data generally were used by previous studies. However, panel data analysis became a popular analysis method for the researchers in recent years because the panel data includes both cross-

section observations of the countries, households, firms and etc. and also time data. Thus, it can be said that panel data analyzes are the integration of time series and cross-section data analysis.

There are several advantages of panel data analysis (Nerlove and Balestra, 1992: 22; Baltagi, 1995: 135; Gujarati, 2004: 637). Some of them are :

1) Panel data are related to the individuals, firms, countries and etc,. Furthermore, panel data also include time units, so the possibility of the presence of heterogeneity is high. Under this condition, panel data estimation methods allow the heterogeneity in data series.

2) Secondly, because of the integration of time series and cross-sectional observations, panel data analyzes include more observations than the other estimation methods.

3) In time series, large time intervals are almost indispensable to effective analyzes and correct results. However, panel data analysis allows shorter time intervals than time series analysis.

4) On the other hand, in the panel data, the possibility of multicollinearity problem is less than the other estimation methods.

5) Panel data analysis allows the analysis of complex models.

Due to problems with data accessibilities, panel data could be effective in case of a lack of data.

If each data matches with every time unit, it means that there is no missing data. Therefore this panel dataset called balanced panel data. Thus, balanced panel data means that, if panel data includes N variables and T times, total observation (n) is $n=NxT$.

The other case is unbalanced panel data; this type of panel data refers to data of at least one unit that does not match with every year, so lack of the data. This type of panel data called unbalanced panel data (Wooldridge, 2003: 250). It means that $n<NxT$.

Unbalanced panel data analyzes are implemented in this study because of the problems about data accessibility, which generally occurs due to prohibitions, lack of records and etc.

4.2.2 Types of Panel Data

Panel data are separated into two groups, which are short and long panel data.

Short Panel refers to the number of individuals or, with the other words, variables are more than time periods; therefore, if N>T, this kind of panel data is called a short panel.

If the quantity of periods is more than individuals, this type of panel data is called a long panel, so T>N.

4.2.3 Panel Data Models

Panel data analysis explains the behavior of individuals with the time periods. Panel data models are generally classified into three categories according to the parameters, which parameters are take value according to the unit and/or time, as a pooled model, fixed-effect model, and random effect model.

4.2.3.1 Pooled Model

The pooled model assumes that constant coefficients are homoscedastic, and there is no correlation between the observations of units in time periods. Therefore if all of the coefficients among the time and units are constant, the pooled model could be available to analyze.

The pooled model is called a classic panel data model. The estimation of the classical model is done by the least-squares method (Yerdelen, 2018: 40). The pooled model ignores the interaction between units due to constant coefficients.

Pooled model is generally defined as follows;

$$Y_{it} = B_1 x_{it} + B_2 x_{it2} + \ldots + B_k x_{itk} + u_{it} \qquad i = 1,2,...,N;\ t = 1,2,...,T \quad (1)$$

The coefficients in the model are kept constant for all horizontal cross-section, and individuals are the most straightforward notation of the panel data analysis. This assumption showed in equation (2).

$$Y_{it} = B_0 + B_1 x_{it} + B_2 x_{it2} + \ldots + B_k x_{itk} + u_{it} \quad (2)$$

"i" represents the individual units, and t shows the time periods. "μit" is an error term of the equation.

4.2.3.2 Individual-Specific Effects Models

If there are any important differences between the individual units, the usage of the individual effect model is more accurate. Individual-specific effect models are separated into two categories, which are the fixed-effect model and the random effect model**.**

The major difference between random and fixed effect models is the modeling way of the individual-specific component.

"αi" is the distinctive term between the individual effect models and pooled models. This term leads to significant differences between FEM and REM, which are individual effect models. In the FEM, the component is the piece of the intercept, but in the REM component belongs to error variance.

The primary concern of these models is examining a correlation between specific effects and regressors.

4.2.3.3 Fixed Effect Model

There are several ways to eliminate the effect of fixed effects in panel data analyzes, which is represented with the "ai." Instead of these approaches, the fixed-effect model could be an accurate way to deal with the fixed effect problem (Wooldridge, 2018: 463). Fixed effects also refer to the exclusion of the individual effects of independent variables from the model. (Stock and Watson, 2003: 278-283). In the FEM, the constant is the unique term for each group, so the model allows different constants for each group. In this situation, each unit has a constant which does not change with time

The fixed-effects regression model is

$Y_{it} = B_1 x_{it} + B_2 x_{it2} + \ldots + B_k x_{itk} + a_i + u_{it}$, t = 1,2,….. T (3)

In the equation, α is the intercept, μit is the error term of the equation.

$v_{it} = a_i + u_{it}$

"*uit"* is the idiosyncratic error or time-varying error. Since it refers to unobserved factors that change over time and affect *yit*, and "vit" denotes the composite error term (Wooldridge, 2018: 440).

In the FE model, although the assumption is "Xit" remains uncorrelated and independent, the individual effect (αi + μi) allows the correlation among the independent variables "Xit." Therefore, each individual unit has unique characteristics that may or may not has an impact on the predictor variables.

On the other hand, the usage of fixed-effect models includes some problems. One of them is the excessive use of dummy variables due to the large cross-sectional unit. This situation leads to a problem in the model in terms of the degree of freedom. Another is, excessive variables could lead to the presence of multicollinearity in the model. Since the estimation of many variables could be problematic. (Gujarati, 2004: 646)

4.2.3.4 Random Effect Model

The random-effect model was developed as an alternative to the fixed-effect model, and this model also called the error component model. The main difference between the error component model and the FEM model is "ai." The assumption of the random effect model is the random distribution of "ai" with a constant average and variance.

The error component model can be written as ;

$Y_{it} = B_0 + B_1 x_{it} + B_2 x_{it2} + \ldots + B_k x_{itk} + a_i + u_{it}$ i = 1,2,...,N; t = 1,2,...,T (4)

The equation becomes an ECM in the light of the assumption of "ai" is uncorrelated with the independent variables, so it means that individual effect has to be constant (Wooldridge, 2018: 470):

$Cov(x_{itj}, a_i) = 0, t = 1, 2, \ldots, T; j = 1, 2, \ldots, k.$

As it is seen in the equation(4), there is only one difference between the FEM and REM model which difference is the "ai." Since the primary goal of the fixed effect model is eliminating the "ai." However, in the error component model, "ai" is the piece of the error term and not the intercept. Thus, the RE model includes all of the assumptions of the FE model, except "ai."

If there is any idea about “ai” correlate with any explanatory variables, the FEM is more suitable than the REM.

4.2.3.5 Differences Between Fixed and Random Effect Models

The decision process to the appropriate model for panel data analyzes could be complicated. The solution of this problem is obtained via examination of the correlations, which correlation occurs between the individuals, error component term “ai,” and the X regressors.

If there is no correlation between “ai” and the X, ECM could be appropriate. On the contrary, if “ai” and the X correlate, FEM could be suitable (Gujarati,2004: 650).

There are some observations about the model choice, which are (Judge et al. , 1982: 497-498) **:**

1. If the time units are more than cross-sectional units, in this case, FEM may be suitable.

2. If Cross-sectional units more than time-series data, and if estimators provide the Error component model assumptions, ECM estimators are more suitable than FEM estimators.

3. If there is a correlation between individual error component “a_i,” and regressors, the REM estimators are biased, on the contrary, which FEM estimators are unbiased

These assumptions are valid, but none of them include a formal test to determine the suitable model for analysis.

In order to decide a suitable model for final analysis, the formal test was developed by Jerry Hausman in 1978, which is called the Hausman test.

4.2.4 Panel Unit Root Test

In panel data analysis, unit root tests are a necessary condition for accurate analysis. Unit roots determine the stationary status of the data. Since the stationary status of data is related to the significancy of estimators. The stationary status of the panel data refers to the effect of previous period values of series on the current period. Thus, the determination of this relationship is necessary to find accurate results, so unit root tests carry a vital role for the analysis.

In this study, Levin-Lin-Chu unit root tests were used to determine the stationary status of the series, which test is the common unit root test for the panel data analysis.

Hypotheses are:

H_0 : $\delta \geq 0$; there is a unit root in series/ data not stationary

H_1 : $\delta < 0$; there is no unit root/ data stationary

According to the hypothesis, if the null hypothesis cannot be rejected, there is a unit root in the series. On the contrary, if the alternative hypothesis is accepted, the series are stationary, and there is no unit root in the data series.

The general model of the panel unit root test is;

$$\Delta y_t = \hat{\beta}_1 + \hat{\beta}_2 t + \rho \gamma_{t-1} + u_t$$

4.2.4.1 Levin, Lin ve Chu Test

First-generation unit root tests include the assumption that there is no correlation between the units. This assumption restricts the analyzes because economies are growing day by day, and this growth also induces an rise in all of the databases and economies of the countries becomes much closer than the old times. Therefore, the probability of the correlation of data is so high in today's world. Thus, to overcome this restriction, different tests were produced, which are taking into consideration the correlations.

The second-generation unit root tests are separated into the three categories among themselves, which are the first group, second group, and third group. Some

first group tests began to take into account correlations via transformations. LLC test is one of them.

Although Levin-Lin-Chu unit root test is the first generation unit root test, it is become an applicable test as a second-generation unit root test in the first category via taking a differ from means of the series to decrease the effect of correlation (Yerdelen, 2017: 68)

Levin-Lin-Chu tests are based on the assumption of constant parameters are common for all sections, and LLC tests also search the common unit root processes. Levin-Lin-Chu test is the modification of the Augmented Dickey-Fuller unit root test (Levin, Lin, and Chu, 1992: 18). They offered more reliable unit root tests for analyzes than available tests. Implementation of the Levin-Lin-Chu test includes three steps. They are;

1) Different Augmented Dicky Fuller (ADF) tests are applied for each cross-section units

2) The estimation process of LLC tests leads to short term standard deviation, and long term variances are obtained by the null hypothesis of a unit root.

3) Lastly, calculations are applied to panel analysis

Levin, Lin, Chu tests consider with an equation as follows (Baltagi, 2005) :

$$\Delta y_{it} = p y_{i,t-1} + \sum_{L=1}^{p_i} \theta_{iL} \Delta y_{it-L} + a_{mi} d_{mt} + \varepsilon_{it} \quad m = 1, 2, 3$$

4.2.5 Hausman Test

Hausman test is a helpful test to decide between the random effect model and the fixed-effect model. Although there are several decision mechanisms to decide the appropriate test, Jerry Hausman (Hausman, 1978: 1251-1270) created a formal test for easy decision to model choice. Hausman test assumes that the error component model is unbiased and consistent. The hypotheses of the test are (Baltagi, 2005:271):

H_0 : [$E(\alpha i / xi) = 0$] random effect

H_1 : [$E(\alpha i / xi) \neq 0$] fixed effect

Hausman test examines whether there is any difference between FEM and REM estimator in terms of statistical significancy (Cameron and Trivedi, 2005: 271-

273). Ho hypothesis represents the random effect model estimator is suitable. Otherwise, if the alternative hypothesis is accepted by the test, the fixed-effect model is accurate.

4.2.6 Cross – Dependency Tests

The literature clearly shows that panel data models can include cross-sectional dependency because of the shocks and unobserved data in which data are part of error terms (Baltagi, Feng and Kao, 2012: 1; Pesaran, 2004: 1-3; Anselin, 2001: 1-2). The world does not only grow with the human population, but it also grows with financial and economic integration. Thus this globalization and integration process leads to interdependencies between cross-sectional units.

To determine the cross-sectional dependencies in the panel data models, there are some tests that are available in the literature. They are

1)Breusch Pagan (1980) cd LM1 test is suitable if time period units more than Cross-sectional units. (T>N),

2)Pesaran's (2004) cd LM2 test is accurate if time periods equal to cross-sectional units (T=N),

3) Pesaran's (2004) cd LM test is suitable if the time period less than cross-sectional units. (T<N).

4.2.7 Pesaran's CD Test

The test was created and modified by Pesaran in 2000, to determine the cross dependency;

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

The null hypothesis is, there is no cross-sectional dependency in the analysis which is represented with;

H0: ρij = ρji = cor (uit, ujt) = 0 for i ≠ j

Also, the alternative hypothesis is ;

H1: $\rho ij = \rho ji \neq 0$ for some $i \neq j$

The null hypothesis shows the non-existence of cross-sectional dependence. It shows the CD $\rightarrow$ N (0,1) function is valid if N$\rightarrow\infty$ and T is big enough. On the contrary of the Lagrange multiplier test, unlike LM statistics, CD statistic includes zero average with fixed values for N and T (De Hoyos and Sarafidis, 2006: 485). Due to the expansion of the range of panel models, these tests include homogenous/heterogeneous and nonstationary models. The fixed-effect model and error component models are not suitable and unbiased with homogenous and heterogeneous dynamic models (Pesaran and Smith, 1995: 102).

Due to a lack of data and access problems, unbalanced panel data also has a place in the literature. For this type of panel data, Pesaran (Pesaran, 2004: 17-18) modified his tests to analyze unbalanced panel data, which is given by

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

4.2.8 Seemingly Unrelated Regression (SUR)

In panel data analysis, If there is a correlation between units and model includes violation of the homogeneity assumption, SUR models are an available way to accurate analysis (Yerdelen, 2012: 72).

On the other hand, some variables may seem independent in the model. Thus, even if they look like independent, in some conditions, residuals of them may be dependent. Thus in this situation, usage of Seemingly Unrelated Regression is proper (Zellner and Huang, 1962: 312-313).

In this regression model, analyzes are implemented via taking into consideration the correlation between residuals. Therefore, this solution increases the effectiveness of the analysis.

4.2.9 Beck-Katz Predictor

Beck and Katz, in 1995, suggested the Panel-Corrected Standard Errors (PCSE) model to the correction of correlation problems among the units. This model also available for small size panels. On the other hand, non-parametric correction methods are available to solve the cross dependency problem of units; the PCSE model is one of them.

Monte Carlo simulations showed that the standard errors of Beck and Katz's model are less than the Park's standard errors. On the other hand, T-statistics of Park's predictor is wrong due to the downwash of the variances.

Furthermore, in panel models, PCSE is the more certain model than the Huber-white predictor. Since the Huber-white predictor neglects the clustering (Yerdelen, 2013: 262)

CHAPTER FIVE
DATA AND RESULTS

5.1 DATA

Even though the world is globalizing day by day, it is still not possible to reach the data from all countries. Data could not be reachable in social sciences due to several reasons such as prohibitions, recording problems of data and etc. (Messner, 1992: 157). Therefore data was obtained according to their accessibility. Thus, in order not to damage analysis, the listwise deletion method is used in this study.

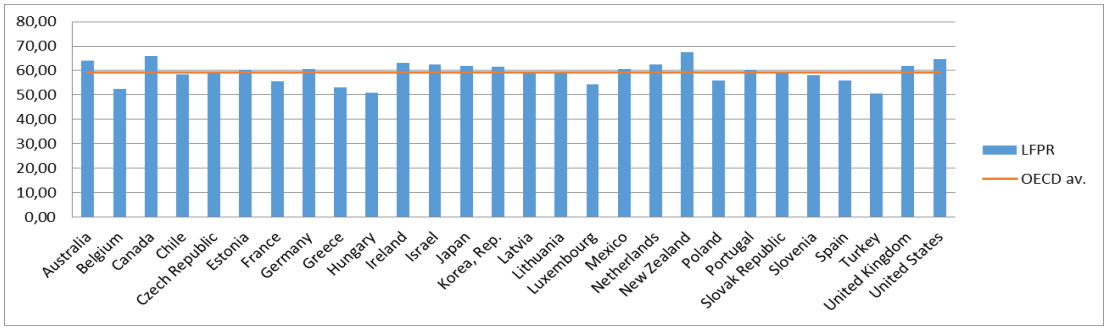
Listwise deletion is a method which method deal with missing data. In this method, all of the data removed from the analysis, if any of the data is missing in the data series (Allison, 2001: 75). Thus, data were used as unbalanced data, and via the listwise deletion method, some OECD countries and years are excluded from the analysis.

The data was, which data are used in empirical analysis, obtained from the OECD database, Worldbank database, and United Nations database. All of the data belong to 28 OECD countries between 1990-2017 years.

The labor force refers to both employed and unemployed people who are searching for a job. LFPR is calculated with the division of the labor force into the total working-age population (OECD, 2019). The LFPR is the proportion of the population who are in the interval of 15-64 ages and economically active. This portion of the population refers to the labor force for producing the goods and services during a specified period (WorldBank, 2019).

Labor force participation data was used as research data, so the dependent variable. In this study, the LFPR includes all of the population who are suitable for starting to work and older than 15 years old. Data were obtained from the Worldbank database, and data series include 28 OECD countries which data belong to 1990-2017 years.

Figure 12: Average Labor Force Participation Rates of OECD

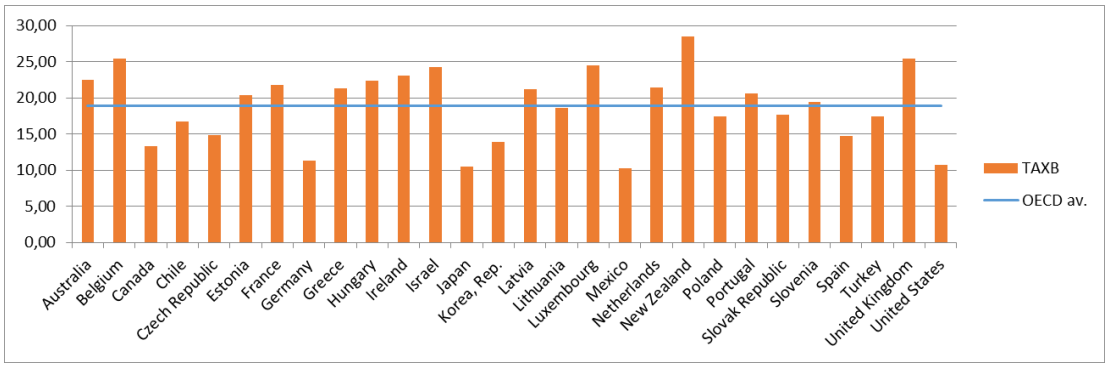


Source: Worldbank Database, 2019

Tax revenues are the main source of income for governments. Government revenues called a tax revenues which are collected via taxation of economic actors in the economy (OECD, 2019).

Taxes are generally classified into two categories, which are direct and indirect taxes. However, in this research, because of the several different tax policies of different countries, tax data was selected as a tax burden to clearly understand the effect of taxes on the LFPR, which tax is the ratio of total tax revenue to GDP. Data were obtained from the Worldbank database between the 1990-2017 years.

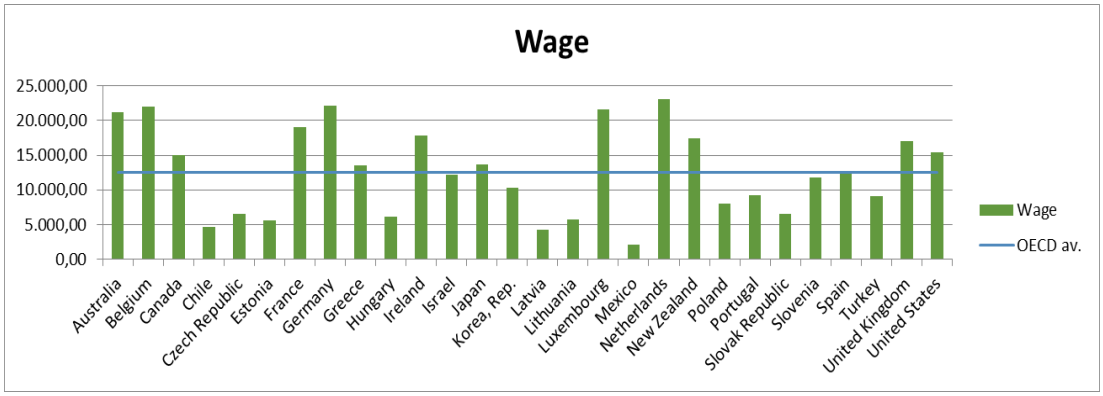
Figure 13: Average Tax Burdens of OECD Countries



Source: OECD Database, 2019

Real minimum wage refers to nationwide minimum wages, which are calculated according to a change in purchasing power parity. Thus, it means that the ratio of nominal wages to inflation. The effect of the real minimum wage on the labor-leisure decision was searched. Since, wages determine the expenditure opportunities of individuals, so it leads to an income effect. Therefore the real minimum wage used in the analysis. Data were obtained from the OECD database.

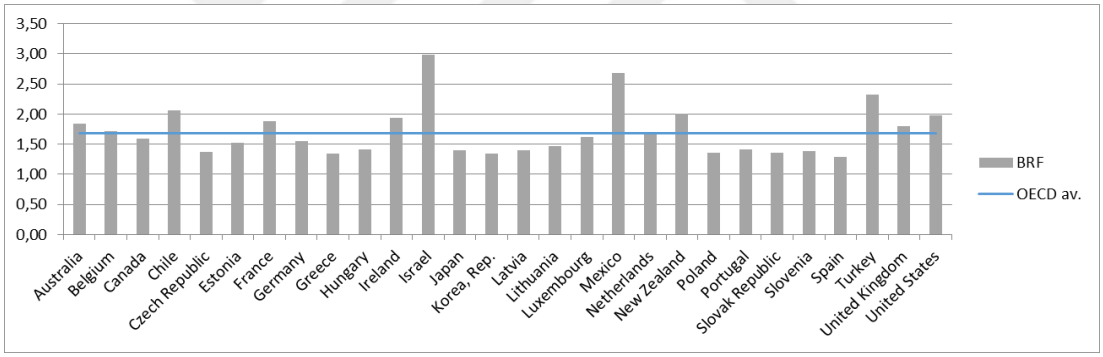
Figure 14: Average Real Minimum Wages of OECD Countries



Source: OECD Database, 2019

The fertility rate is the birth rate per woman. Thus, data have a significant impact on the LFPR due to its effect on the total population. Data were collected from the World Bank database.

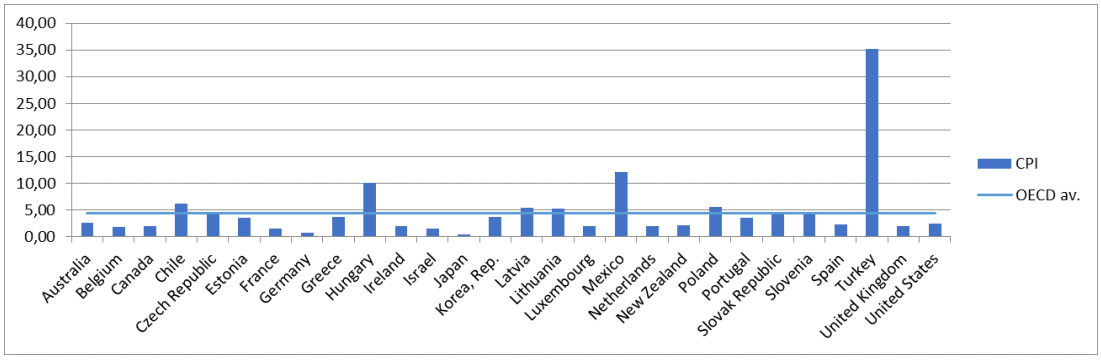
Figure 15: Average Birth Rate Fertilities of OECD Countries



Source: Worldbank Database, 2019

The consumer price index is the change in the price level of goods and services which are consumed and bought by the actors of the economy. Therefore, an increase in the CPI level leads to a decrease in the purchasing power of the households, so people need more money when CPI reaches a high level. Due to the impact of the cpi on the purchasing power of consumers, the decision of the people about labor-leisure choice also changes. Data were obtained from the WorldBank database.

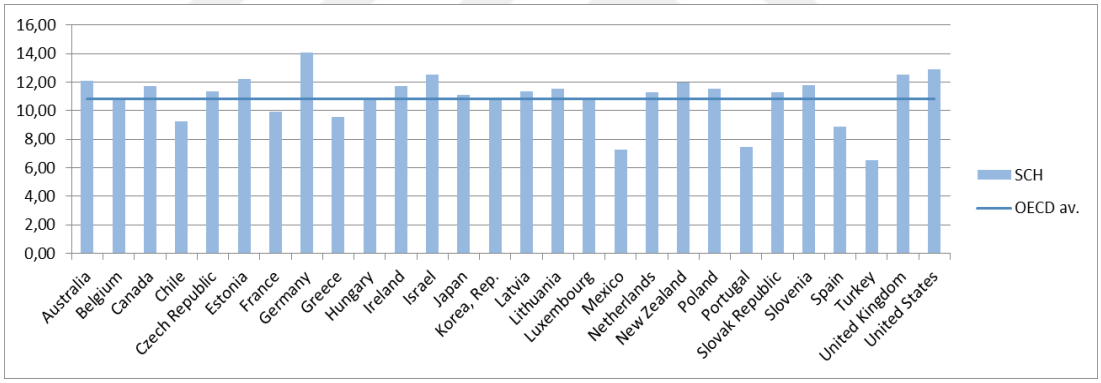
Figure 16: Average Consumer Price Indexes of OECD Countries



Source: Worldbank Database, 2019

Average years of schooling is the average education year of the people. Data have an influence on the labor force since the schooling year of the people is effective in the joining age to the labor force. Data was obtained from the Human Development Report of the United Nations development program.

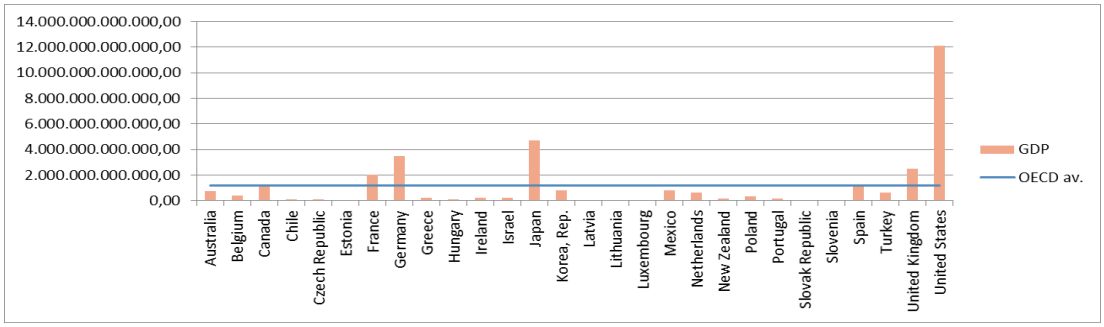
Figure 17: Average Years of Schooling of OECD Countries



Source: United Nations Development Programme Human Development Report, 2019

Gross domestic product is the final value of goods and services which are produced in the borders of the country. Thus, data also shows that the economic activity level of the countries due to its ingredients. Hence, data have a relation with the LFPR. Since an increase in economic activities has a positive impact on joining to the labor force. Data were obtained from the Worldbank Database.

Figure 18: Average Gross Domestic Product of OECD Countries



Source: Worldbank Database, 2019

Table 2: Data Presentations and Their Expected Signs

Data	Presentation	Definition	Expected Sign
Labor Force Participation Rate	LFPR	Dependent Variable	
Tax Burden	TAXB	Independent Variable	Negative
Real minimum wage	RWAGE	Independent Variable	Positive
Consumer Price Index	CPI	Independent Variable	Positive
Gross Domestic Product	GDP	Independent Variable	Positive
Average Years of Schooling	SCH	Independent Variable	Positive
Birth Rate Fertility	BRF	Independent Variable	Positive

5.2 EMPIRICAL RESULTS

Panel data analyzes were used as an analyzing method in all models. Data belongs to OECD countries that are available in terms of the accessibility of data, between 1990-2017 years. Firstly, the LLC panel unit root test was implemented to all data to determine the presence of unit root in the series and to reveal the stationary status of the data. Since, In panel data analysis, data should be stationary to enter the regression. According to the LLC test results, which test was used as unit root test in this thesis, all of the data are stationary at the level.

Secondly, to decide the appropriate panel data model, which are the FEM or REM, Hausman tests were implemented to determine the suitable models (Gujarati,

2004: 651). Hausman test results showed that, the random effect model (Error Component Model) is available to use in all models.

After the implementation of the random effect model, Cross-dependency tests were implemented, which tests are Pesaran's CD test, to determine the presence of the cross dependency between cross-sectional units. According to results, all models include cross-dependency.

Lastly, the presence of autocorrelation and heterogeneity was searched in the models. To detect the autocorrelation problem in the models, Durbin-Watson statistics were used because this statistic is one of the proper methods to determine the presence of autocorrelation (Gujarati, 2004: 467-468). Results showed that all models include autocorrelation problem. On the other hand, all models also include heteroscedasticity problem.

Due to Cross-sectional variance problems and autocorrelation problems, the GLS period SUR model and PCSE cross-sectional covariance (Cross Section Weight-PCSE) methods were used in the models which methods provide to eliminate autocorrelation and cross-sectional variance problems**.**

Before proceeding to model analysis, the following analyzes were examined respectively;

1) Panel unit root tests
2) Hausman tests
3) Cross-Section Dependency Tests
4) Durbin-Watson Statistics

According to LLC unit root test results (Table 3), all data are stationary at the level, and data does not include trend.

At the %5 significance level, the probabilities of all data are less than 0.05. Thus results show that the alternative hypothesis is valid, which hypothesis is there is no unit root in the series.

Only in the real minimum wage series presence of the unit root was detected, so these series were not stationary at the level, but this problem was solved by taking the logarithm of series.

Table 3: Unit Root Test Results for Variables

	Levin-lin-chu		
Variables	Statistic	Probability	Status
LFPR	-2.52628	0.0058***	Stationary
TAXB	-3.93098	0.0000***	Stationary
SCH	-3.47200	0.0003***	Stationary
RWAGE	-2.07519	0.0190**	Stationary
CPI	-8.80522	0.0000***	Stationary
BRF	-3.59038	0.0002***	Stationary
GDP	-3,92906	0.0000***	Stationary

*Probabilities: p < 0.10 = *; p < 0.05 = **; p < 0.01 = ****

Hausman test results(Table 4) showed that in all models random effect model is available to use. Since, according to the hypothesis of the Hausman test, the null hypothesis is not rejected, so the random effect model is suitable.

Table 4: Hausman Test Results

	Chi-Sq. Statistic	Prob
Model 1	15.916936	0.0031
Model 2	33.670048	0.0000
Model 3	16.376223	0.0058
Model 4	32.712339	0.0000

Cross dependence tests (Table 5) reveal that all models include cross-section dependency problems. Since according to probabilities, the null hypothesis rejected in the analysis. To appropriate analyzes, this issue should be resolved.

Table 5: Cross-Section Dependency Test Results for All Models

		Statistic	Prob
Model 1			
	Breusch-Pagan LM	2262.762	0.0000
	Pesaran scaled LM	68.54811	0.0000
	Pesaran CD	6.209296	0.0000
Model 2			
	Breusch-Pagan LM	2281.793	0.0000
	Pesaran scaled LM	69.24029	0.0000
	Pesaran CD	6.515622	0.0000
Model 3			
	Breusch-Pagan LM	2285.715	0.0000
	Pesaran scaled LM	69.38292	0.0000

	Pesaran CD	6.427274	0.0000
Model 4			
	Breusch-Pagan LM	2275.836	0.0000
	Pesaran scaled LM	69.02362	0.0000
	Pesaran CD	6.531145	0.0000

According to Durbin-Watson statistics (Table 6), all models include autocorrelation problem. Since in the Durbin-Watson test, d=0 represents the perfect positive serial correlation, and d=4 shows that the perfect negative correlation. However, if d=2 or close to "2", it can be said that there is no autocorrelation (Gujarati, 2004: 469). Thus, all of the models include positive serial correlation so autocorrelation**.**

Table 6: Durbin-Watson Test Results

	Durbin-Watson Statistics
Model 1	0.160862
Model 2	0.186579
Model 3	0.160877
Model 4	0.192672

After applying preliminary analysis, the results obtained were examined.

Model 1 includes four independent variables, which are tax burden, cpi, schooling, and birth rate fertility. According to test results, all data have an impact on the dependent variable of the study, which variable is the LFPR. The probabilities of data are significant at all %1, %5, and %10 significancy levels. Therefore model 1 clearly shows, there is a statistical significance between dependent and independent variables.

On the other hand, according to test results, birth rate fertility is the most impressive variable in the model due to its coefficient value, and it also has a positive impact on the dependent variable.

Secondly, schooling data also has a positive and significant impact on the dependent variable. Cpi and tax burden stay at the other side of the results of the model in which data have a negative relationship with the dependent variable. Although cpi is the weakest determinant of the model, this variable also has an impact on the dependent variable.

Furthermore, the tax burden, which is the leading independent variable to analyzes, has a significant effect on the dependent variable, which effect is negative and approximately 19 percent (Table 7).

Table 7: Estimation Results for Model 1

	Coefficient	Prob
Constant	48,50512	0.0000***
TAXB	-0,18657	0.0000***
CPI	-0,04545	0,00000***
SCH	0,92248	0,00000***
BRF	2,81231	0,00000***
R2	0.431908	
Adjusted R-Squared	0,428369	
Prob(F-stat)	0,00000***	
Durbin-Watson	1,83219	

*Probabilities: p < 0.10 = *; p < 0.05 = **; p < 0.01 = ****

In model 2, five independent variables were used to analyze, which are TAXB, GDP, CPI, SCH, and BRF. In addition to model 1 GDP data, which data is vital to determine the economic development level of countries, was added to this model. According to results, SCH and BRF have a positive relationship with the LFPR, and they are also the most significant determinant of the dependent variable like in model 1. Still, TAXB and CPI have a negative relationship with the primary variable of this study.

However, in this model, the effectiveness of TAXB data on the dependent variable leads to a decline in the effectiveness of GDP though cpi almost stays at the same level. On the other hand, GDP data statistically significant according to results and has a positive relationship with the LFPR, which relation is approximately %31 (Table 8). It means that, when the economy shows the tendency to increase, the LFPR also increases. As a result, the model clearly shows that people prefer to work when the economy rises.

Table 8: Estimation Results for Model 2

	Coefficient	Prob
Constant	40,28018	0.0000***
TAXB	-0.156754	0.0000***
GDP	0.311872	0.0001***
CPI	-0.037999	0.0000***
SCH	0.885956	0.0000***
BRF	2,67695	0.0000***
R2	0.417263	
Adjusted R-squared	0,412717	
Prob(F-stat)	0.000000***	
Durbin-Watson	1.843471	

*Probabilities: p < 0.10 = *; p < 0.05 = **; p < 0.01 = ****

Model 3 includes wage data, unlike the model 1 and model 2. Unlike model 2, model 3 does not include GDP data. The main goal of this model is the understanding effect of the real minimum wage on the LFPR.

According to test results, RWAGE data statistically significant at the %10 level and almost significant at the %5 significance level, in which data's probability is 0.0537. On the other hand, the model shows the wage has an essential impact on the LFPR, and its effect is more significant than GDP's effect when data was used without GDP in the analysis (%42).

Another critical situation in this model is the effect of TAXB data. Since the effectiveness of the data on dependent variables reached a maximum level according to all other models. This effect is negative and almost has a %19 impact on the LFPR (Table 9).

Table 9: Estimation Results for Model 3

	Coefficient	Prob
Constant	45,14105	0.0000***
TAXB	-0.193166	0.0000***

RWAGE	0.423407	0.0537*
CPI	-0.039598	0.0000***
SCH	0.881943	0.0000***
BRF	2,78856	0.0000***
R2	0.431397	
Adjusted R-squared	0,426961	
Prob(F-stat)	0.00000***	
Durbin-watson	1.830214	

*Probabilities: p < 0.10 = *; p < 0.05 = **; p < 0.01 = ****

According to the test result, there is a statistical significance between LFPR, GDP, TAXB, CPI, BRF, and SCH. However, an interesting point of this model, while GDP was used in the model with RWAGE, wage data was insignificant in the analysis, in which data's probability is 0,8423. Results refer to; there is a positive effect of SCH, BRF, and GDP on the LFPR. In other respects, the TAXB has an inverse relation with LFPR, and it also represents the lowest effective data in the model (Table 10).

Table 10: Estimation Results for Model 4

	Coefficient	Prob
Constant	39,76077	0,00000***
TAX	-0.152011	0,00000***
RWAGE	0.046732	0.8423
GDP	0.314099	0.002***
CPI	-0.038034	0,00000***
SCH	0.881809	0,00000***
BRF	2.665616	0,00000***
R2	0.414636	
Adjusted R-squared	0,409148	
Prob(F-stat)	0,00000***	
Durbin-watson	1.847406	

*Probabilities: p < 0.10 = *; p < 0.05 = **; p < 0.01 = ****

CONCLUSION

The aim of this thesis is to investigate the relationship between taxes and the labor force participation rate. In the literature, there are several works and discussions about the impact of taxes on LFPR and, thus, on the labor-leisure decision of individuals.

LFPR is an important element of the economy because it affects the number of products that are produced in the country. Therefore, this vital indicator can change the welfare of all of the economic actors. Despite the fact that technology changes the effectiveness and techniques of manufacturing, the workforce is still vital for production processes.

Labor force participation can be affected by any changes in the economy or country. One of these reasons and the important one is the tax policies.

Taxes have an essential influence on the purchasing power of the economic actors who are not tax collectors. High tax rates lead to a decrease in purchasing power, so it induces that the decline of consumption opportunities and investments. If people think their work will be wasted in terms of revenue, they will be indifferent between labor and leisure, and even leisure could be preferable.

This thesis researched the impact of the taxes on LFP in terms of the labor-leisure decision. To reveal this effect, five other control variables were used in the analysis, which are GDP, average schooling years, CPI, real minimum wage rates, and birth rate fertility. 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 were obtained according to their accessibilities, and OECD countries were selected as a sample of the study, and data belong to 28 OECD countries between 1990-2017 years.

To analyze these data, panel data analysis was implemented to all models. Period SUR models and PCSE cross-sectional covariance methods were used in the analysis to solve the autocorrelation and cross-dependency problems.

According to analysis results, in all models, tax burden and labor force participation rate have an inverse relationship. It means that a high tax burden prevents the joining to the labor force in the OECD countries. This impact change between 15-

20 as a percentile in four models. Thus, results clearly show that taxation policies matter LFPR.

In some studies, which are related to FLFPR, results showed that birth rate fertility has a negative impact on the FLFPR. Since women who are in the prime age group may want to take care of her child herself, thus, they may prefer to leave work. Furthermore, if their wages relatively less than their husbands' wages, due to both avoid from taxes and the high opportunity cost of working, leisure becomes a more attractive choice than the work for them.

However, this thesis searched the whole labor force participation rate of society, so it includes both men and women. Therefore, we expected that the birth rate fertility has a positive effect on the LFPR. Results provided our expectation, so we reached the positive impact of the birth rate fertility on the labor force participation rate.

On the other hand, an average schooling year is one of the most critical conditions for the labor force. Since, at the same time, high schooling year generally means that the highly skilled workforce. Thus, the study expected that the increase in average schooling years leads to an increase in the LFPR because of a rise in the qualified workforce. According to results, average years of schooling have a positive impact on the labor force participation rate, and also it has one of the primary determinants of LFPR.

The surprise variable of the analysis was inflation. Since, an increase in inflation means that the decrease in purchasing power of households. Thus, we expected that a positive relationship with the dependent variable of CPI. However, results showed that there is an inverse relationship between CPI and the LFPR, even if it is the weakest impact among the independent variables.

GDP is the major driver of the economic growth of the countries. Even if it does not represent the eligible growth in an economy alone, it also gives the general information about the countries' economic situation. Hence, if gross domestic product increase, demand for labor also increase in the economies. Thus, the study expected that the increase in gross domestic product triggers an increase in the LFPR. In all models, our expectations promoted by the results. Since, the gross domestic product has a positive and significant impact on the LFPR in all models.

This thesis reached similar results, in which studies claimed that there is a relationship between tax and LFPR. Empirical results revealed that joining the workforce decision sensitive to taxes. The analysis showed that the tax collectors have to pay attention to the setting of the tax rates, and they have to find optimal tax rates. Since incorrect tax rate decisions could be harmful to the economy in terms of the current and potential production capacities because human resources will decline in the presence of high tax rates. Even high taxes seems like a high revenue for the government; leisure could become an attractive choice for the labor suppliers in the presence of high taxes.

As a result, if governments want to raise the LFPR, they should adopt pro-natal policies. In addition to this policy, analysis reveals that the necessary infrastructure for education should be prepared while pro-natal policies were implemented by policymakers. Since the average education year of the individuals has an essential impact on the decision to join the workforce. Consequently, this thesis could help determine the macroeconomic variables which are effective in the labor force participation.

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