DOKUZ EYLÜL UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
ECONOMICS PROGRAM
MASTER'S THESIS

THE VALIDITY OF ABRAMS CURVE FOR TURKEY

Ceyda ÇALIM

Supervisor
Prof. Dr. Rabia Yeşim KUŞTEPELİ

İZMİR-2020

DECLARATION

I hereby declare that this master's thesis title as "The Validity of Abrams Curve for Turkey" 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.

Date
…/…/…….
Name SURNAME
Signature

ABSTRACT

Master's Thesis

The Validity of Abrams Curve for Turkey

Ceyda ÇALIM

Dokuz Eylül University

Graduate School of Social Sciences

Department of Economics

Economics Program

Unemployment is one of the most important macroeconomic problems for both developing and developed countries. Turkey also has been obliged to contend with unemployment and youth unemployment over the years. Unemployment has been associated with many reasons. One of these is the direct relationship between government size and unemployment, first proposed by Abrams (1999). This study purposes to investigate the validity of Abrams curve in terms of both unemployment and youth unemployment for Turkey to show larger government size increases unemployment. For this purpose, four different models were formed for unemployment and youth unemployment and ARDL bounds test approach and Granger causality analysis were applied to the models over the period of 1994-2018. According to the empirical results, conclusions that confirm the validity of the Abrams curve for both unemployment and youth unemployment were reached. Furthermore, the Granger causality test results show that there is a one-way causal relationship from government size to unemployment. For youth unemployment, any causality between youth unemployment and government size was not found.

Keywords: Unemployment, Youth Unemployment, Government Size, Abrams Curve, ARDL Approach, Granger Causality.

ÖZET

Yüksek Lisans Tezi

Abrams Eğrisinin Türkiye için Geçerliliği

Ceyda ÇALIM

Dokuz Eylül Üniversitesi

Sosyal Bilimler Enstitüsü

İngilizce İktisat Anabilim Dalı

İngilizce İktisat Programı

İşsizlik hem gelişmekte olan ülkeler hem de gelişmiş ülkeler için en önemli makroekonomik sorunlardan biridir. Türkiye de yıllar içinde işsizlik ve genç işsizliği ile mücadele etmek zorunda kalmıştır. İşsizlik bugüne kadar pek çok sebeple ilişkilendirilmiştir. Bunlardan birisi de ilk kez Abrams (1999) tarafından ortaya atılan kamu büyüklüğü ile işsizlik arasındaki direkt ilişkidir. Bu çalışma, kamu büyüklüğünün işsizliği artırdığını gösteren Abrams eğrisinin Türkiye'de işsizlik ve genç işsizliği açısından varlığını araştırmayı amaçlamaktadır. Bu amaçla işsizlik ve genç işsizliği için dörder farklı model oluşturulmuş ve 1994-2018 yılları baz alınarak modellere ARDL sınır testi yaklaşımı ve Granger nedensellik analizi uygulanmıştır. Ampirik sonuçlara göre hem işsizlik hem genç işsizliği için Abrams eğrisinin geçerliliğini doğrulayan sonuçlara ulaşılmıştır. Bunun yanında, nedensellik test sonuçları ise, kamu büyüklüğünden işsizliğe doğru tek yönlü nedensellik ilişkisinin varlığını göstermektedir. Genç işsizliğinde ise genç işsizliği ve kamu büyüklüğü arasında herhangi bir nedensellik bulunamamıştır.

Anahtar Kelimeler: İşsizlik, Genç İşsizliği, Kamu Büyüklüğü, Abrams Eğrisi, ARDL Yaklaşımı, Granger Nedensellik Analizi.

THE VALIDITY OF ABRAMS CURVE FOR TURKEY

CONTENTS

CHAPTER THREE
LITERATURE REVIEW

CHAPTER FOUR
DATA AND METHODOLOGY

CHAPTER FIVE
EMPIRICAL RESULTS

ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
app.	Appendix
ARDL	Auto Regressive Distributed Lag
CUSUM	Cumulative Sum
CUSUMSQ	Cumulative Sum Squared
DF	Dickey-Fuller
ECM	Error Correction Model
ECT	Error Correction Term
EVDS	Electronic Data Delivery System
GDP	Gross Domestic Product
HQ	Hannan Quinn
ILO	International Labour Organization
OECD	Organisation for Economic Co-operation and Development
p.	Page
PP	Phillips-Perron
SC	Schwarz Criterion
STEM	Science Technology Engineering Mathematics
TURKSTAT	Turkish Statistical Institute
VAR	Vector Auto Regression
VEC	Vector Error Correction
VECM	Vector Error Correction Model

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

INTRODUCTION

Unemployment is the one of the macroeconomic problems that affects people directly and most substantially. In pursuant of the International Labour Organization (ILO) definition, the unemployed are determined as those people who have not worked more than one hour during the short reference period whereas who are convenient for and searching work willingly and actively (O'Higgins, 1997: 64).

According to Turkish Statistical Institute (TurkStat) (2016) definition, all persons 15 years of age and over who have used at least one channel for job searching during the last four weeks, who are able to start a job within two weeks and who were not employed within the reference period are considered as unemployed. Before 2014, the reference period of job search was "last 3 months" instead of last four weeks. The unemployed includes also people who have already found a job beginning within three months or established his/her own job whereas were waiting to complete necessary documents to start work. In addition, the unemployment in the 15-24 age group is called youth unemployment.

The problem of unemployment poses a greater threat for developing countries, especially since they are disadvantaged in terms of economic development and economic growth. It is important to know what kind of unemployment is in order to plan and implement policies to help decrease unemployment. Unemployment in developing countries is mainly structural unemployment. It also has been found that structural and frictional unemployment is the most effective for Turkey (Yıldız, 2014: 22).

When the failure of wages to adjust to a level at which labor supply equals labor demand and job rationing occurs, it creates structural unemployment. Although workers are actively seeking for the jobs that correspond their skills, there is an essential mismatch between number of available job and number of people who want to find a job (Mankiw, 2009: 169). Due to the time that takes workers to search for job frictional unemployment occurs. Also, it can exist even when there are enough job opportunities and wages are flexible. Since, workers have different abilities and preferences, jobs have different skill requirements and flow of information about vacancies and job candidates is imperfect, this kind of unemployment occurs. Public policies seek to reduce the natural rate of unemployment by decreasing frictional unemployment. Government programs affecting unemployment include government employment agencies that disseminate information about job openings to better

match workers and jobs. In addition, public job training programs help workers displaced from declining industries get skills needed for jobs in growing industries (Mankiw 2006: 167-169).

All countries would like to ensure full employment. Societies expect that opportunities of employment are expanded, and the problem of unemployment is solved by welfare state as well. Monetary and fiscal policies are among the most important factors in increasing employment. In addition, government expenditures are one of the most important instruments considered to affect employment in fiscal policies. As government expenditures affect to the economy with its size; it also affects the economy with the way of financing and the way these expenditures are used (Kaya et al. 2015: 84).

The relationship between government expenditures and the unemployment is basically explained by two approaches. First, in the classical approach, the interventions of the state through government expenditures affect the prices in the market and disrupt the allocation of resources. Thus, economic growth is prevented, production decreases and unemployment increases. Secondly, according to the Keynesian approach, public sector activities contribute to aggregate demand and affect the market to ensure full employment. Therefore, the state must take an active role in preventing unemployment through government expenditure (Kanca and Bayrak, 2015: 58).

Government size is measured by government expenditures mostly. Since size of government can be used as a policy means in terms of macroeconomic stability, it is an important factor associated with the unemployment. In his study, Abrams (1999), for the first time, attributed unemployment to the increasing size of government in the economy. After the study of Abrams (1999), the positive relationship between the government size and unemployment has been defined as the Abrams Curve (Christopoulos and Tsionas, 2002: 797). This research investigates the validity Abrams curve for Turkey. Considering that different macroeconomic variables may also have an impact on the relationship between government size and the unemployment, the number of variables has been widened in order to gain a different dimension to the study. In addition, empirical analyzes are also conducted and examined for the youth unemployment.

This study aims to analyze the impact of government size on the unemployment and youth unemployment in Turkey. As to the knowledge of the writer, there is no master thesis in literature focusing on the relationship between government

size and both of unemployment and youth unemployment for Turkey. Thus, in this respect, it is thought that this study will contribute to the literature. The research question of this thesis is "Is the Abram's curve valid for Turkey in terms of unemployment and youth unemployment?".

The remainder of this thesis is structured in five chapters. In chapter one, theories of employment based on different approaches and theoretical literature review of relationship between government size and unemployment are investigated. In chapter two, statements are made about Turkey's overall unemployment situation. Chapter three is composed of a detailed literature review on the relationship between government size and the unemployment in the world and Turkey. In chapter four, the dataset, the variables in the analysis and the methodology are described. Subsequent to the explained methodology, the final section offers the empirical results of applied analysis for Turkey.

CHAPTER ONE
THEORETICAL BACKGROUND AND LITERATURE REVIEW

1.1. THEORIES OF EMPLOYMENT

The phenomenon of employment, which is one of the basic elements of economic and social policies, has been an area where economic theories are also discussed. As employment constitutes one of the reasons for government intervention, there are different employment propositions in theories of employment.

1.1.1. Classical Theory of Employment

The role of the state in the market and what the level of its impact should be issue that has been discussed for years. Classical economists argue that the government should not interfere to the economy and that the system will be automatically stabilized by the invisible hand. The economy will stabilize at the point of full employment through flexible real wages under the assumption of perfect competition conditions in the labor market, both in the short and long run. Since individuals who want to work at the current real wage level is employed at this point, this point indicates the full employment equilibrium and this balance will be reached automatically in the labor market (Birol and Gencer, 2014: 262).

According to the classical approach, the theory of employment is based on the concept of production function. Economic theory says production of goods and services (Y) have basically two factors: labor demand (L) and capital stock (K). This function, called the short-term total production function is shown as:

$$Y = f(K, L)A$$

“A” refers to labor productivity or the effect of advances in technology.

There are three basic theories according to this function. First, according to the supply and demand theory of labor, the level of employment equilibrium determined by the intersection of labor supply and labor demand curves must be at full employment level. It is not possible that emerge the involuntary unemployment due to insufficient demand in the whole economy. In other words, "supply creates its own demand", also known as the "Say’s Law" (Adam, 2016: 15).

Second, interest is the equivalent of avoiding consumption. In other words, it is the equivalent of saving. Savings emerge through interest mechanism and become investment expenditures. Interest is shown by equations,

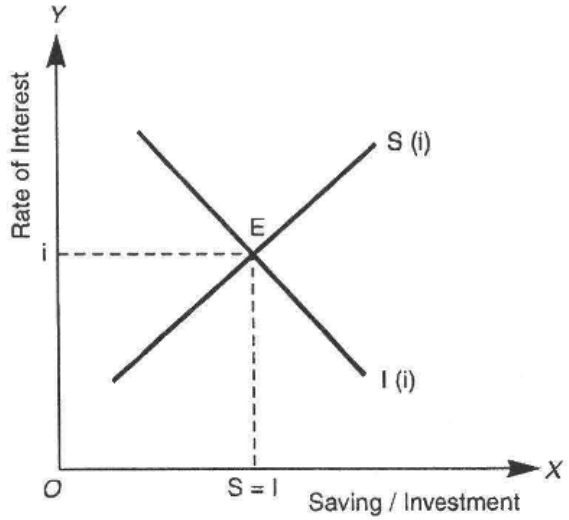
$$S = f(i)$$

Where, S is saving and i refers to rate of interest.

$$I = f(i)$$

Where, I equals to investment. So, $S = I$. This equation indicates capital market equilibrium in Figure 1. Interest rate acts as balancing in order to bring saving and investment equality. Therefore, additional investment does not cause inflation at full employment. According to classical economists, any change in consumption or investment does not impact aggregate demand for output (Chakraborty, 2010: 19).

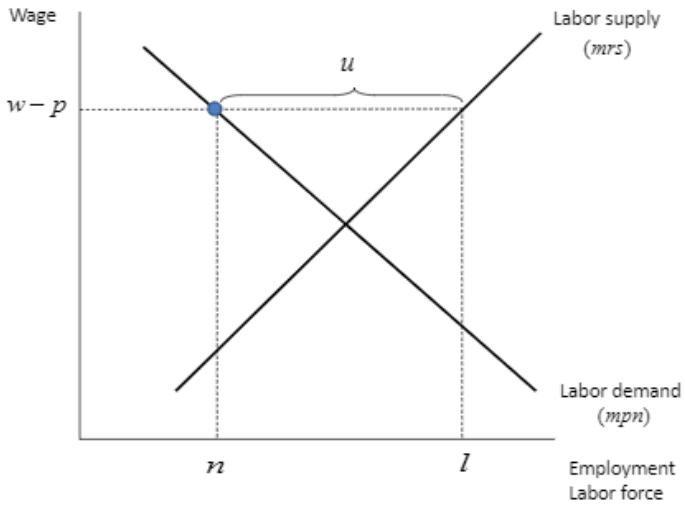
Figure 1: Capital Market Equilibrium



Source: Chakraborty, 2010: 19.

Third, according to the general price level, wages are determined by the supply and demand of labor. At this wage level, it is accepted that anyone can find a job. So, this is the full employment level (Bekiroğlu, 2010: 19). The determinant of the labor supply is the population of the country and the increase in the population raises the labor supply. An increasing in the supply of labor causes unemployment while the labor demand is constant. Unemployment will occur due to the impacts of collective bargaining or other legal or institutional constraints, the prevailing wage lies above its equilibrium level (Galí, 2013: 977). Unemployment in the classical theory of employment is presented in Figure 2.

Figure 2: Unemployment in the Classical Theory of Employment



Source: Gali, 2013: 977. “w-p” denotes real wage, “n” is level of employment, “l” is labor force.

When unemployed people are willing to work for a lower wage, the real wage level decreases. Decreasing the real wage level in the economy is reflected in the costs of goods and causes the prices of goods to fall. Therefore, demand for goods with lower prices increase, firms start to provide employment to meet this demand and full employment equilibrium level is reached again (Şentürk, 2017: 17).

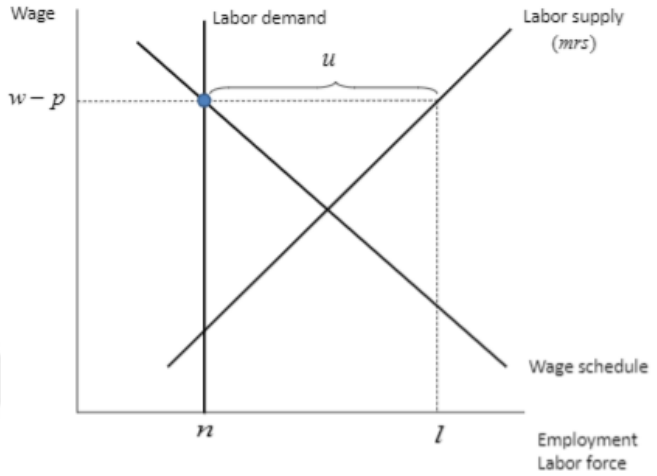
1.1.2. Keynesian Theory of Employment

Keynes (1936) criticized the Classical Theory by explaining the cause of unemployment with an insufficient demand in his study, "The General Theory of Employment, Interest, and Money”. According to Keynesian view, when the economy is left to its own self, the balance will not automatically be in full employment, on the contrary, there will be an involuntary unemployment resulting from the lack of effective demand in the economy. (Birol and Gencer, 2014: 266).

In addition, the real wage can be identified independently in consequence of bargaining between workers and their employers. The real wage does not change because of any adjustment in the nominal wage. Involuntary employment may occur in equilibrium (Figure 3). As in the classical theory, unemployment is shown through the gap between labor supply and the intersection between labor demand and wage equation. Although there is a different slope for the wage equation, the gap has the

same limits. The important difference is how to increase employment. Labor demand curve should shift rightwards for this (Galí, 2013: 980).

Figure 3: Unemployment in the Keynesian Theory of Employment



Source: Galí, 2013: 980

In this case, the government should intervene during periods of recession and high unemployment and raise the level of employment and income by increasing effective demand through fiscal and monetary policies. Thus, it is achieved the full employment (Birol and Gencer, 2014: 267).

1.1.3. Neo-Classical Theory of Employment

Neo-Classical economics, which is the continuation of classical economic thought but differs in some points, is mainly based on two factors. First, both firms and individuals have rational behaviors that can be examined through basic microeconomic methods. Secondly, in case of any deviation, wages and prices do not adapt rapidly to reach the market to full employment. Therefore, in order to achieve full employment balance in the economy, fiscal and monetary policies should be adjusted and regulated according to the situation in the economy (Tunalı, 2017: 76).

In addition, according to the Neo-Classics, the conditions of perfect competition must be valid also in the labor market; the government should not intervene in wages and trade unions and, also should not determine the level of wages. In short, wages should be as flexible as interest rates and should not hinder the formation of the full employment equilibrium. Accordingly, the government should

be contented oneself with again the classical functions and should be small (Birol and Gencer, 2014: 271).

1.1.4. Monetarist Theory of Employment

Monetarism was developed by Milton Friedman. According to the theory developed by Milton Friedman, he argues that aggregate demand can be determined primarily by changes in money supply. Money supply influences on major macroeconomic variables such as total output, prices and employment. These variables are both less and temporarily affected by fiscal policy. They acknowledge that unlike classical economists, the economy cannot always be at full employment. People may be unemployed in order to search for a better job or benefit from unemployment compensation. Thus, they have argued that there is always “natural unemployment" in the economy (Bekiroğlu, 2010: 35).

The weighted average of the subgroups within the labor force is "Natural Rate". Increasing female labor force participation rate and structural unemployment, demographic changes, public policies, oil crisis, weakening of labor unions, turning to technology-based production process, producing high value-added products, loss of skills of individuals in unemployment process, and productivity may affect "Natural Unemployment Rate" (Bayrakdar, 2014: 58).

The free market mechanism will ensure full employment in the long run, even if it causes underemployment in the short run. In the short term, the expected price level differs from the real one, so that governments can reduce the unemployment rate in the short term through expansionary policies. However, in the long run where the expected price level is equal to the real price level, it is considered that governments are not able to have an impact on the unemployment rate by implementing expansionary policies (Bekiroğlu, 2010: 36).

1.2. THEORETICAL LITERATURE REVIEW OF RELATIONSHIP BETWEEN GOVERNMENT SIZE AND UNEMPLOYMENT

One of the most significant aims of economies today is to generate various policies in order to increase the welfare level of the society. The question of what the government size will be important in the formation of these policies. Since the share of government expenditures are substantial, an intervention by means of government

expenditures may affect price stability and the general stability of the economy. However, these effects change according to the way in which government expenditures are made, how they are regulated and planned as well as to the economic structure of the countries (Bölükbaş, 2018b: 564). It is known that many factors affect unemployment in the economy so, the direct relationship between government size and the unemployment, which is the subject of thesis, is worth to investigate.

The study of conducted by Abrams (1999) on relationship about government size and unemployment can be regarded as a pioneering paper. There are several reasons for thinking of existing relationship between unemployment and government size. Firstly, big governments demand large income taxes. Therefore, people reconsider on work-leisure time and they can extend to job search time. Secondly, big governments are more expected to finance that health and lucrative unemployment insurance programs, therefore decreasing the cost of unemployment to the individuals. Thirdly, governments have intensive adjustments which may cut off labor market activity. Fourthly, when government size increase, other things equal, the private sector size reduce. Unemployment that results from declining in private sector may take long time to assimilate into another part. This can cause increase to unemployment. These possible factors are sufficient to indicate the existence of a relationship between unemployment and government size. As a matter of course, it cannot be said that large governments will certainly raise the unemployment rate. Impact of government size on unemployment will vary depending on how each government allocates its own budget. For instance, large expenditures for job training and placement will have different effects than those for unemployment insurance. Moreover, the rate considered as unemployment is the reported rate. Public programs that encouraging individuals outside the labor force or to shuffle inactive workers into welfare programs will reduce the official unemployment rates. At one point or another, according to Abrams, the relationship between unemployment and government size is quite high (Abrams, 1999: 396).

Wang and Abrams (2011) also analyzed the relationship between government size and steady-state unemployment rate. They divided total government expenditures into transfer outlays and government purchases of goods and services since these types of outlays may produce different impacts. For instance, unemployment insurance decreases the finding rate. A major factor of government spending, health care expenditures may affect rates of separation or finding. When

labor force who know to receive provided health care from government during their unemployment process, they may be lower the finding rate. On the other hand, employees who know that provided health care would proceed after they quit their job, it is likely to increasing the separation rate. Thus, both of these impacts would cause increasing in the unemployment rate. Moreover, when government spending on capital and infrastructure, labor productivity and demand for labor tend to raise. However, if possible, crowding out impacts on private investment spending occur, labor productivity does not increase. According to their study results, firstly, they concluded that raises in government size tend to increase the steady-state unemployment rate. Secondly, there are different impacts on the steady-state unemployment rate depending different types of government expenditures. Transfers and subsidies have a high significant impact while government purchases have insignificant impact. Thirdly, measures of labor market institutions do not impact the unemployment rate significantly (Wang and Abrams, 2011: 5-7).

Christopoulos et al. (2005) denominated that to result of the existence of a positive relationship between government size and unemployment is as the "Abrams curve". They attributed to various reasons government size have adversely impact on unemployment rate. First, when the enlargement of public expenditure with the public health care insurance and beneficial unemployment insurance, perceived cost of unemployment decreases to the unemployed employees. Second, the increase in government expenditure requires higher tax rates. Thus, work-leisure decisions of unemployed people are affected, and a long-term job search appears. The third reason is the decline in private investments resulting from the crowding-out effect, leading to unemployment. Fourth, with the enlargement of the government, the information content of price signals in the labor market decrease and the disappearance of effectiveness exists in labor market by intensive regulations (Christopoulos et al. 2005: 1193).

Feldman's study (2010) is the first to analyze the impact of government size on unemployment in developing countries. He drew conclusion that a large government sector is likely to raise the unemployment rate. As a matter of principle, he remarked a rise in unemployment could a rise in the government size sector. For instance, an increase in unemployment may lead higher government expenditures for unemployment benefits, transfers and subsidies (Feldman, 2010: 290).

Feldmann (2006) explained the theoretical foundations of the relationship between government size and unemployment in his study that analyzed how

government size affects unemployment in industrial countries. Firstly, government sector crowds out the private sector, especially in private investment. Therefore, unemployment increases since productivity growth, technical progress and the international competitiveness in the economy show a tendency to decrease. Secondly, when there is a larger government sector than the private sector, this situation is likely result to higher unemployment due to the fact that ability of large government sector is limited to absorb people entering working life or to stimulate structural changes among employees. Furthermore, high government expenditure is in need of high taxes. Thus, the disposable income of households and aggregate demand decreases, ceteris paribus. Profitability of private investment also reduce because of high taxes. These impacts tend to raise unemployment. In addition, if trade unions are strong, a rise in labor taxes switch to higher real labor costs so, labor demand decreases and unemployment increases. The other way around, if unions are weak and workers have to put up with high tax burden, leisure time may be more charming because of decreasing net wages. This causes voluntary unemployment to increase as well. Finally, when the extent of borrowing funds required for government spending has increased, it led to an expectation that households and enterprises may require to pay higher taxes and cut off in their disposable income. Thus, households and enterprises will reduce consumption and investment and increase unemployment (Feldmann, 2006: 452).

The study conducted by Aslan and Kula (2010) that is the first examined the relationship between unemployment and size of government for Turkey. In their work, the main points of the theoretical background are summarized as follows. The increase in government size, that is, the increase in government expenditures, increases the tax burden on taxpayers. Therefore, choice of work-leisure is affected; people tend to utilize leisure time and job searching of individuals take a long time. In addition, the raise in government size will lead a crowding-out effect on private investments and cause unemployment. Another theoretical background is that increases taxes on labor due to increased government expenditures will result increase in unemployment. Because, where labor unions are strong, the increase in labor tax causes to rise in labor costs, and thus the demand of labor falls.

Aysu and Gökmen (2011) found a statistically significant relationship between the size of government and unemployment in their study which examined that in Organisation for Economic Co-operation and Development (OECD) countries. Their study also based on similar theoretical framework like above studies. Government

size is anticipated to affect the unemployment rate through higher tax burden, work-leisure choices, the costs of employment, the inefficient allocation of production factors and nonprofitability of private investment. In addition, intensive regulations of government are likely to adverse effect labor market functioning. Because these regulations prevent flexible employment arrangements of firms that respond to demand changes.

CHAPTER TWO
UNEMPLOYMENT IN TURKEY

Unemployment is one of the most important problems facing all the countries of the world and signals that it will continue to be on a par or even more important coming years. Since the countries have completed their technological developments have met unemployment before, they have gained ground in solving unemployment problem and eliminating the negative effects of unemployment (Durak and Kaya, 2014: 55).

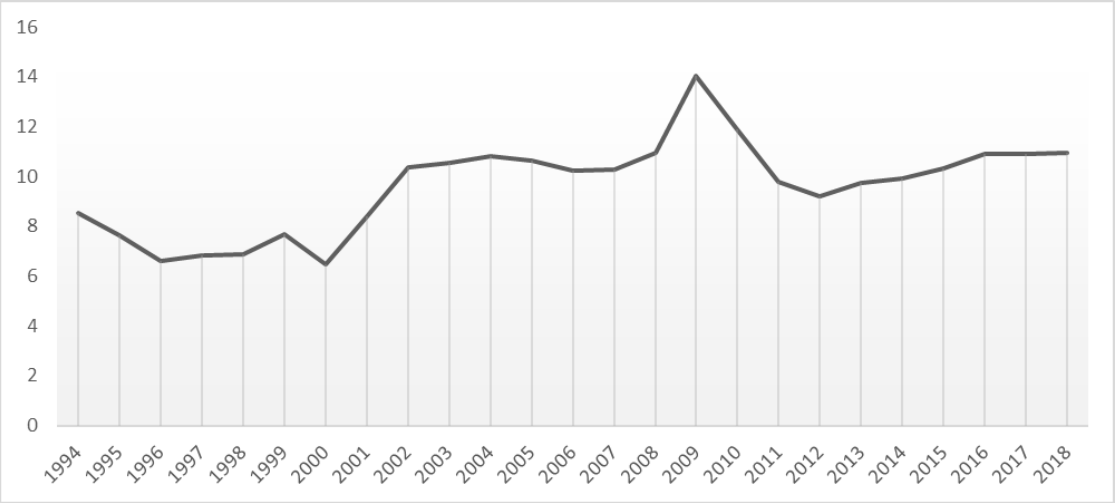
Unemployment in Turkey has become one of the most fundamental macroeconomic problems with the start of economic and social structures change since 1980. Turkey, after the 1980s has revealed the export-led growth strategy while abandoned import substitution industrialization policies. In the 1990s, it was understood that solely economic growth did not solve the problem of unemployment and the structural feature of unemployment gained prominence. In these years, active labor market policies have come to the forefront in the fight against unemployment. The content of these policies was mainly the implementation of lifelong education and formation programs and the encouraging of entrepreneurship. In addition, concrete steps have been taken to reach a solution at the European Union level (Bekiroğlu, 2010: 148). With the 2001 crisis, unemployment increased further and the post-crisis recovery in employment was very slow and limited compared to the recovery in economic growth. Reasons such as rapid population growth, disinvestment, instability in education policy, stability that cannot be achieved in political and economic fields have rendered this problem even serious (Durak and Kaya, 2014: 55).

Furthermore, many issues such as the qualification level of the labor force, rapid technological changes, the inability of the labor force to respond to the requirements of the industry and the inadequacy of capacity utilization rates make it complicated by expanding the size of unemployment (Şentürk, 2017: 90).

In Figure 4, the unemployment rate in Turkey is presented over the period of 1994-2014. When the unemployment rates are examined in the figure, 2009 is the year with the highest unemployment rate of 14%. Many white-collar workers working in banks became unemployed after the banking crisis in 2001, the crisis in the financial sector affected the real sector, causes to the increase in unemployment rates (Bekiroğlu, 2010: 149). The unemployment rate, which is 6.5% in 2000, increases to 10.3% in 2002 after the banking crisis. The highest unemployment rate among these

years is 14.02% in 2009 and the lowest unemployment rate is 6.61% in 1996. After 2012, the unemployment rate has been in an increasing trend.

Figure 4: Unemployment Rate (%) in Turkey, 1994-2018



Source: Turkish Statistical Institute (TurkStat), Labor Force Statistics, https://biruni.tuik.gov.tr/isgucuapp/isgucu.zul, https://biruni.tuik.gov.tr/medas/?kn=72&locale=tr (26.09.2019).

2.1. UNEMPLOYMENT BY SECTORAL DISTRIBUTION

All sectors have different unemployment rate in the economies of countries. The differentiation of unemployment rates between sectors is shaped by the effects of world economic conjuncture and economic policies implemented by the governments. Number of unemployed persons are shown according to the branch of economic activity of last workplace in Turkey during the period 2014-2018 (Table 1). Most of the sectoral distribution of unemployment is gathered in industry and services sectors. In addition, number of unemployed persons in all of the sectoral distribution have increasing trend.

Table 1: Unemployment (Thousand) by Branch of Economic Activity of Last Workplace

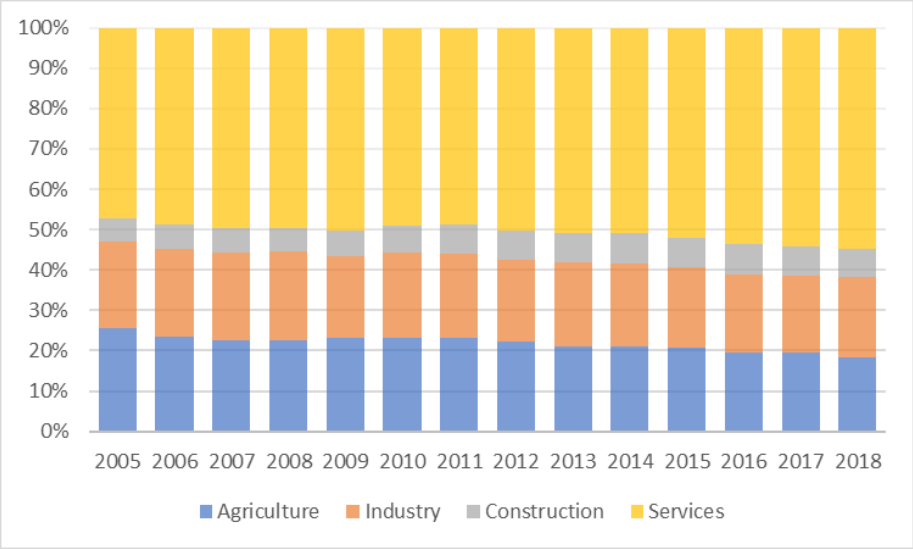
Years	Agriculture	Industry	Construction	Services	Those who quitted job before the last 8 years	First time job seekers
2014	174	550	425	1327	129	248
2015	179	568	421	1485	144	260

2016	173	605	438	1724	141	249
2017	175	564	416	1860	146	293
2018	178	560	482	1892	164	260

Source: TurkStat, Labor Force Statistics, https://biruni.tuik.gov.tr/medas/?kn=72&locale=tr (26.09.2019).

The sectoral distribution of employment is one of the most important indicators of economic development. In developing countries, the agricultural sector maintains its importance and the transition to the services sector is experienced without adequate development in the industrial sector (Karataş, 2016: 22). In Turkey, it is observed that employment takes place mainly in the services sector (Figure 5). This is determined as 54.9 % in 2018. When Figure 5 is analyzed, it can be seen that a continuous increase in the services sector, while the share of employment in industry and agriculture is close to each other and the decreasing trend prevails in both sectors after 2010.

Figure 5: Employment (15+ Age) by Economic Activity in Turkey, 2005-2018



Source: TurkStat, http://www.tuik.gov.tr/PreTablo.do?alt_id=1007 (26.09.2019).

2.2. UNEMPLOYMENT BY EDUCATIONAL LEVEL

The relationship between education and unemployment is very important for the development of countries. The fact that a significant part of the employment is composed of labor force with low education level is a negative indicator for the development of the current country and total value-added production (Akgün, 2019:

15). In addition, determining the educational level of the unemployed population may effective in revealing the causes of unemployment. In Table 2, unemployment ratio by educational status over the period 1994-2018 in Turkey. According to Table 2, the share of unemployed people before 2004 is mostly at high school graduates. As of 2005, the biggest share belongs to primary education graduates. In addition, the proportion of unemployed persons with higher education has increased overall in Turkey. For coming years, the education system in Turkey should be analyzed and improvements should be made. Otherwise, the higher educated population cannot be utilized by the national economy and may remain idle.

Table 2: Unemployed Rate by Educational Status (15+ Age)

Years	A	B	C	D	E	F	G	H
1994	3,2	6,1	7,4	-	13,1	**16,8**	15,2	7,7
1995	2,8	4,2	6,5	-	11	14,5	**14,8**	6,4
1996	2,1	3,3	5,2	-	8,9	**14**	13,4	6,6
1997	1,6	3,3	5	-	10	**15,**1	14,5	6,7
1998	2,2	4,7	5	-	8,8	**14,3**	13	8,4
1999	2,2	4,2	6,2	-	9,6	**14,9**	13,3	8,1
2000	3,4	5,6	5,2	10,3	8,3	10,5	10,9	7
2001	3,1	5,8	7,4	9,3	10,8	**13,3**	13,2	7,8
2002	4,6	6,1	9,2	10,7	12,6	14,6	**14,8**	11,1
2003	7	9,5	9,7	11,3	12,1	**13,2**	12,3	11,1
2004	4,3	7,5	9,1	13,3	12,6	14,7	**16**	12,2
2005	4,9	9,7	9,3	**14,5**	12,2	13,9	13,6	10
2006	4,8	9,3	9,1	**15,2**	11,2	14	11,8	9,6
2007	5,2	10,6	8,7	**16,8**	10,2	13,9	12	9,7
2008	6,3	12,1	9,4	**17,7**	10,9	14,1	11,7	10,3
2009	8	15,3	12,2	**22,2**	14	18	15,6	12,1
2010	6	12,5	10	**18,3**	11,5	15,9	13,2	11
2011	4,6	10,7	7,8	**14,3**	9,5	12,6	11	10,4
2012	3,9	10	7	**14**	9	11,8	10,1	10,1
2013	4,9	10,7	7,5	**14,8**	9,1	12	10,5	10,3
2014	6,3	11,1	7,8	**13,9**	9	11,9	10,6	10,6
2015	5,3	11,5	8,2	**14,7**	10,1	12,4	10,2	11
2016	5,7	11,7	8,5	**14,6**	10,4	13,4	11,6	12
2017	5,8	11,6	8,1	**14**	10,6	13,3	11,9	12,7
2018	5,8	11,5	8,5	**14**	10,9	13,1	11,4	12,4

Source: TurkStat, Labor Force Statistics, https://biruni.tuik.gov.tr/isgucuapp/isgucu.zul?dil=2 , https://biruni.tuik.gov.tr/medas/?kn=72&locale=tr, (26.09.2019).

A: Illiterate, B: Literate Without Any Diploma, C: Primary School, D: Primary Education, E: Junior or Vocational High School, F: High School, G: Vocational School at High School Level, H: Higher Education. 8 years compulsory education came into force in 1997-1998 academic year, primary education option does not exist before 2000.

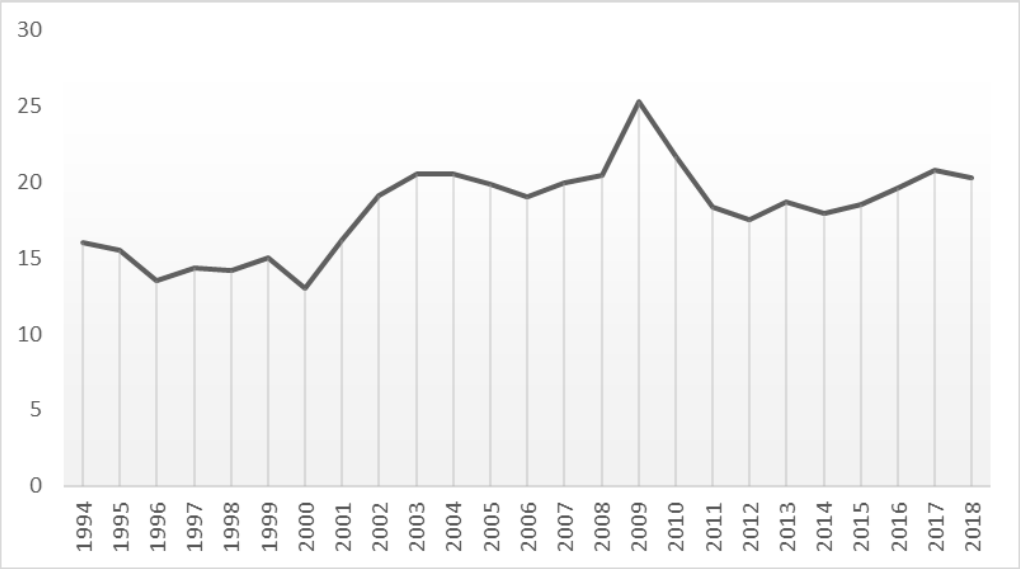
2.3. YOUTH UNEMPLOYMENT

The problem of youth unemployment is a social and economic problem that needs to be addressed first in developing countries as well as in countries that have completed the industrialization process. In this context, there is a generally accepted tendency towards youth unemployment. Young people are under more social risk than adults and early career opportunities are uncertain and irregular for them (Murat and Şahin, 2011: 12).

Young persons are more likely to voluntarily quit their work in contrast with the elderly, especially during the recession period. Moreover, during these periods, since it is easier to layoff young workers and their dismissal compensation is low, youth unemployment rates increase. The relatively low preference of young people in the labor market by employers will lead to poverty and social exclusion. The fact that the young labor force who cannot adapt to the structural transformation in Turkey has not received the necessary education is among the macroeconomic causes of the youth unemployment problem. The lack of recognition of young people in the labor market and the additional costs to employers also increase youth unemployment (Bayrakdar, 2014: 111).

Youth unemployment is quite important due to exist remarkable young population in Turkey. When compared to total unemployment and youth unemployment rates in both Turkey and the world youth unemployment is seem more than the unemployment rate. This shows how serious youth unemployment problem is (Çondur and Bölükbaş, 2014: 82). As can be seen in the Figure 6, youth unemployment rates are approximately twice the total unemployment rate. The economic crisis is one of the major causes of increasing youth unemployment in Turkey. With the crisis in 2001, it is observed that youth unemployment has increased rapidly. In addition, when the period following the global economic crisis that began in the world in 2008 is examined, it can be seen that the youth unemployment rate is 20.5% in 2008, increased to 25.3%. Since 1994, the lowest youth unemployment rate is about 13%, which is even a high rate.

Figure 6: Youth Unemployment Rate (%) in Turkey, 1994-2018



Source: Turkish Statistical Institute (TurkStat), Labor Force Statistics, https://biruni.tuik.gov.tr/isgucuapp/isgucu.zul, https://biruni.tuik.gov.tr/medas/?kn=72&locale=tr (26.09.2019).

When young people become unemployed, they move away from productivity and become dependent on their families and the environment in which they live. Young people who do not have the financial gain and fulfill their responsibilities lead to the emergence of a class that is not productive and does not make any contribution to society and economy. For this reason, it is important to determine the direction of the investments well and to keep up with the changes in the markets in order to increase the employability of the young labor force (Karaca, 2019: 108).

CHAPTER THREE
LITERATURE REVIEW

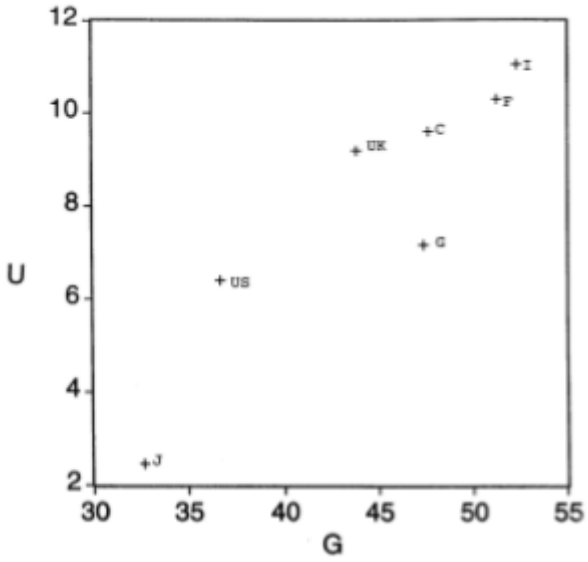
In the literature review section, the studies are examined under two titles. Firstly, it is presented the empirical studies which are conducted for developed and developing countries, then it is continued with the empirical studies for Turkey.

3.1. EMPIRICAL STUDIES FOR DEVELOPED AND DEVELOPING ECONOMIES

Recently, researchers have conducted studies on countries or groups of countries about the relationship between government sector size and the unemployment rate. The findings of these studies range to depend on the different economic characteristics of the countries, empirical method used, and selected time period. However, the results present evidence that the hypothesis about relationship between government size and unemployment is valid in predominantly developed and developing countries.

The relationship between unemployment rate and government size was first empirically investigated by Abrams (1999). In this study, twenty OECD countries were examined for the 1984–1993 time period. Initially, he examined the wealthiest large seven industrial countries (Canada, France, Germany, Italy, Japan, United Kingdom and the United States) that contains majority of the total population of all OECD countries. As a result, Abrams (1999) clearly suggests a positive relationship between the government size and the unemployment rate, shown as G-U curve with a positive slope (Figure 7). This curve was later called Abram's curve in the literature. In addition, the rank order correlation has highly significant 0.96 correlation (t-statistic = 7.6) between government outlays and the unemployment rates. Then, eight countries (Australia, Austria, Belgium, the Netherlands, Denmark, Finland, Switzerland and Sweden) were added to the Group of Seven. The rank-order correlation has decreased to 0.42 (t-statistic = 1.67). Finally, five other OECD countries were added to the sample (Greece, Norway, Ireland, Portugal, and Spain). The findings for 20 countries are nearly identical for the weighted regression for the 15 countries sample. The statistical findings are an evidence for a connection between the government size and the unemployment rate. According to the findings in this study, increase in government size generally ensure expenditure and tax effects that enhance the unemployment.

Figure 7: Relationship between Government Size and the Unemployment Rate for Seven Industrial Countries



Source: Abrams, 1999: 397.

In a study conducted by Demekas and Kontolemis (1999) for Greece, it was stated that the expansion of the government size had a decreasing effect on employment. In addition, increasing government wages have positive effect on private sector wages and cause to higher unemployment. It is found that expansion of government employment does not have an important effect on unemployment, it can even raise it.

Yuan and Li (2000) investigated the impacts of government spending shocks on employment, working hours and output in the US economy. The results indicate that a raise in government spending increases hours worked per worker, crowds out private consumption and rises output. Also, with the interest rate effect, a reduction of job openings occurs and accordingly it causes a decrease in employment.

Following this study, Christopoulos and Tsionas (2002) and Christopoulos et. al. (2005) examined the same relationship for ten developed economies of the European Union and they obtained a similar result with Abrams (1999) such that there is positive relationship between government size and the unemployment rate. In both studies, the same time period (1961-1999) was selected. Christopoulos et. al. (2005) used panel cointegration analysis and appropriate estimation techniques while Christopoulos and Tsionas (2002) used credible causality analysis with a result of unidirectional causality from government size to unemployment rate, to confirm the Abrams curve hypothesis.

Abrams and Wang (2006), show that the government size affect the steady-state unemployment rate significantly. Government size is measured as total government outlays as a percentage of Gross Domestic Product (GDP). They used data from twenty OECD countries over the period of 1970-1999. As a result, they showed that government transfers and subsidies influenced significantly the steady-state unemployment rate. However, there was no evidence related with impact of government purchases of goods and services on the unemployment rate.

Feldmann (2006) analyzed empirically how the size of government sector affects unemployment in nineteen industrial countries over the period of 1985-2002. Contrary to previous studies, he used several different indicators that measure government size and examined the impacts on the unemployment rates among young people, women and the low skilled labor. According to the results, a large government sector has a negative influence on long-term unemployment, especially on women employment and low skilled employment

In another study, Feldmann (2009) analyzed the relationship between size of government and unemployment in 58 developing countries (including Turkey) using the period 1980 to 2003. According to the regression results, the size of government sector increases unemployment. Share of government consumption and transfers and subsidies most obviously appear to have a negative effect on economic growth. Furthermore, although there was a weak relationship, implications such as high marginal income and payroll tax rates, and low-income thresholds can also increase unemployment in long term. Feldman (2010) conducted a similar study based on 52 developing countries and reached a positive relationship between government size and unemployment. The impact of size of government sector on unemployment appears significant and high for both among the total labor force, and among women and youth labor force.

Sa (2011) investigated how government size affects economic growth and unemployment in 32 advanced and 51 developing countries during the period of 1996-2006. It was found that the impact of government size on economic growth was positive for developing countries and negative for advanced countries. According to the regression results, a larger government size is likely to increase unemployment rate in the both groups of countries. Moreover, the relative effect of government size on the unemployment rate in developing countries is approximately three times higher than in advanced countries.

Aysu and Dökmen (2011) investigated the relationship between unemployment rate and government size using panel cointegration analysis for seventeen OECD countries during the period of 1990-2007. The empirical results displayed a statistically significant and strong evidence for a positive relationship between government size and unemployment rates. Therefore, researchers suggest that government size can be decreased through policy implications in order to enhance employment growth and employment.

According to Holden and Sparrman's study (2011), the opposite of the Abrams Curve hypothesis is valid. They investigated empirically the impact of government purchases on unemployment by use of panel data estimation in 20 OECD countries, during the period between 1960 and 2007. They reached a conclusion that increasing on government purchases contribute to decrease unemployment; an increase one percent of GDP decreases unemployment by 0.2 % in the same year and 0.25 % points after one year, after that gradually disappearing the following decade.

Rahmat and Saeidi (2017) investigated the impact of government development expenditures on reducing unemployment rates in different provinces in Iran over the period of 1998-2013. According to the results, government development expenditures have a significant adverse impact on the unemployment rate in the provinces. Furthermore, it was found that the impact of government development expenditure in small provinces is more than the large provinces, on the contrary to hypothesis.

Afonso et. al. (2018) analyzed causal relationship between government size, unemployment, and inflation in eight large emerging market economies during the period of 1980-2015. Their findings confirm the validity of the Abrams curve, existing a long run strong, positive and statistically significant relationship between government size and unemployment rate if government consumption spending and indirect taxes are considered as the measure of government size.

Table 3 provides a summary of the literature for Abrams curve for developed and developing economies.

Table 3: Summary of Existing Empirical Studies on Government Size and Unemployment for Developed and Developing Economies

Developed Economies			
Study	**Country or Countries**	**Econometric Method**	**Empirical Finding**
Abrams (1999)	20 OECD countries	Regression Analysis	Positive relationship between government size and unemployment. When the government size increases, the unemployment rate rises, ceteris paribus.
Yuan and Li (2000)	USA	VAR (Vector Auto Regression) and Generalized Methods of Moments (GMM)	Abrams curve is valid. Government spending increases both hours worked per worker and output but decreases the employment level.
Christopoulos and Tsionas (2002)	10 EU countries	Causality and Cointegration	Abrams curve is valid. Accordingly, there is unidirectional causality running from government size to unemployment rate.
Christopoulos et al (2005)	10 EU countries	Panel Cointegration Analysis	Abrams curve is valid. In the LR, there is one-way causality that runs from government size.
Feldman (2006)	19 industrial countries	Regression Analysis	Abrams curve is valid.
Wang and Abrams (2006)	20 OECD countries	Error Correction Model (ECM) and Dynamic Panel Data Model	Abrams curve is valid, but it varies depending on types of government outlays.
Aysu and Dökmen (2011)	17 OECD countries	Panel Cointegration Analysis	Abrams curve is valid.
Holden and Sparrman (2011)	20 OECD countries	Panel Data Estimation	The opposite of the Abrams curve hypothesis is valid.
Developing Economies			
Demekas and Kontolemis (1999)	Greece	VAR	Abrams curve hypothesis is valid.
Feldmann (2009)	58 developing countries	OLS Regression	Abrams curve hypothesis is valid.
Feldmann (2010)	52 developing countries	OLS Regression	Abrams curve hypothesis is valid.
Sa (2011)	32 developed and 51	OLS Regression	Abrams curve is valid for both developing and developed countries. The larger

	developing countries		government size, the higher unemployment.
Rahmat and Saeidi (2017)	Iran	Panel Data Estimation	The opposite of the Abrams Curve hypothesis is valid.
Afonso et al (2018)	8 large emerging countries	Vector Error Correction Model (VECM),	Abrams curve hypothesis is valid.

3.2. EMPIRICAL STUDIES FOR TURKEY

There are a few studies that investigate the validity of Abrams curve hypothesis In Turkey and it cannot be said that the findings of these studies overlap with each other.

For the first time, Aslan and Kula (2010) analyzed the validity of Abrams curve for Turkey over the period 2000:1-2007:3 and the relationship between the size of the government sector and unemployment in accordance with educational level. On the contrary to the previous study of Abrams (1999) and many other studies, it was found that government size decisively decreased all four types of unemployment (unemployment rate of secondary school or equivalent vocational school graduates, general high school graduates, high school equivalent vocational school graduates and college or faculty graduates) according to the cointegration tests conducted. The reasons for this result might be the analysis of the unemployment variable in accordance with education levels, using time series analysis in this study, and the addition of the external variables such as consumer price index and per capita income to the model.

Bayrakdar (2014) investigated the influence of government size on unemployment rate by using time series analysis during the period of 2000-2013. According to results of analysis, the long-term correlation was found between government size and unemployment. It was shown that 1% increase in government size raised unemployment by 0.16%. Besides, the causality test indicated that there is a one-way causality from government size to unemployment.

In the study conducted by Durkaya and Ceylan (2016), there was an inverse long run relationship between government size, real gross domestic product and unemployment. However, it was found that government size coefficient was not statistically significant in this long run relationship. In the short run, the unilateral causal relationship from the unemployment rate to the government size and from the real GDP to the unemployment rate were determined.

Erdogan et. al. (2018) examined the relation between government size and various macroeconomic variables over the period of 2006:1–2016:2. In the short run, a positive impact of government size on unemployment was found. However, in the long run, a unidirectional causality running from unemployment to government size has been determined. According to the results of this study, Abrams curve hypothesis is valid in Turkey for a short period.

Topal and Günay (2018) investigated the Abrams curve hypothesis validity in Turkey during the period of 1965-2016. According to empirical results, Abrams curve hypothesis is not valid in the short run. However, it is valid in the long run; there is a positive relationship between government size and the unemployment rate.

Bölükbaş (2018a) examined the causal relationship between government size, unemployment and youth unemployment in the period 2005-2018. Empirical results indicated unidirectional causality relationship from government size to unemployment and youth unemployment. In this regard, this study has parallels with Aslan and Kula (2010) and Christopoulos and Tsionas (2002).

In addition, there are studies in the literature about the effects of types of government expenditure which can be used as a proxy for government size on unemployment. One of these studies is conducted by Kanca and Bayrak (2015) examining the relationship between the components of government expenditures and the level of unemployment by using data from 1980 to 2013. The study suggests that there is bidirectional causality between transfer spending and unemployment while there is an inverse relationship between current and investment expenditures and the level of unemployment. In another study, Topal (2017) investigated the effects of public investment on employment in Turkey at the regional level. It is found that public investments increase employment in the long run (reduce unemployment and youth unemployment).

Table 4 provides a summary of the literature for Abrams curve for Turkey.

Table 4: Summary of Existing Empirical Studies on Government Size and Unemployment in Turkey

Study	Period	Econometric Method	Empirical Finding
Aslan and Kula (2010)	2000:1-2007:3	VECM	Abrams curve hypothesis is not valid.

Bayrakdar (2014)	2000-2013	Auto Regressive Distributed Lag (ARDL), Time Series Analysis	Abrams curve hypothesis is valid.
Kanca ve Bayrak (2015)	1980-2013	Johansen Cointegration, Granger Causality Analysis	Abrams curve is not valid. Types of public expenditure such as transfers, investment and current expenditures reduce unemployment rate.
Durkaya and Ceylan (2016)	2002-2014	ARDL	The Abrams curve hypothesis is not valid in the short run. There is no significant relationship between government size and unemployment in the LR.
Topal (2017)	2004-2016	Panel ARDL, ECM	Public investment reduces unemployment and youth unemployment in the LR at the all regions except for TR90 and TRC3.
Erdogan et al. (2018)	2006:1-2016:2	VAR	The Abrams curve hypothesis is valid in the SR. There is no significant relationship in the LR.
Bölükbaş M. (2018a)	2005-2018	VAR, Toda-Yamamoto causality analysis	There is a unidirectional causality running from government size to unemployment and youth unemployment.
Topal and Günay (2018)	1965-2016	ARDL bounds test and estimator	The Abrams curve hypothesis is not valid in the SR, but it is valid in LR.

In the light of above arguments, the following hypotheses for this thesis are as follows:

H_1: There is positive relationship between government size and the unemployment rate in Turkey.

H_2: There is positive relationship between government size and the youth unemployment rate in Turkey.

CHAPTER FOUR
DATA AND METHODOLOGY

In this section, explanations about the variables and the methodology used are made. The relationships are analyzed between unemployment and youth unemployment and some macroeconomic variables that affect them. In addition, information is given about the data set and econometric method used in the analysis.

4.1. DATA AND VARIABLES

In this study, the impact of government size on unemployment size in Turkey is analyzed using econometric techniques with E-views program. In this analysis, annual data covering 1994-2018 period are used. Descriptive information about the data set is shown in Table 5. Forecasting is made for missing data (for the years 1996, 1998, 2017 and 2018) in the school enrollment data. Forecasting is determined by Microsoft Excel program. Calculates, or predicts, a future value by using existing values. The predicted value is a y-value for a given x-value. The known values are existing x-values and y-values, and the new value is predicted by using linear regression. Deposit interest data for 2018 is obtained from TurkStat. According to data of GDP Per Capita (TL) in TurkStat, they contain two different periods (as 1968-2006 and 1998-2018) and they are not compatible with each other. However, dollar-denominated series in TurkStat is compatible with World Bank series, there are close values. Therefore, data of GDP Per Capita ($) from World Bank are used. Moreover, World Bank definition of secondary education “completes the provision of basic education that began at the primary level and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers" is considered.

The data of schooling ratio by higher education are attained from Ministry of National Education, National Education Statistics. In these statistics, schooling ratios for the educational year 2000/'01-2005/'06 were calculated according to the population projection based on the results of Population Census 2000 and schooling ratios as of the 2007-2008 educational year were calculated according to the results of the Address Based Population Registration System. In addition, in Turkey, compulsory education was expanded to 8 uninterrupted as of 1997/'98 educational year but to 12 gradual years as of 2012/'13 educational year. Higher education

includes all the educational institutions which are based on secondary education, and which provide at least two years of higher education.

Table 5: Descriptive Information about Dependent and Independent Variables

Dependent Variables			
Variables	**Definition**	**Data Sources**	
Unemployment Rate	(Number of unemployed persons (15+) / Total labor force (15+)) * 100	TurkStat	
Youth Unemployment Rate	(Number of unemployed persons (15-24) / Labor force (15-24)) * 100	TurkStat	
Independent Variables			
Variables	**Definition**	**Data Sources**	**Expected Sign of Relationship**
Government Size	[Government Final Consumption Expenditure (Thousand TRY, at Current Prices)/ GDP (Thousand TRY, at Current Prices)] * 100	TurkStat	Positive
Real Exchange Rate	Consumer Price Index based Real Effective Exchange Rate (2003=100)	EVDS (Electronic Data Delivery System)	Positive
Inflation	Measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services.	World Bank	Negative
Deposits Interest Rate	Interest rates are the current rates of the last months of the years. For TL deposits interest rates, saving deposits interest rate on 1 year was used until 2002 and average weighted deposits interest rate up to 1 year has been used since 2002.	The Republic of Turkey Presidency for Strategy and Budget	Positive
GDP Per Capita	GDP per capita is GDP divided by midyear population. Data are in current U.S. dollars.	World Bank	Negative
School Enrollment, Secondary (% Gross)	Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.	World Bank	Positive

Schooling Ratio, Higher Education (% Gross)	It is obtained by dividing the total number of students in a specific level of education by the population in the theoretical age group.	Ministry of National Education	Positive

The relationship between variables and the unemployment in this study is briefly explained below.

Government Size: The variable of government size is a key independent variable in this research. Abrams (1999) first examined the relationship between size of government and the unemployment. As a result of the study, a relationship is found between government size and the unemployment and the direction of this relationship is positive. This is the main starting point of this study is whether this conclusion is valid or not for Turkey. In the literature review section, research about two variables are given in detail.

Real Exchange Rate: In open economies, the relationship between real exchange rate and unemployment is much more significant. It is a factor that determines the direction of domestic and foreign demand and affects employment levels. When the fluctuations in the real exchange rate exist, uncertainty prevails in the country and it becomes difficult for businesses to have predict to future. Therefore, production is negatively affected, and the unemployment rate increases (Karataş, 2016: 2).

The impact of the real effective exchange rate on the employment level can be from many channels. When the real exchange rate drops, domestic firms gain competitiveness against imported products. With the increase in competitiveness, production and the employment increases occur (Selim and Güven, 2014: 143). The rise in the real exchange rate, for example, appreciation of the TL, can lead to the unemployment, especially as it increases imports and reduces exports (Bilgin, 2004: 92).

Inflation: The relationship between unemployment and inflation was first examined by Phillips, A. W. (1958). It is stated that there is an inverse and strong relationship between the rate of change of money wage rates and the unemployment rate (Phillips, 1958: 299). The Phillips curve showing the relationship between money wages rates and unemployment has been transformed into a curve showing the relationship between inflation and unemployment (Samuelson and Solow, 1960: 192). However, according to Friedman (1977) and Phelps (1967), the Phillips curve is not stable in the short term, and there is no inverse relationship between unemployment

and inflation in the long term. When the inflation rate rises in the long run, the expected inflation rate will increase over time. Thus, the short-term Phillips curve will shift upward or downward depending on the expected inflation. In this case, the unemployment rate will not change in the long run it will be turn back to the natural unemployment rate (Karatas 2016: 10).

Deposits Interest Rate: Two sector and fixed-investment model that is developed by Phelps (1994) suggests that aggregate demand structure is important for performance of aggregate labor market. When there is an unexpected rise in demand of government for the consumer good increases the real interest rate, decreases equilibrium employment. Therefore, higher real interest rates positively affect unemployment (Feldman 2013: 660). The real interest rate has statistically significant impact on unemployment, positively (Wang and Abrams 2011: 20) In the study conducted by Ayhan (2019) for the determinants of unemployment, it was found that interest rate positively affected the number of unemployed according to the ARDL model results. Doğrul and Soytaş (2010) found that there is a causal relationship from interest rate to employment in the long run. In the study examined by Doğan (2012), macroeconomic variables such as GDP growth, export growth, unemployment, growth in money supply and interbank interest rate between 2000 and 2010 were investigated. According to the findings of the study, a positive relationship was found between interest rate and unemployment. In other words, interbank interest rate raises unemployment. Contrary to these studies, when the variables that determine the unemployment rate are examined in Turkey for the period 1982-2006, it has been identified that deposit interest rate had a decreasing effect on the unemployment (Göktaş and İşçi, 2010: 292).

GDP Per Capita: GDP per capita is the one of the indicators reflecting the level of economic development. Günaydın and Cetin (2015) investigated the macroeconomic determinants of the youth unemployment. According to their estimation results, there is a negative and significant relationship between GDP per capita and youth unemployment in both long and short term. In other words, increasing in GDP per capita contributes to the reduction of youth unemployment. There is also a causality in the long run, from real income per capita to the youth unemployment. Furthermore, Christopoulos and Tsionas (2002), Christopoulos et al. (2005), Feldman (2010) and Aslan and Kula (2011) also included the GDP per capita as variable in their studies about relation between the government size and the unemployment rate. Since higher income per capita level is likely to lead to lower

unemployment rate, it is expected that there is a negative relation between GDP per capita and the unemployment rate in this study.

School Enrollment and Schooling Ratio: There are many studies on the relationship between education and unemployment. In studies examining the relationship between education level and the unemployment, there are conclusions that education both has a negative and a positive impact on the unemployment. Furthermore, it was found that there is a negative relationship between education level and unemployment in most of the studies conducted in the developed countries, whereas in studies about the relationship between unemployment and education level in the developing countries, a positive relationship was generally found (Bağcı, 2018: 355). In that case, educated people are more likely to be unemployed and this may cause higher unemployment rate. In this study, data of school enrollment that is the one of the education indicators is included to all models. It is expected that school enrollment affects to the unemployment and youth unemployment, positively since Turkey is the one of the developing countries.

Both theoretical studies and the literature on the unemployment lead to the hypothesis that the unemployment rate in the economy is affected by the above independent variables.

In the analysis of the relationship between government size, the unemployment rate and youth unemployment rate, the loglinear functional specifications has been carried out where the unemployment and youth unemployment rate are dependent variables:

Model 1: $lnunemp_t = \alpha_0 + \alpha_1 lngov\_size_t + \alpha_2 lngdp\_per\_capita_t + \alpha_3 lnexch\_rate_t + \alpha_4 lninf_t + \alpha_5 lnint\_rate_t + \alpha_6 lnschool_t + \alpha_7 lnsch\_ratio + \varepsilon_t$

Model 2: $lnunemp_t = \beta_0 + \beta_1 lngov\_size_t + \beta_2 lngdp\_per\_capita_t + \beta_3 school_t + \beta_4 sch\_ratio + \varepsilon_t$

Model 3: $lnunemp_t = \gamma_0 + \gamma_1 lngov\_size_t + \gamma_2 lnexch\_rate_t + \gamma_3 lnschool_t + \gamma_4 sch\_ratio + \varepsilon_t$

Model 4: $lnunemp_t = \delta_0 + \delta_1 lngov\_size_t + \delta_2 lnexch\_rate_t + \delta_3 lninf_t + \delta_4 lnschool_t + \delta_5 lnsch\_ratio + \varepsilon_t$

Model 5: $lnyouth_t = \theta_0 + \theta_1 lngov\_size_t + \theta_2 lngdp\_per\_capita_t + \theta_3 lnexch\_rate_t + \theta_4 lninf_t + \theta_5 lnint\_rate_t + \theta_6 lnschool_t + \theta_7 lnsch\_ratio + \epsilon_t$

Model 6: $lnyouth_t = \vartheta_0 + \vartheta_1 lngov\_size_t + \vartheta_2 lnexch\_rate_t + \vartheta_3 lninf_t + \vartheta_4 lnschool_t + \vartheta_5 lnsch\_ratio + \epsilon_t$

Model 7: $lnyouth_t = \mu_0 + \mu_1 lngov\_size_t + \mu_2 lnexch_{rate_t} + \mu_3 lnschool_t + \mu_4 lnsch\_ratio + \epsilon_t$

Model 8: $lnyouth_t = \varphi_0 + \varphi_1 lngov\_size_t + \varphi_2 lngdp\_per\_capita_t + \varphi_3 school_t + \varphi_4 lnsch\_ratio + \epsilon_t$

where: $unemp_t$ = unemployment rate; $youth_t$ = youth unemployment rate; gov_size_t = government size; $gdp\_per\_capita_t$ = GDP per capita; $exch\_rate_t$ = real exchange rate; inf_t =inflation rate; int_rate_t = deposit interest rate; $school_t$ = school enrollment; ε_t and ϵ_t = error terms; and ln = natural log operator.

4.2. METHODOLOGY

While investigating whether Abrams curve is valid or not in Turkey or in other words whether the government size affects to unemployment positively, primarily the stationarity of the series of variables is tested using Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) unit root tests. After that, the ARDL bounds test is examined for cointegration and the Granger causality test is applied. All tests are conducted for eight models, both when the dependent variable is unemployment rate and when it is youth unemployment rate. In this context, firstly, econometric methods used in this research will be mentioned.

4.2.1. Unit Root Tests

Macroeconomic time series are generally not stable. The series having this characteristic are stabilized by taking the first or second-order differences or logarithms. There are many tests use to determine stability. In this study, the stability of the data for the variables are tested using the Augmented Dickey-Fuller (Dickey and Fuller, 1979: 427-431) and Phillips-Perron (Phillips and Perron, 1988: 335-346)

unit root tests. According to these tests, the time series are stationary if they do not contain the unit root and are not stationary if they have the unit root.

4.2.1.1. Augmented Dickey-Fuller (ADF) Test

In the literature the tau statistic is known as the Dickey- Fuller (DF) test since it was discovered by David Dickey and Wayne Fuller. Implementing the DF test contains several decisions. In order to allow for several possibilities, the DF test is estimated in three different forms, that is, under three different null hypotheses. (Gujarati, 2002: 815)

Firstly, if the model does not contain constant term and trend,

$$\Delta Y_t = \delta Y_{t-1} + u_t \quad (1)$$

Secondly, if the model has a constant term but not deterministic trend,

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + u_t \quad (2)$$

Thirdly, if the model contains constant term and a stochastic trend,

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + u_t \quad (3)$$

The models (1), (2), (3) are estimated for the DF test, respectively. t is the time or trend variable. It is assumed that error term is uncorrelated. The DF test cannot be conducted if the error terms contain autocorrelation. Autocorrelation problem of the error term can be eliminated by adding the lagged values of the time series. Dickey and Fuller have developed a new test that incorporates the lagged values of the dependent variable into the model as independent variables. This is known as Augmented Dickey-Fuller test. The estimated models for this test are shown below (Gujarati, 2002: 817).

If the model has not constant term and trend,

$$\Delta Y_t = \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t \quad (4)$$

If the model includes constant term but not deterministic trend,

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t \quad (5)$$

If the model contains constant term and a stochastic trend,

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t \quad (6)$$

where ε_t is an error term and where $\Delta Y_{t-1} = (Y_{t-1)} - Y_{t-2})$, $\Delta Y_{t-3} = (Y_{t-3)} - Y_{t-4})$, etc. The critical values of the DF and ADF test statistics are the same in both. The number

of lagged difference terms used in the model is generally determined empirically. It is aimed to include enough terms that will ensure that the error term is serially uncorrelated in the equation.

4.2.1.2. Phillips-Perron (PP) test

The DF and the ADF test are based on some important assumptions, such as the fact that the error terms are independently distributed and have constant variance. Philips and Perron (1988) suggested that DF and ADF tests were inadequate if the assumptions were not accorded or the series were exposed to a structural break. PP test is a test that develops the ADF test and makes less restrictive assumptions about error terms. It uses nonparametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms. The equations of the PP test are modeled as follows;

no constant term and no trend: $Y_t = \delta Y_{t-1} + u_t$ (7)

with constant term and no trend: $Y_t = \beta_1 + \delta Y_{t-1} + u_t$ (8)

with constant term and trend: $Y_t = \beta_1 + \delta Y_{t-1} + \beta_2(t - \frac{T}{2}) + u_t$ (9)

In equation (9), T represents the number of observations. The average of error term is equal to zero in the equations (7), (8), (9), whereas, it might be consecutively dependent, or it may violate the assumption of heteroskedasticity problem. Therefore, the PP test does not depend on the assumptions of the DF or ADF test. Furthermore, the PP and the Dickey Fuller test have the same critical values. In the PP test, as in the DF and ADF tests, the basic hypothesis is established that the series has unit root and the rejection of H_0 shows us that the series does not contain unit root, i.e. it is stationary.

4.2.2. Cointegration Analysis in Time Series: Autoregressive Distributed Lag (ARDL) Bounds Test

If the variables in question have a long term or equilibrium relationship, they will be cointegrated. The cointegration test is used to examine (Gujarati, 2002: 822) whether stationary series are cointegrated or not. If the series are not stationary, the difference is taken to stable it. Therefore, the cointegration test is applied to prevent loss of information and non-resolution situations (Dikmen, 2018: 325).

The most used cointegration tests are the Engle-Granger or the Johansen cointegration tests. However, in these cointegration tests, all series should be non-stationary at the level or must become stationary when the difference of all the series is taken to the same degree. If one or more of the series are stationary at the level value, i.e. I (0), the cointegration relationship cannot be investigated with these tests. The bounds test is that developed by Pesaran, Shin and Smith (2001) is useful to eliminate these problems. This new method is called ARDL (Autoregressive Distributed Lag) approach. It provides more effective results in small number of sample observations in comparison with standard cointegration tests (Pesaran et al. 2001: 308). In addition, long and short-term coefficients can be estimated at the same time in time series analysis with ARDL approach, which is another reason why it is superior to other cointegration tests. The underlying variables should not integrate of order I (2). Otherwise, ARDL cannot be applied (Nkoro and Uko, 2016: 86).

The ARDL method contains two stages. In the first step, the existence of cointegration is investigated through bounds test. In the second step, long-term relationship is estimated, and short-term analysis is also fulfilled by using error correction model (ECM) (Adamu, 2017: 301).

This approach is illustrated by using the ARDL $(p, q_1, q_2 \dots, q_k)$ model cointegration testing;

$$\Delta X_t = \delta_{0i} + \sum_{i=1}^{k} \alpha_i \Delta X_{t-1} + \sum_{i=1}^{k} \alpha_2 \Delta Y_{t-i} + \delta_1 X_{t-1} + \delta_2 Y_{t-1} + v_{1t} \quad (10)$$

$$\Delta Y_t = \delta_{0i} + \sum_{i=1}^{k} \alpha_i \Delta Y_{t-1} + \sum_{i=1}^{k} \alpha_2 \Delta X_{t-i} + \delta_1 Y_{t-1} + \delta_2 X_{t-1} + v_{1t} \quad (11)$$

Where k is that maximum lag order chosen by the user. The F-statistic is implemented on the joint H_0 that the coefficients of the lagged variables ($\delta_1 X_{t-1}$ $\delta_1 Y_{t-1}$) equal to zero. (δ_1, δ_2) indicate the long-run dynamics and (α_i, α_2) correspond to the short-run relationship of the model. H_0 represents that the long-run relationship does not exist $(H_0: \delta_1 = \delta_2 = 0)$. Alternative hypothesis indicates that the long run relationship exists, $(H_1: \delta_1 \neq \delta_2 \neq 0)$ when there are two independent variables (Nkoro and Uko, 2016: 80-81).

This test comprises asymptotic critical value bounds. Two sets of critical values are produced: upper bound and lower bound. First set refers to the I (1) series and second set related to the I (0) series. If the F test statistic is in excess of upper critical bound values, H_0 can be rejected and there is long-run relationship between

the variables regardless of the order of integration of the variables. Otherwise, if the F test statistic is below lower critical values, H_0 cannot be rejected and there is not long-run relationship which means that no cointegration between variables.

After determining the coefficients for the long-term relationship, the diagnostic tests of the model are examined, and the suitability of the model is determined. In addition, Cumulative Sum (CUSUM) and Cumulative Sum Squared (CUSUMSQ) tests can be used for the stability of the variables in the ARDL model (Brown et al. 1975: 158). If there is cointegration, an error correction model based on ARDL can be used to determine the short-term relationships between variables;

$$\Delta Y_t = \delta_{0i} + \sum_{i=1}^{k} \alpha_i \Delta Y_{t-1} + \sum_{i=1}^{k} \alpha_2 \Delta X_{t-i} + \varphi ECT_{t-1} + v_{1t} \quad (12)$$

Error correction term (ECT_{t-1}) replaces the ARDL bounds test long run terms. The coefficient of the ECM term (φ) indicates how much of an imbalance in the short run will convergence toward long run equilibrium. The term error correction is expected to be negative and significant (Nkoro and Uko, 2016: 85). Significance of "φ" is determined by its t-statistic. If "φ" is significant, it also means that the explanatory variable (X) Granger-causes the dependent variable (Y) in the long run (Pesaran et al. 2001: 303).

4.2.3. Granger Causality Test

The causal relationships between economic variables are investigated through causality tests. Granger causality test is one of the tests used to determine the direction of the causality among the variables. After confirming the long-term relationship between variables by applying the ARDL bounds test and combined cointegration techniques we can implement this test.

If variable X Granger causes variable Y, changes in X should precede changes in Y. So, if lagged values of X are included in a regression of Y on other variables (including its own lagged values) and it significantly improves the prediction of Y, then it can be said that X causes Y (Gujarati, 2002: 697). Causal relationships between two variables can be expressed such that;

- X, "Granger-causes" of Y ($X \rightarrow Y$)
- Y, "Granger-causes" of X ($Y \rightarrow$ X)
- There is two-way causality between X and Y ($X \leftrightarrow Y$)
- There is no causal relationship between X and Y.

This test assume that the series are stationary. In nonstationary case, it will depend on time t, and the presence of causality may alter over time. Then causality may exist at this moment of time (Granger,1969: 429). If variables are not stationary in the level form, they can be made stationary taking first difference. Determining of the number of lagged terms is significant in the causality tests. Akaike or Schwarz information criterion may be used to make the choice, as in the case of the distributed lag models. Also, it is assumed that error terms are uncorrelated (Gujarati, 2002: 698). If the variables X_t and Y_t are stationary, the Granger causality test requires estimation of the Vector Autoregressive Models (13) and (14) indicated.

$$Y_t = a_1 + \sum_{i=1}^{n} \beta_i X_{t-i} + \sum_{j=1}^{m} \delta_j Y_{t-j} + e_{yt} \quad (13)$$

$$X_t = a_2 + \sum_{i=1}^{n} \theta_i X_{t-i} + \sum_{j=1}^{m} \gamma_j Y_{t-j} + e_{xt} \quad (14)$$

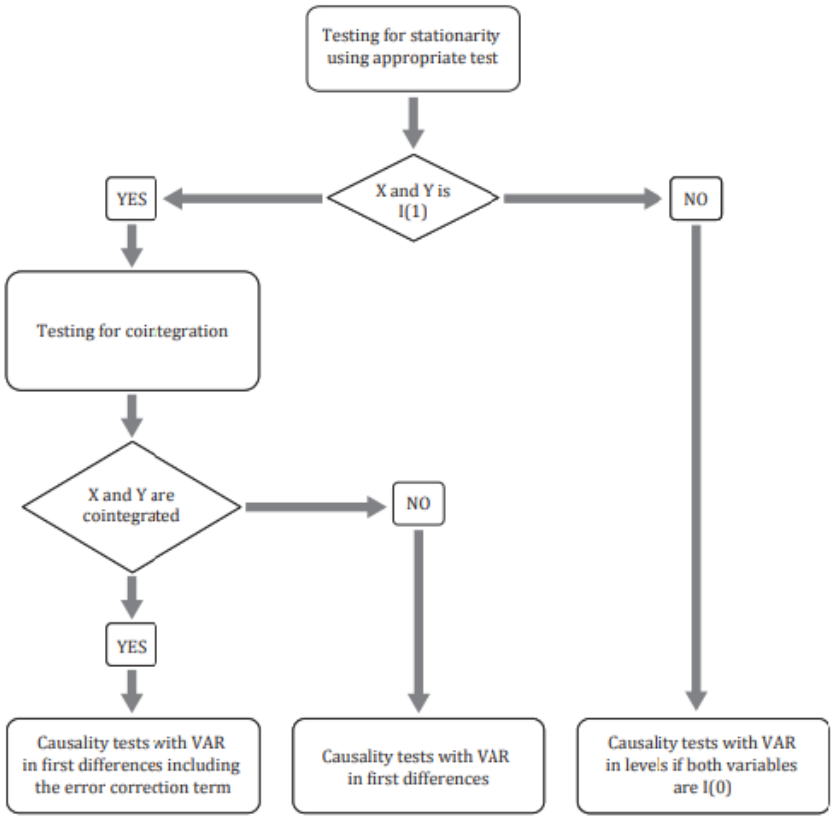
In the analysis, the significance of the following H_0 and H_1 hypotheses are tested. Accordingly, if the H_0 hypothesis is rejected, it can be claimed that there is a causal relationship between the variables (Engeloğlu et al., 2015: 143).

$H_0: \sum_{i=1}^{n} \beta_i = 0$ (X_t does not the “Granger-cause” of Y_t)

$H_1: \sum_{i=1}^{n} \beta_i \neq 0$ (X_t “Granger-causes” of Y_t)

If the series are nonstationary in I (0) but stationary in I (1), then Granger causality tests should be applied in first differences (Figure 8). In this sense, spurious causality problem may occur because of ignoring relationships among the variables. Therefore, causality tests should be carried out in an error correction model rather than with the use of simple Granger causality tests applied on first differences when there is long run cointegration relationship (Kočenda and Černý, 2015: 152).

Figure 8: Testing Strategy for Determining Causality between Pairs of Variables



Source: Kočenda and Černý (2015: 161)

CHAPTER FIVE
EMPIRICAL RESULTS

In this chapter, the empirical results obtained by using the data set and methods stated in the previous chapter are presented in detail.

5.1. UNIT ROOT TEST RESULTS

In Augmented Dickey-Fuller (ADF) test, the null hypothesis of the unit roots cannot be rejected for unemp, youth, gdp_per_capita, exch_rate, school and sch_ratio variables but it can be rejected for the gov_size, inf and int_rate variables. Gov_size, inf and int_rate variables are stationary at level. In Phillip-Perron (PP) test the null hypothesis of a unit root cannot be rejected for unemp, youth, gdp_per_capita, exch_rate, school and sch_ratio variables but rejected the null hypothesis for the gov_size and int_rate variables. According to PP test, gov_size and int_rate variables are also stationary at level. To verify whether the variables except gov_size and int_rate are integrated of order 1 (I (1)), the null hypothesis of a unit root is tested for the first difference variables. Almost all results of ADF and PP tests reject the null hypothesis of a unit root at first difference except and indicating that all variables are integrated of order one (Table 6). Furthermore, logarithm of all data is used in all performed tests.

Table 6: ADF and PP Unit Root Test Results

	ADF			**PP**		
	H_n: There is a unit root.			**H_n: There is a unit root.**		
Variables	**None**	**Constant**	**Trend and Constant**	**None**	**Constant**	**Trend and Constant**
	LEVEL					
unemp	0.304873 (0.765)	-1.380466 (0.574)	-2.122173 (0.508)	0.308785 (0.766)	-1.478511 (0.527)	-2.122173 (0.508)
youth	0.38662 (0.787)	-1.51628 (0.508)	-2.03528 (0.553)	0.401807 (0.791)	-1.51628 (0.508)	-2.151412 (0.493)
gov_size	-1.548899 (0.111)	-1.862531 (0.342)	-4.128615 (0.017) **	-3.44879 (0.001) ***	-1.65007 (0.4427)	-4.128615 (0.017) **
gdp_per_capita	1.695827 (0.974)	-1.980248 (0.292)	-0.969412 (0.929)	1.6615 (0.9728)	-1.973908 (0.2954)	-1.02965 (0.9204)
exch_rate	-0.171272 (0.614)	-1.740587 (0.399)	-0.173805 (0.989)	-0.187091 (0.608)	-1.652038 (0.4417)	-0.62961 (0.967)

inf	-1.703878 (0.083) *	-1.689502 (0.423)	-0.180001 (0.989)	-1.58779 (0.104)	-1.667107 (0.434)	-0.250813 (0.987)
int_rate	-1.676073 (0.087) *	-1.500818 (0.516)	-0.676069 (0.963)	-1.851769 (0.062) *	-1.520543 (0.506)	-0.344117 (0.983)
school	2.121671 (0.989)	-1.314091 (0.605)	-1.992700 (0.575)	2.211936 (0.991)	-1.308206 (0.608)	-1.9927 (0.575)
sch_ratio	7.62197 (1.000)	0.797243 (0.992)	-2.226237 (0.455)	6.835456 (1.000)	0.668546 (0.989)	-2.224278 (0.456)
FIRST DIFFERENCE						
unemp	-4.351698 (0.000) ***	-4.321656 (0.002) ***	-4.211105 (0.015) **	-4.356640 (0.000) ***	-4.383823 (0.002) ***	-4.263030 (0.013) **
youth	-4.536746 (0.000) ***	-4.488309 (0.001) ***	-4.376769 (0.010) **	-4.530113 (0.000) ***	-4.478463 (0.001) ***	-4.359650 (0.011) **
gov_size	-7.487410 (0.000) ***	-7.810621 (0.000) ***	-7.755249 (0.000) ***	-7.781878 (0.000) ***	-11.10389 (0.000) ***	-13.52216 (0.000) ***
gdp_per_capita	-4.179271 (0.000) ***	-4.432933 (0.002) ***	-4.699040 (0.005) ***	-4.19658 (0.000) ***	-4.432591 (0.002) ***	-4.699885 (0.005) ***
exch_rate	-6.552816 (0.000) ***	-6.399213 (0.000) ***	-7.649708 (0.000) ***	-6.415318 (0.000) ***	-6.273222 (0.000) ***	-8.024250 (0.000) ***
inf	-3.716420 (0.000) ***	-3.760822 (0.009) ***	-4.218390 (0.015) **	-3.771909 (0.000) ***	-3.819088 (0.008) ***	-4.214056 (0.015) **
int_rate	-3.908830 (0.000) ***	-4.051301 (0.005) ***	-4.575592 (0.007) ***	-3.871351 (0.000) ***	-4.002910 (0.005) ***	-5.200187 (0.001) ***
school	-4.044458 (0.000) ***	-4.620665 (0.001) ***	-4.548015 (0.007) ***	-4.044458 (0.000) ***	-4.617777 (0.001) ***	-4.541764 (0.007) ***
sch_ratio	-1.721864 (0.0804) *	-3.794049 (0.009) ***	-3.743458 (0.039) **	-1.465819 (0.130)	-3.76852 (0.0097) ***	-3.728281 (0.041) **

Automatic lag length selection (Schwarz Information Criteria) used as max 2. P values shown below test statistics. *, ** and *** indicate the 10%, 5%and 1% significant levels, respectively.

According to the results of the ADF and PP unit root tests, it is found that the variables had different degrees of stationary and it is confirmed that none of the variables stagnated at two or higher differences. Therefore, possible short- and long-term relationships between related variables are investigated by using the ARDL approach, which was mooted by Pesaran (1997) and developed by Pesaran and Smith (1998), Pesaran and Shin (1999) and Pesaran et al. (2001).

5.2.THE RESULTS OF THE MODELS FOR UNEMPLOYMENT RATE

5.2.1. ARDL Test Results for Models of 1, 2, 3 and 4

Autoregressive Distributed Lag (ARDL) bounds test approach is a widely used cointegration method in recent years to investigate long term relationships between

variables. As mentioned in the previous section, the most important advantage of this approach is that the ARDL does not impose a restrictive assumption that all the variables under study must be integrated of the same order. Although ARDL cointegration technique does not require pre-testing for unit roots, to avoid ARDL model crash in the presence of integrated stochastic trend of I (2), the unit root test should be carried out. According to unit root test results, our variables are stationary at level values or first order. Therefore, there is no obstacle to the ARDL cointegration approach. Firstly, the results of the models in which unemployment is a dependent variable, then the results of the models created for youth unemployment will be examined.

The optimal lag length for the ARDL is found to be “2” for model 3 and model 4. The appropriate lag length for the model 1 and model 2 is “1”. To determine the lag structure for the regressors in the models, the ARDL models are chosen that minimize Akaike Information Criterion (AIC), Schwarz Criterion (SC) and Hannan Quinn (HQ) Criterion. The optimal lag length is selected based on the lag has with the most stars (Table 7).

Table 7: The Appropriate Lag Length for the ARDL Models of 1, 2, 3 and 4

VAR Lag Order Selection Criteria				
	Lag	**AIC**	**SC**	**HQ**
Model 1	0	-8.255639	-7.862954	-8.151459
	1	**-18.03186***	**-14.49770***	**-17.09425***
Model 2	0	-4.887046	-4.640200	-4.824965
	1	-12.84522	**-11.36414***	**-12.47273***
	2	**-13.08592***	-10.37060	-12.40302
Model 3	0	-5.971860	-5.725013	-5.909778
	1	-12.92962	-11.44854	-12.55714
	2	**-15.02140***	**-12.30609***	**-14.33851***
Model 4	0	-5.505529	-5.209313	-5.431031
	1	-12.75382	-10.68031	-12.23234
	2	**-17.03516***	**-13.18435***	**-16.06669***

* indicates lag order selected by the criterion

Model 1 includes all dependent variables (the government size, GDP per capita, exchange rate, inflation, interest rate, school enrollment and schooling ratio) that previously described. Model 2 is formed by subtracting variables such as inflation, the exchange rate and the interest rate from model 1. It contains the unemployment rate, government size, GDP per capita, school enrollment and schooling ratio variables. In addition, size of government, exchange rate, school enrollment and schooling ratio which are independent variables take part in model 3. Model 4 comprise of the unemployment rate, the government size, the exchange rate, inflation schooling ratio and school enrollment variables.

Table 8 demonstrates the estimates of the selected ARDL models specification. Moreover, it is significant to have statistically desirable parameter estimates for the further steps of the analysis. For that purpose, several diagnostic tests are carried out for the models. The results of diagnostic tests are provided in the bottom panel of Table 8. The serial correlation is tested by the Breusch-Godfrey Lagrange Multiplier test of residual serial correlation. The Jarque–Bera is a normality test that based on a test of skewness and kurtosis of residuals in order to test whether existing of normal distribution. The heteroscedasticity is tested by the Breusch-Pagan-Godfrey test. According to these diagnostic tests results, autocorrelation and heteroscedasticity problems are not observed in all four models and the models have normal distribution.

Table 8: The Estimates of the ARDL Models (Dependent Variable: Unemployment Rate)

Variables	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
unemp(-1)	0.681249	0.0001***	0.630233	0.0001***	0.176751	0.1197	0.166790	0.1970
gov_size **gov_size(-1)**	0.040863 0.573006	0.9217 0.1251	0.963228 -0.498218	0.0008*** 0.068*	0.901245	0.0002***	0.878507	0.0016***
gdp_per_capita **gdp_per_capita (-1)**	-0.539965 0.428744	0.016** 0.0244**	-0.08887	0.2569				
exch_rate	0.062391	0.8213			-0.130417	0.1832	-0.134151	0.1966
inf **inf (-1)**	-0.168047 -0.19115	0.1102 0.0246**					-0.004989	0.8543
int_rate **int_rate(-1)**	0.005386 0.49463	0.9671 0.0009***						
school **school (-1)**	0.98829 -0.620178	0.0035*** 0.1229	0.625659	0.0007***	0.26069 0.20201	0.2765 0.5063	0.261478 0.207904	0.2931 0.5122

school (-2)					0.685872	0.011**	0.682264	0.0149**
sch_ratio	0.839773	0.0277**	1.071446	0.0151	0.789776	0.0081***	0.776841	0.0141**
sch_ratio (-1)	-0.720304	0.0354**	-1.153250	0.0060***	-0.261789	0.5098	-0.242383	0.5685
sch_ratio (-2)					-0.775638	0.0298**	-0.783605	0.0360**
Lag	1, 1, 1, 0, 1, 1, 1, 1		1, 1, 0, 0, 1		1, 0, 0, 2, 2		1, 0, 0, 0, 2, 2	
Number of observations	24		24		23		23	
R-squared	0.972010		0.904407		0.960308		0.960414	
Diagnostic Tests Statistics (probability)								
Breusch-Godfrey LM	1.610248 (0.2584)		0.504665 (0.4877)		1.648629 (0.233)		1.439362 (0.2784)	
Jarque-Bera	0.042598 (0.978926)		4.905165 (0.086071)		0.128252 (0.937887)		0.151167 (0.927202)	
Breusch-Pagan-Godfrey	1.050819 (0.4857)		1.206709 (0.3541)		1.949497 (0.1328)		1.960549 (0.1343)	

***, ** and * denote significant at the 1%, 5%, 10% levels, respectively.

The bounds test of cointegration can be implemented for models in order to analyze the long-run relationship between the variables. Table 9 reports the estimated F-statistics and t-statistics values for the models. The estimated F-statistics value for the model 1 is 7.599028, which is above the upper bound critical values provided by E-Views 10 package program at 1 % significance level. For the model 2, the estimated F-statistics value is 5.71732 and it is above the upper bound critical values. In the F test for the model 3, the test statistic obtained at approximately 20.45 was found to be greater than the lower and upper limits of 3.07 and 4.44 at 1 % significance level. For the model 4, F test statistics was found as about 15.87 and it also lies above the upper bound critical values at %1. Since F-statistics values are higher than critical value I (1) for these all models null hypotheses that there is no cointegration in the series is rejected and it is concluded that there is a long-run relationship among the variables.

In addition, the cointegration relationship can be analyzed by examining the t-statistics reached as a result of the bounds test on the estimated ARDL models. T-statistics are significant for model 3 and model 4 and are found as -7.719652 and -6.7933, respectively. The computed t- statistics should be considered in terms of absolute values. These results are greater than the critical values at 1% significance level. This also means there is cointegration between the series in model 3 and model 4. Only the results of the t-statistic for model 1 and model 2 are in the uncertainty

zone. However, they are not lower than the critical values at all significance level. Therefore, cointegration results were based on F statistics in this study.

Table 9: Results of the Bounds Test of Cointegration; Model 1, Model 2, Model 3, Model 4

		Significance level	***Bound critical values***	
	F-statistic		***I(0)***	***I(1)***
Model 1	7.599028***	%1	2.54	3.91
		%5	1.97	3.18
k=7		%10	1.7	2.83
N=24	t-statistic			
	-2.770457	%1	-2.58	-4.88
		%5	-1.95	-4.23
		%10	-1.62	-3.9
Model 2	F-statistic			
	5.717320***	%1	3.07	4.44
		%5	2.26	3.48
k=4		%10	1.9	3.01
N=24	t-statistic			
	-2.945352	%1	-2.58	-4.23
		%5	-1.95	-3.6
		%10	-1.62	-3.26
Model 3	F-statistic			
	20.44844***	%1	3.07	4.44
		%5	2.26	3.48
k=4		%10	1.9	3.01
N=23	t-statistic			
	-7.719652***	%1	-2.58	-4.23
		%5	-1.95	-3.6
		%10	-1.62	-3.26
Model 4	F-statistic			
	15.87173***	%1	2.82	4.21
		%5	2.14	3.34
k=5		%10	1.81	2.93
N=23	t-statistic			
	-6.7933***	%1	-2.58	-4.44
		%5	-1.95	-3.83
		%10	-1.62	-3.49

***, ** and * denote probability significant at the 1%, 5%, 10% levels, respectively. Lower and upper bound critical values were determined by EViews 10 package program as a result of "Bounds Test". k is the number of variables. N is the number of observations. The ARDL models are estimated by using an no constant and no trend (Case I).

After the cointegration tests, long-term coefficients are calculated for the cointegrated models. In this context, the long-term coefficients and probabilities based on the estimation results of the conditional error correction regression method established for the four ARDL models where the unemployment rate is a dependent variable are presented in Table 10.

Table 10: The Long-Run ARDL Relationships for Model 1, Model 2, Model 3 and Model 4

Model 1 (1, 1, 1, 0, 1, 1, 1, 1); dependent variable: d(unemp)		
Variables	***Coefficient***	***Probability***
gov_size	1.925856	0.1516
gdp_per_capita	-0.348927	0.4936
exch_rate	0.195735	0.8245
inf	-1.126887	0.0744*
int_rate	1.568672	0.0944*
school	1.154857	0.1056
sch_ratio	0.374805	0.5579
Model 2 (1, 1, 0, 0, 1); dependent variable: d(unemp)		
Variables	***Coefficient***	***Probability***
gov_size	1.257579	0.0574*
gdp_per_capita	-0.240340	0.3608
school	1.692037	0.0140**
sch_ratio	-0.221231	0.3087
Model 3 (1, 0, 0, 2, 2); dependent variable: d(unemp)		
Variables	***Coefficient***	***Probability***
gov_size	1.094741	0.0003***
exch_rate	-0.158417	0.2055
school	1.395168	0.0000***
sch_ratio	-0.300821	0.0006***
Model 4 (1, 0, 0, 0, 2, 2); dependent variable: d(unemp)		
Variables	***Coefficient***	***Probability***
gov_size	1.054364	0.0051***
exch_rate	-0.161004	0.2134
inf	-0.005988	0.8526
school	1.382180	0.0000***
sch_ratio	-0.299021	0.0010***

***, ** and * denote significant at the 1%, 5%, 10% levels, respectively

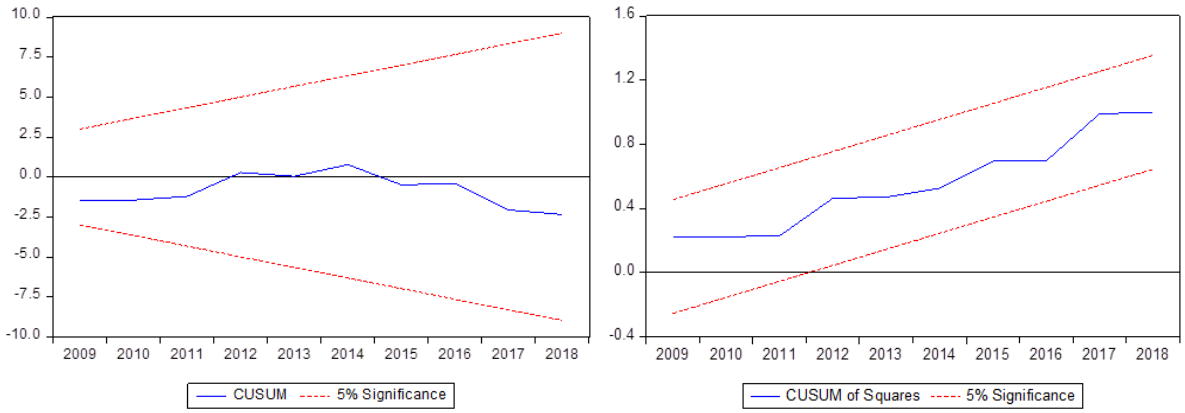
When the findings are examined for long run relationship in model 1, the long run coefficients of the interest rate and inflation rate are statistically significant. A 1 % increase in the inflation rate in the long run will result to decrease the unemployment rate by approximately 1.13% at 10% significant level. The coefficient of the interest rate is about 1.57, this means that a 1% increase in the interest rate expected to raise the unemployment rate by about 1.57 %.

In model 2, the long run coefficients of the government size and school enrollment are positive and statistically significant. This shows that an increase in the government size in the long run will increase unemployment rate. In this context, a 1 % increase in government size in the long run is expected to increase the unemployment rate by approximately 1.26 %.

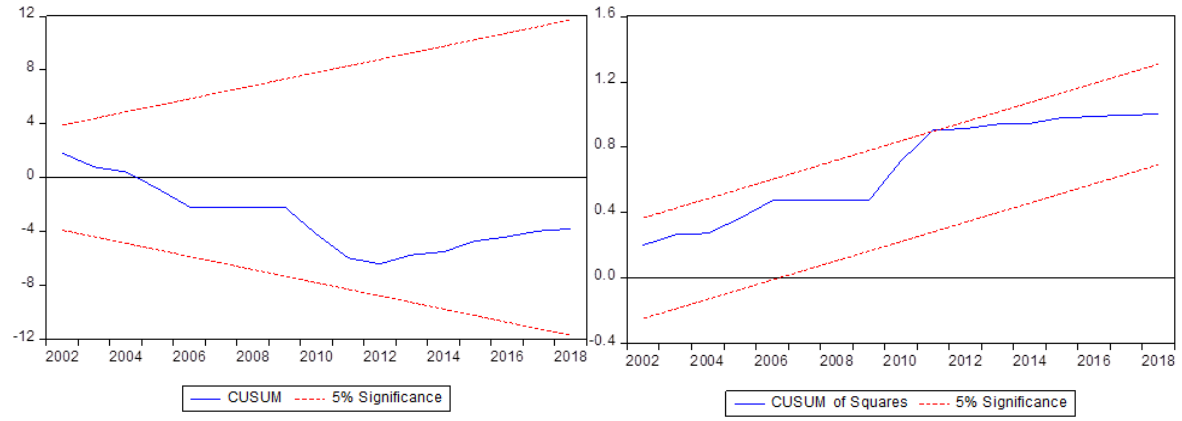
Moreover, there is positive and statistically significant relationship between the government size, school enrollment and unemployment rate at significance level of 1 % in model 3. In this context, a 1 % increase in government size and school enrollment in the long run is expected to increase the unemployment rate by 1.09 and 1.40 %, respectively. A statistically significant relationship is found between schooling ratio and the unemployment rate at significance level of 1% negatively. In addition, the results for model 4 are very similar to model 3. After all, a significant long-term relationship between the changes in government size and unemployment could be determined in the three model except the model 1.

Due to the structural changes in the economies it is likely that macroeconomic series may be subject to one or multiple structural breaks. Therefore, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) tests which are proposed by Brown et al. (1975) are used to check the stability of the each one of the four models. The results of the CUSUM and CUSUMSQ tests for long run ARDL models are presented in Figure 9. Accordingly, the parameters of the models are reliable and there are not any structural breaks in CUSUMSQ tests; statistics stay within the critical bounds of 5% significance level.

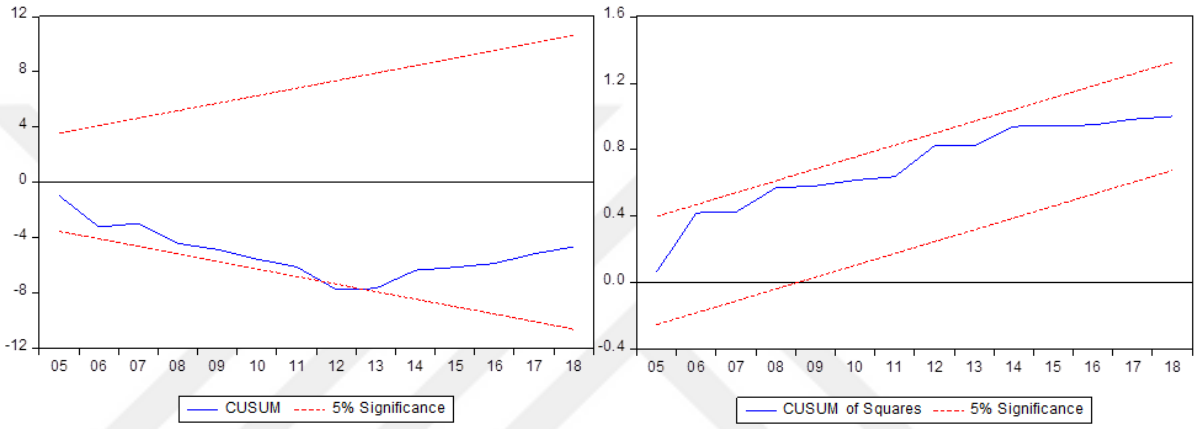
Figure 9: Plot of CUSUM and CUSUMSQ Tests of the Long Run ARDL Models for Model 1, Model 2, Model 3, Model 4



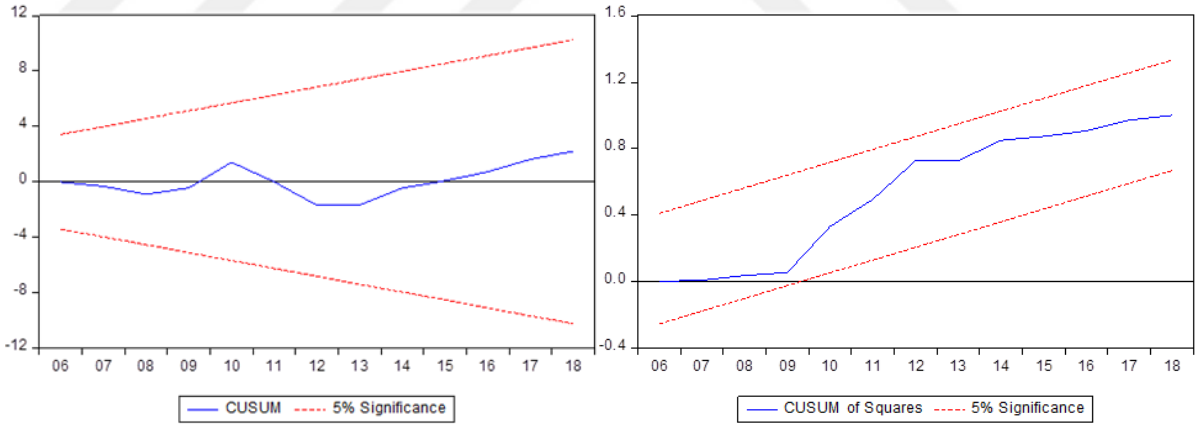
Model 1



Model 2



Model 3



Model 4

Short-term error correction model estimation results obtained by adding a lagged value of the error correction term derived separately for each model to the model and subtracting the one lag level values of the variables from the related equations are presented in Table 11.

Table 11: The Short-Run ARDL Relationships for Model 1, Model 2, Model 3 and Model 4

Model 1 (1, 1, 1, 0, 1, 1, 1, 1); dependent variable: d(unemp)		
Variables	***Coefficient***	***Probability***
d(gov_size)	0.224865	0.5438
d(gdp_per_capita)	-0.095193	0.5608
d(exch_rate)	-0.675012	0.0301**
d(inf)	5.38E-05	0.9994
d(int_rate)	-0.383773	0.0094***
d(school)	-0.164472	0.6664
d(sch_ratio)	0.128181	0.7557
ect1(-1)	-0.975259	0.0007***
Constant	-0.025338	0.5237
Model 2 (1, 1, 0, 0, 1); dependent variable: d(unemp)		
Variables	***Coefficient***	***Probability***
d(gov_size)	1.033348	0.0074***
d(gdp_per_capita)	0.085828	0.6110
d(school)	0.203829	0.5994
d(sch_ratio)	0.813199	0.0644*
ect2(-1)	-0.517905	0.0086***
Constant	-0.073354	0.1090
Model 3 (1, 0, 0, 2, 2); dependent variable: d(unemp)		
Variables	***Coefficient***	***Probability***
d(gov_size)	0.925653	0.0031***
d(exch_rate)	-0.018982	0.9199
d(school)	0.103738	0.8051
d(sch_ratio)	0.798523	0.0721*
ect3(-1)	-0.492471	0.0053***
Constant	-0.063783	0.1499
Model 4 (1, 0, 0, 0, 2, 2); dependent variable: d(unemp)		
Variables	***Coefficient***	***Probability***
d(gov_size)	0.864106	0.0054***
d(exch_rate)	-0.235922	0.2397
d(inf)	-0.142657	0.0328**
d(school)	0.292463	0.4743
d(sch_ratio)	0.579102	0.1926
ect4(-1)	-0.644192	0.0060***
Constant	-0.063799	0.1513

***, ** and * denote significant at the 1%, 5%, 10% levels, respectively.

In the model 1, the coefficient of the error correction term is about -0.975, and this represents the speed of the adjustment. The ECT is negative and statistically significant even at a confidence level of 99 %. Thus, it implies that the unemployment rate converges to the long-run equilibrium by 97.5 % in one period with the speed adjustment via the channel of the other variables in model 1.

In model 2, the coefficient of error correction term is about -0.52 and statistically significant at 1%. In model 3, the coefficient of error correction term is

approximately -0.492 and it indicates that the effect of a shock will adjust at a rate of about 49.2 %. The coefficient of the error correction terms of model 4 are also negative (approximately -0.64) and statistically significant at significance level of 1 %. Thus, it can also be concluded that the adjustment is meaningful in the short-run ARDL relationship.

If short-term relationships between variables are examined that presented at Table 11, the coefficients of the government size are approximately 1.03, 0.92 and 0.86 in model 2, model 3 and model 4, respectively. These coefficients are positive as expected and statistically significant at a confidence level of 99 %. Besides, there is a positive relationship between government size and unemployment rate in model 1 whereas it is not statistically significant in the short term. In model 1, the exchange rate and interest rate have negative relationship with unemployment rate at confidence level of 95 % and 99 %, respectively. The coefficient of schooling ratio in model 2 and model 3 is positive and statistically significant at significance level of 10%. Moreover, the coefficient of inflation is found negative and statistically significant in model 4. The short run relationships are not statistically significant between the rest of the variables and the unemployment rate.

All diagnostic tests for the short run are also examined as it is done for long run in Table 10, and the results are reported in Table 12. Breusch-Godfrey LM, Jarque-Bera and Breusch-Pagan-Godfrey test results show that the estimations for four models pass these diagnostic tests and verify each of the basic assumptions. For instance, in the Breusch-Godfrey LM test the null hypothesis equals that there is no heteroskedasticity. If the Prob (F-Statistic) is greater than the critical value (0.05) the null hypothesis cannot be rejected. F-Statistics calculated for the models are greater than 0.05 thus there is not heteroskedasticity problem.

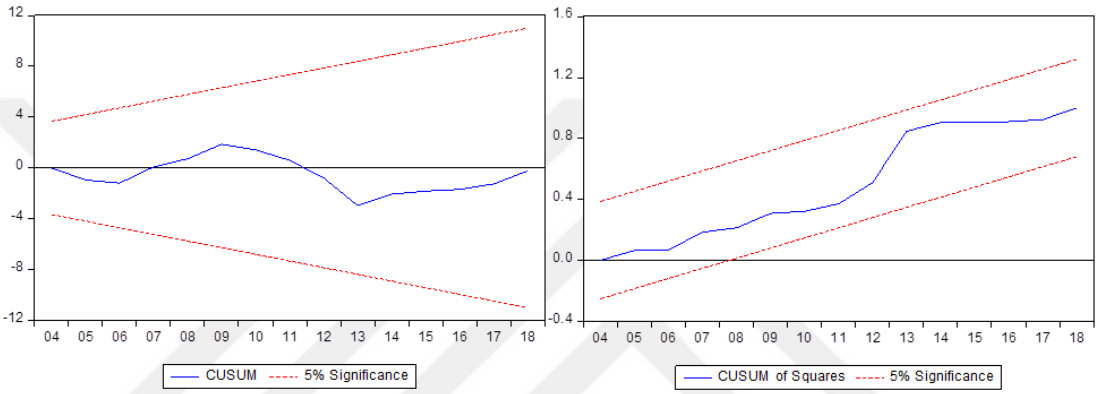
Table 12: Diagnostic Tests of Short Run Error Correction Models of 1, 2, 3 and 4

Diagnostic tests of short run error correction model				
	Model 1	**Model 2**	**Model 3**	**Model 4**
R-squared	0.757396	0.583569	0.587498	0.614226
Breusch-Godfrey LM	1.122877 (0.3549)	0.300633 (0.7444)	0.433730 (0.6555)	1.307545 (0.2996)
Jarque-Bera	0.79547 (0.67184)	83.048238 (0.217813)	3.266977 (0.195247)	2.756345 (0.252039)
Breusch-Pagan-Godfrey	0.995929 (0.4772)	0.057566 (0.9975)	0.115347 (0.9874)	0.266393 (0.9451)

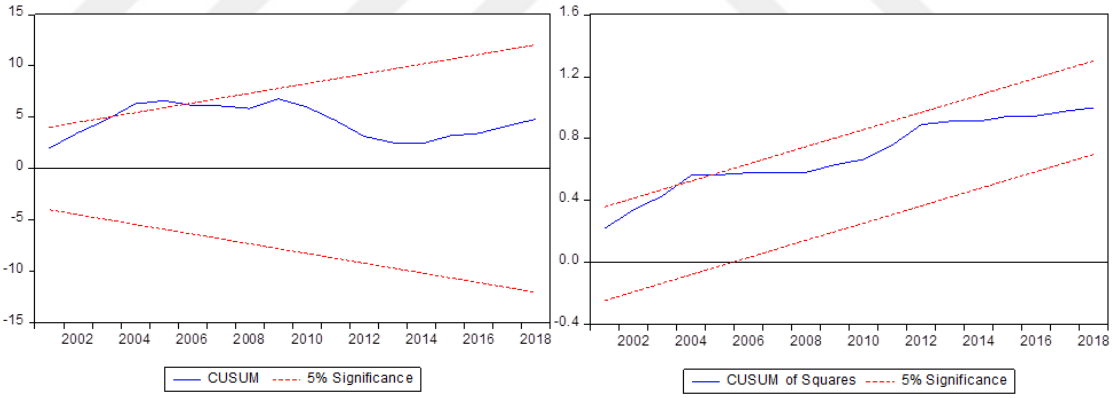
The parentheses indicate the probability values.

Finally, CUSUM and CUSUMSQ tests are used to determine whether the short run or error-correction models undergo structural breaks during the period. The results show the goodness of fit for each three models as presented in Figure 10. The results of the CUSUM and CUSUMSQ tests for model 2 suggest that the residual variance is somewhat stable since the CUSUM and CUSUMSQ are generally within the 5 % significance lines.

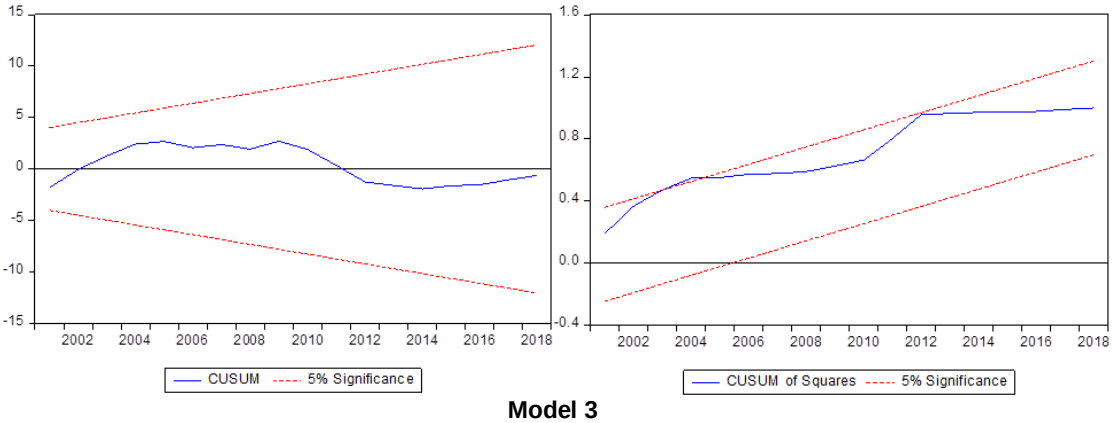
Figure 10: Plot of CUSUM and CUSUMSQ Tests of the Short Run or Error-Correction Models for Model 1, Model 2, Model 3 and Model 4



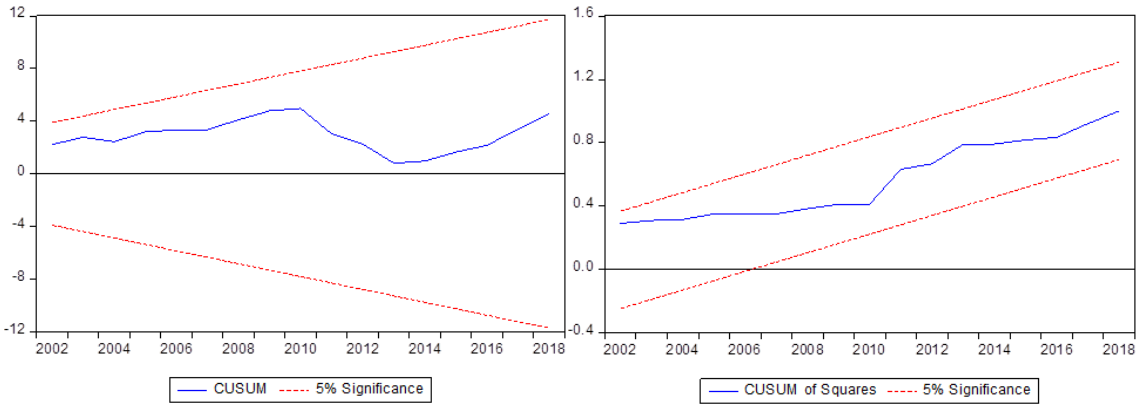
Model 1



Model 2



Model 3



Model 4

5.2.2. Granger Causality Test Results for Models of 1, 2, 3 and 4

The presence of a cointegrated relationship between the variables assures the existence of a "causality" bond in at least one direction. Within the framework of Granger causality test, the direction of interaction between these variables is determined. In this part, Vector Error Correction (VEC) Granger Causality test is applied for models that are existed cointegration. In addition, Pairwise Granger Causality tests are also used for good measure (Appendix 1, 2 and 3).

The VEC causality test applied for model 1 does not give result because of insufficient number of observations when calculated lag value "1" is based on. Therefore, Pairwise Granger Causality test result is shown for model 1 in Table 13. In model 1, there are relationships from the government size, interest rate and schooling ratio to the unemployment rate. There are unidirectional relationships from the unemployment rate to inflation and from schooling ratio to interest rate. In addition, there are relationships from the government size, GDP per capita, inflation and interest rate to the exchange rate.

Table 13: Pairwise Granger Causality Test for Model 1

Null Hypothesis	F-Statistic	Prob.
gov_size does not Granger Cause d(unemp) * d(unemp) does not Granger Cause gov_size	2.92353 0.29747	0.0811 0.7465
d(gdpper_capita) does not Granger Cause d(unemp) d(unemp) does not Granger Cause d(gdpper_capita)	0.89230 2.15906	0.4281 0.1460
d(exch_rate) does not Granger Cause d(unemp) d(unemp) does not Granger Cause d(exch_rate)	0.61207 2.42218	0.5538 0.1187
inf does not Granger Cause d(unemp) d(unemp) does not Granger Cause inf *	0.97821 2.92168	0.3962 0.0812

int_rate does not Granger Cause d(unemp) ** d(unemp) does not Granger Cause int_rate	5.73941 1.63126	0.0125 0.2249
d(school) does not Granger Cause d(unemp) d(unemp) does not Granger Cause d(school)	1.30211 0.12714	0.2977 0.8814
d(sch_ratio) does not Granger Cause d(unemp)*** d(unemp) does not Granger Cause d(sch_ratio)	7.28548 0.81722	0.0052 0.4583
d(gdpper_capita) does not Granger Cause gov_size gov_size does not Granger Cause d(gdpper_capita)	0.64486 1.67071	0.5371 0.2176
d(exch_rate) does not Granger Cause gov_size gov_size does not Granger Cause d(exch_rate) **	1.44173 4.46265	0.2640 0.0277
inf does not Granger Cause gov_size gov_size does not Granger Cause inf	2.29606 0.33084	0.1294 0.7226
int_rate does not Granger Cause gov_size gov_size does not Granger Cause int_rate	2.12962 0.44391	0.1479 0.6484
d(school) does not Granger Cause gov_size gov_size does not Granger Cause d(school)	0.00854 0.10777	0.9915 0.8984
d(sch_ratio) does not Granger Cause gov_size gov_size does not Granger Cause d(sch_ratio)	2.56654 0.85248	0.1062 0.4438
d(exch_rate) does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause d(exch_rate) *	1.15452 3.28291	0.3387 0.0623
inf does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause inf	1.12063 1.55820	0.3490 0.2391
int_rate does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause int_rate	1.22299 0.59071	0.3190 0.5649
d(school) does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause d(school)	0.18291 1.52599	0.8345 0.2457
d(sch_ratio) does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause d(sch_ratio)	1.38546 0.54610	0.2771 0.5890
inf does not Granger Cause d(exch_rate) ** d(exch_rate) does not Granger Cause inf	3.85680 0.08772	0.0416 0.9164
int_rate does not Granger Cause d(exch_rate) ** d(exch_rate) does not Granger Cause int_rate	6.04558 0.84869	0.0104 0.4453
d(school) does not Granger Cause d(exch_rate) d(exch_rate) does not Granger Cause d(school)	0.06504 2.54571	0.9373 0.1079
d(sch_ratio) does not Granger Cause d(exch_rate) d(exch_rate) does not Granger Cause d(sch_ratio)	0.01522 0.82680	0.9849 0.4543
int_rate does not Granger Cause inf inf does not Granger Cause int_rate	0.34759 1.32813	0.7110 0.2897
d(school) does not Granger Cause inf inf does not Granger Cause d(school)	0.43503 2.00187	0.6543 0.1657
d(sch_ratio) does not Granger Cause inf inf does not Granger Cause d(sch_ratio)	1.92078 0.84800	0.1770 0.4456
d(school) does not Granger Cause int_rate int_rate does not Granger Cause d(school)	0.15665 0.19956	0.8562 0.8210
d(sch_ratio) does not Granger Cause int_rate** int_rate does not Granger Cause d(sch_ratio)	5.57295 0.43845	0.0138 0.6521
d(sch_ratio) does not Granger Cause d(school) d(school) does not Granger Cause d(sch_ratio)	0.04946 0.03919	0.9519 0.9617

(**) denotes the rejection of the hypothesis at 5% significance level, (*) denotes the rejection of the hypothesis at 10% significance level. Rejection means there is causality between the variables. Lag value is 2.

Since there are cointegrations in model 2, model 3 and model 4, VEC Granger causality test is applied for them. Their results are presented in Table 14. In model 2, there is a one-way causality from government size to the unemployment rate at 5%

significance level. According to test results for model 3, the exchange rate Granger-causes government size without a feedback effect and it appears to be statistically significant at the 1% level in the short run.

In model 4, there is unidirectional causal relation from government size to unemployment rate at 1% significance level. In addition, it appears that the exchange rate and inflation rate Granger-cause the school enrollment and inflation Granger-causes the exchange rate. Apart from these, no causal relationship was found between the other variables in model 4.

Table 14: VEC Granger Causality Test Result for Model 2, Model 3 and Model 4

Model 2 Lag:1			
Dependent Variable: d(unemp)		**Dependent Variable: d(gov_size)**	
	Chi-sq		Chi-sq
d(gov_size)	4.289255**	d(unemp)	0.106438
d(gdpper_capita)	0.422697	d(gdpper_capita)	0.113065
d(school)	0.883494	d(school)	1.049111
d(sch_ratio)	0.103776	d(sch_ratio)	0.262088
Dependent Variable: d(gdpper_capita)		**Dependent Variable: d(school)**	
	Chi-sq		Chi-sq
d(unemp)	2.36639	d(unemp)	0.073708
d(gov_size)	0.991545	d(gov_size)	0.397063
d(school)	0.079902	d(gdpper_capita)	0.330286
d(sch_ratio)	0.695185	d(sch_ratio)	0.00209
Dependent Variable: d(sch_ratio)			
	Chi-sq		
d(unemp)	0.016911		
d(gov_size)	0.000452		
d(gdpper_capita)	0.056058		
d(school)	0.08859		
Model 3 Lag:1			
Dependent Variable: d(unemp)		**Dependent Variable: d(gov_size)**	
	Chi-sq		Chi-sq
d(gov_size)	1.42999	d(unemp)	0.464712
d(exch_rate)	0.396642	d(exch_rate)	7.575561***
d(school)	0.034199	d(school)	0.065715
d(sch_ratio)	0.121333	d(sch_ratio)	0.114729
Dependent Variable: d(exch_rate)		**Dependent Variable: d(school)**	
	Chi-sq		Chi-sq
d(unemp)	2.086931	d(unemp)	0.014519
d(gov_size)	1.627716	d(gov_size)	0.095553
d(school)	0.039540	d(exch_rate)	2.465487
d(sch_ratio)	0.139719	d(sch_ratio)	0.209082
Dependent Variable: d(sch_ratio)			
	Chi-sq		

d(unemp)	0.001515
d(gov_size)	0.000607
d(exch_rate)	0.754676
d(school)	0.288436

Model 4 Lag:1			
Dependent Variable: d(unemp)		**Dependent Variable: d(gov_size)**	
	Chi-sq		Chi-sq
d(gov_size)	7.650868***	d(unemp)	0.903052
d(exch_rate)	0.003805	d(exch_rate)	2.223884
d(inf)	2.508165	d(inf)	0.088313
d(school)	0.47694	d(school)	0.049948
d(sch_ratio)	0.156666	**d(sch_ratio)**	0.141123
Dependent Variable: d(inf)		**Dependent Variable: d(school)**	
	Chi-sq		Chi-sq
d(unemp)	0.348761	d(unemp)	0.341015
d(gov_size)	0.030344	d(gov_size)	0.153168
d(exch_rate)	0.374534	d(exch_rate)	4.598004**
d(school)	0.491145	d(inf)	2.934232*
d(sch_ratio)	0.000257	d(sch_ratio)	0.104021
Dependent Variable: d(exch_rate)		**Dependent Variable: d(sch_ratio)**	
	Chi-sq		Chi-sq
d(unemp)	0.210058	d(unemp)	0.712342
d(gov_size)	0.357547	d(gov_size)	0.745011
d(inf)	3.218026*	d(exch_rate)	0.41646
d(school)	0.171583	d(inf)	0.018161
d(sch_ratio)	0.005108	d(school)	0.473745

***, ** and * denote probability significant at the 1%, 5%, 10% levels, respectively.

5.3.THE RESULTS OF THE MODELS FOR YOUTH UNEMPLOYMENT RATE

5.3.1. ARDL Test Results for Models of 1, 2, 3 and 4

The optimal lag length for these ARDL models 6, 7 and 8 was identified to be 2 by considering the AIC, SC and HQ criterion. The appropriate lag length for the model 5 is “1” (Table 15).

Table 15: The Appropriate Lag Length for the ARDL Models of 5, 6, 7 and 8

VAR Lag Order Selection Criteria				
	Lag	**AIC**	**SC**	**HQ**
Model 5	0	-8.439240	-8.046555	-8.335060
	1	**-18.24427***	**-14.71011***	**-17.30665***
Model 6	0	-5.690224	-5.394008	-5.615726
	1	-12.83205	-10.75854	-12.31057

	2	**-16.42961***	**-12.57881***	**-15.46115***
Model 7	0	-6.151988	-5.905142	-6.089907
	1	-12.95512	-11.47404	-12.58263
	2	**-15.15084***	**-12.43553***	**-14.46795***
Model 8	0	-5.094418	-4.847571	-5.032337
	1	-12.91010	**-11.42902***	-12.53761
	2	**-13.28616***	-10.57085	**-12.60327***

* indicates lag order selected by the criterion

The estimation results of the ARDL models (model 5, model 6, model 7 and model 8) created for the youth unemployment are presented in Table 16. In this table, diagnostic tests statistics of ARDL long run models are also shown. These results show that there is no autocorrelation and heteroskedasticity problem in the models. In addition, the residual terms of the models are normally distributed.

Table 16: The Estimates of the ARDL Models (Dependent Variable: Youth Unemployment Rate)

Variables	**Model 5**		**Model 6**		**Model 7**		**Model 8**	
	Coefficient	Prob.	Coefficent	Prob.	Coefficient	Prob.	Coefficient	Prob.
youth (-1)	0.592759	0.0006***	0.258612	0.0628	0.208222	0.1125	0.194510	0.1778
gov_size	0.226777	0.4638	0.653126	0.0144**	0.571744	0.0059***	0.625272	0.0048***
gov_size (-1)	0.487581	0.0567*						
gdp_per_capita	-0.382949	0.0212**					-0.016915	0.787
exch_rate	0.219154	0.4276	0.038941	0.7723	-0.095160	0.3371		
exch_rate(-1)	0.563346	0.0092***	-0.178652	0.2392				
inf	-0.200335	0.0551	-0.009022	0.8232				
inf (-1)	-0.186633	0.0212**	0.101193	0.0907*				
inf (-2)			-0.081894	0.0992*				
int_rate	0.068339	0.6007						
int_rate(-1)	0.519395	0.0002***						
school	0.395081	0.1745	0.252265	0.3614	0.206012	0.3971	0.191539	0.4437
school (-1)	-0.421715	0.2811	-0.028301	0.9339	0.120333	0.697	0.077881	0.8055
school (-2)			0.885878	0.0043***	0.720548	0.0091***	0.729467	0.0102**

sch_ratio	0.475985	0.0194**	0.589237	0.051*	0.539201	0.0583*	0.499379	0.0996*
sch_ratio(-1)			-0.19878	0.6333	-0.054119	0.8932	-0.089515	0.8292
sch_ratio(-2)			-0.633519	0.0828*	-0.708792	0.0497**	-0.611392	0.0807*
Lag	1, 1, 0, 1, 1, 1, 1, 0		1, 0, 1, 2, 2, 2		1, 0, 0, 2, 2		1, 0, 0, 2, 2	
Numbers of observations	24		23		23		23	
R-squared	0.958058		0.960842		0.938832		0.934868	
Diagnostic Tests Statistics (probability)								
Breusch-Godfrey LM	0.516235 (0.4889)		1.832305 (0.2089)		0.309433 (0.7395)		0.608159 (0.5603)	
Jarque-Bera	2.026308 (0.363072)		1.280907 (0.527053)		0.869956 (0.640838)		0.71417 (0.699713)	
Breusch-Pagan-Godfrey	0.708036 (0.7247)		1.050116 (0.484)		1.813723 (0.1595)		0.635557 (0.7493)	

***, ** and * denote significant at the 1%, 5%, 10% levels, respectively.

After this stage, the existence of cointegration between the variables is tested by using the bounds test. The cointegration results for the models based on the youth unemployment rate are reported in Table 17. In the bounds test especially F-statistics results are taken in basis. The estimated F-statistics for the model 5, model 6, model 7 and model 8 values are approximately 7.60, 12.65, 14.90 and 13.81 respectively and they appear above the upper bound critical values at 1 %. This indicates that there is a long-run equilibrium relationship among variables in these four models.

The t-statistic for the ARDL/bounds test for model 6 and model 7 are greater than upper bound critical values at 1 % significance level when these are examined as absolute values. The t-statistic for the ARDL/bounds test is absolute value of 5.875785 for model 8, which exceeds all the critical values for the upper bounds in absolute terms also. However, t-statistic of model 5 lies between lower and upper bound critical value as absolute terms. According to the t- statistic results, it is found that there is a long-run equilibrium relationship in these models except model 5. Since t-statistic of model 5 is not below the lower bound critical values and it is in the uncertainty zone, it is accepted that F-statistics results.

Table 17: Results of the Bounds Test of Cointegration; Model 5, Model 6, Model 7, Model 8

	F-statistic	*Significance level*	*Bound critical values I (0)*	*I (1)*
Model 5 k=7 N=24	7.596828***	%1	2.54	3.91
		%5	1.97	3.18
		%10	1.7	2.83
	t-statistic			

	-3.233685	%1	-2.58	-4.88
		%5	-1.95	-4.23
		%10	-1.62	-3.9
Model 6 k=5 N=23	F-statistic			
	12.64923***	%1	2.82	4.21
		%5	2.14	3.34
		%10	1.81	2.93
	t-statistic			
	-5.999316***	%1	-2.58	-4.44
		%5	-1.95	-3.83
		%10	-1.62	-3.49
Model 7 k=4 N=23	F-statistic			
	14.8912***	%1	3.07	4.44
		%5	2.26	3.48
		%10	1.9	3.01
	t-statistic			
	-6.438829***	%1	-2.58	-4.23
		%5	-1.95	-3.6
		%10	-1.62	-3.26
Model 8 k=4 N=23	F-statistic			
	13.81442***	%1	3.07	4.44
		%5	2.26	3.48
		%10	1.9	3.01
	t-statistic			
	-5.875785***	%1	-2.58	-4.23
		%5	-1.95	-3.6
		%10	-1.62	-3.26

***, ** and * denote probability significant at the 1%, 5%, 10% levels, respectively. Lower and upper bound critical values were determined by EViews 10 package program as a result of "Bounds Test". k is the number of variables. N is the number of observations. The ARDL models are estimated by using an no constant and no trend (Case I).

As the next step, the long-run coefficients of the ARDL model are estimated in the manner that the last four models and they are given in Table 18. According to the findings for long run relationship in model 5, a 1 % increase in the size of government is expected to increase the youth unemployment rate by approximately 1.75 % at 90 % confidence level. The coefficient of the inflation rate is about -0.95 at 5 % significant level. Moreover, the long run coefficients of the interest rate and exchange rate are positive and statistically significant. Even though there is a negative relationship between the GDP per capita and the youth unemployment rate in model 5, this relationship is not statistically significant.

According to results of model 6, a 1% increase in the government size rise the youth unemployment rate by about 0.89% at 5% significance level. There is negative and statistically significant relationship between schooling ratio and the youth unemployment rate. In addition, a 1 % change in school enrollment will result in a long run change of approximately 1.50 % in the youth unemployment rate.

In model 7, a positive significant relationship is found between government size and the youth unemployment rate at 95 % confidence level. There is a positive

relationship between the school enrollment and the youth unemployment rate. Moreover, a %1 increase schooling ratio would decrease the youth unemployment rate at 99% confidence level in the long run.

In model 8, there is also positive and statistically relationship between government size and the youth unemployment rate at 1% significance level. A 1% raise in school enrollment is expected to increase youth unemployment rate by about 1.24% at 1% significance level. Moreover, increase in schooling ratio would lead to decrease in the youth unemployment rate.

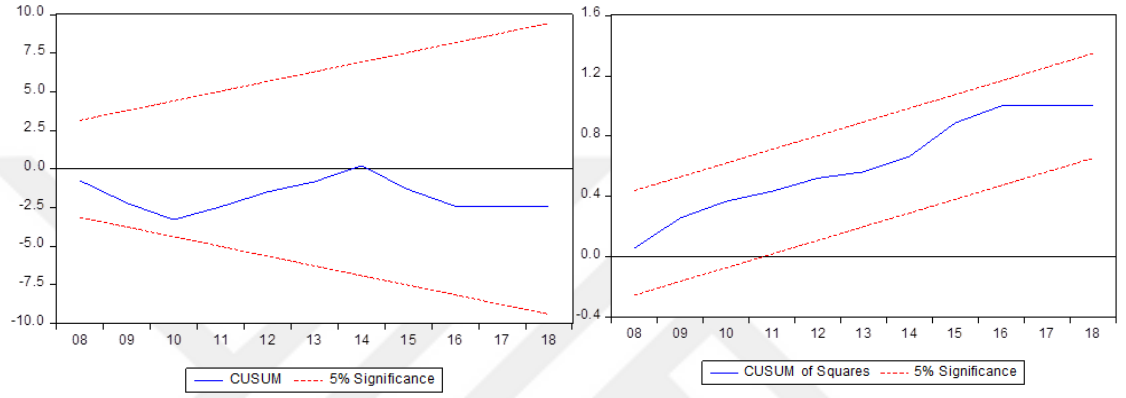
Table 18: The Long Run ARDL Relationships for Model 5, Model 6, Model 7 and Model 8

Model 5 (2, 1, 2, 2, 1, 1, 2) Dependent Variable: d(youth)		
Variables	***Coefficient***	***Probability***
gov_size	1.754143	0.0959*
gdp_per_capita	-0.940350	0.1029
exch_rate	1.921467	0.0731*
inf	-0.950219	0.0369**
int_rate	1.443210	0.0446**
school	-0.065401	0.9073
sch_ratio	1.168805	0.1029
Model 6 (1, 0, 1, 2, 2, 2) Dependent Variable: d(youth)		
Variables	***Coefficient***	***Probability***
gov_size	0.880950	0.0325**
exch_rate	-0.188445	0.2610
inf	0.013860	0.7365
school	1.496979	0.0002***
sch_ratio	-0.327847	0.0059***
Model 7 (2, 0, 2, 2) Dependent Variable: d(youth)		
Variables	***Coefficient***	***Probability***
gov_size	0.722101	0.0109**
exch_rate	-0.120185	0.3595
school	1.322205	0.0000***
sch_ratio	-0.282542	0.0020***
Model 8 (1, 1, 0, 0) Dependent Variable: d(youth)		
Variables	***Coefficient***	***Probability***
gov_size	0.776263	0.0077***
gdp_per_capita	-0.020999	0.7914
school	1.240098	0.0000***
sch_ratio	-0.250194	0.0057***

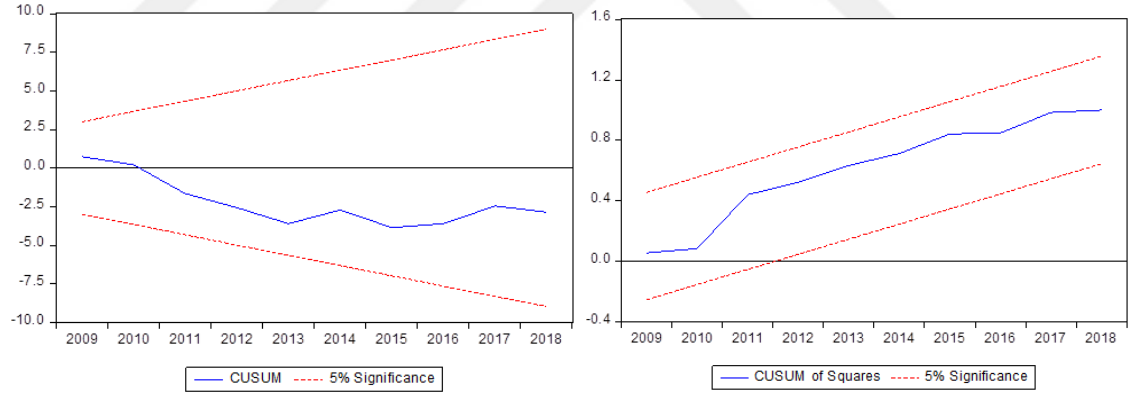
***, ** and * denote significant at the 1%, 5%, 10% levels, respectively.

The CUSUM and CUSUMSQ stability tests are undertaken to assess the parameter consistence for long term models. These test results are reported in Figure 11. According to this figure, both the plots of CUSUM and CUSUMSQ statistics stay within the critical bounds of 5 per cent significance level. All four of these models are stable in the long run, in other words there are not any structural breaks.

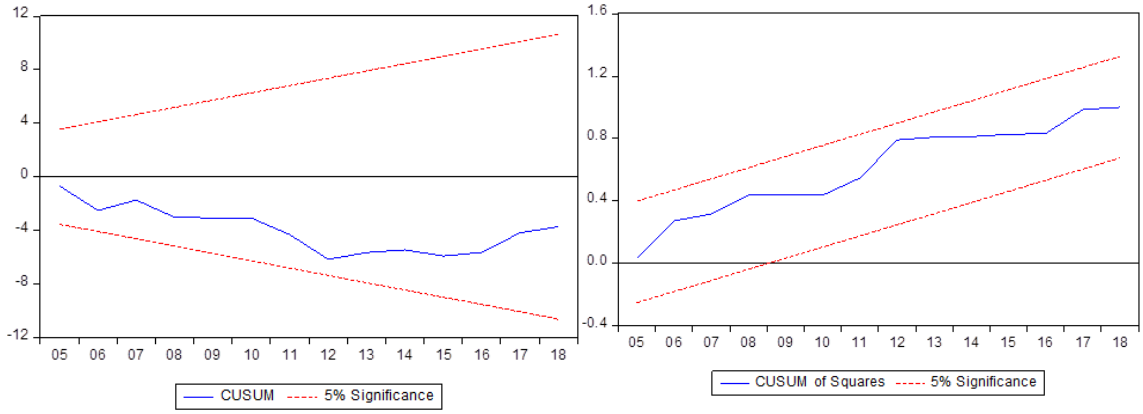
Figure 11: Plot of CUSUM and CUSUMSQ Tests of the Long Run ARDL Models for Model 5, Model 6, Model 7, Model 8



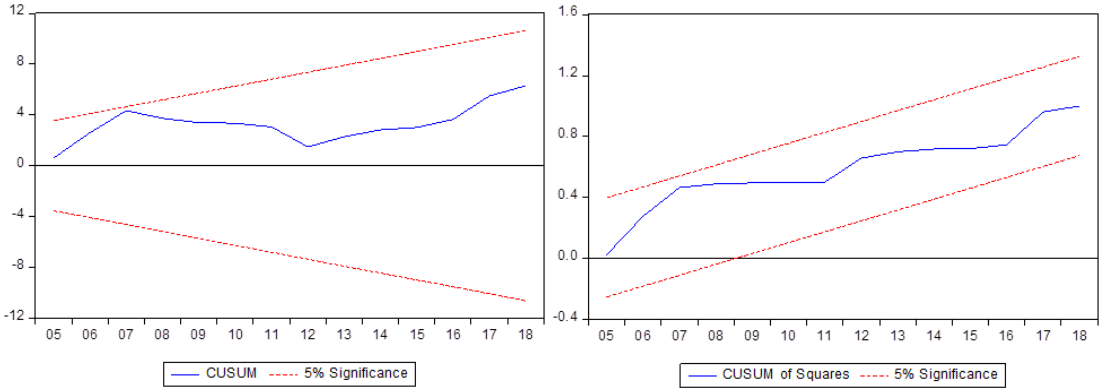
Model 5



Model 6



Model 7



Model 8

After examining the long-term results, one period lagged value of the error terms series obtained from the long-term relationship is added to the models in order to examine the short run relationship. Short term error correction models are created in the same way as for the models of 1, 2, 3 and 4 and their estimation results are presented in Table 19.

The coefficient of the error correction term of the model 5 is approximately -1.09 at 1% significance level. It means that the youth unemployment rate converges to the long-run equilibrium by 109.46% in a period in that model. In model 6, model 7 and model 8 the coefficients of ECT about -0.70, -0.50 and -0.55, respectively. The error correction terms are statistically significant and negative as expected in all the four models. In other words, the short-term deviations disappear, and the series converge again to the long-run equilibrium value.

Table 19: The Short Run ARDL Relationships for Model 5, Model 6, Model 7 and Model 8

Model 5 (1, 1, 0, 1, 1, 1, 1, 0) Dependent Variable: d(youth)		
Variables	***Coefficient***	***Probability***
d(gov_size)	0.06474	0.8407
d(gdp_per_capita)	0.021088	0.8858
d(exch_rate)	-0.788575	0.0075***
d(inf)	0.015524	0.8126
d(int_rate)	-0.386984	0.0038***
d(school)	-0.249025	0.4528
d(sch_ratio)	-0.196561	0.5858
ect5(-1)	-1.094652	0.0002***
Constant	-0.003424	0.9206
Model 6 (1, 0, 1, 2, 2, 2) Dependent Variable: d(youth)		
Variables	***Coefficient***	***Probability***
d(gov_size)	0.63356	0.0216**

d(exch_rate)	-0.224746	0.2268
d(inf)	-0.138517	0.0255**
d(school)	0.186114	0.6203
d(sch_ratio)	0.303054	0.4499
ect6(-1)	-0.702176	0.0060***
Constant	-0.037903	0.3455
Model 7 (1, 0, 0, 2, 2) Dependent Variable: d(youth)		
Variables	***Coefficient***	***Probability***
d(gov_size)	0.687969	0.0165**
d(exch_rate)	-0.01556	0.9316
d(school)	0.018013	0.9643
d(sch_ratio)	0.508893	0.2198
ect7(-1)	-0.500857	0.0094***
Constant	-0.03757	0.3665
Model 8 (1, 0, 0, 2, 2) Dependent Variable: d(youth)		
Variables	***Coefficient***	***Probability***
d(gov_size)	0.825513	0.0227**
d(gdp_per_capita)	0.121998	0.4633
d(school)	0.102157	0.7838
d(sch_ratio)	0.500729	0.2226
ect8(-1)	-0.554131	0.0133**
Constant	-0.047786	0.2685

***, ** and * denote significant at the 1%, 5%, 10% levels, respectively.

Table 19 also indicates the short-term relationship between independent variables and the youth unemployment rate. In model 5, a 1% increase in the exchange rate and interest rate would decrease the youth unemployment rate approximately by 0.79 % and 0.39 %, respectively. There is a negative relationship between inflation and the youth unemployment rate in model 6. Moreover, the coefficient of the government size is positive and statistically significant in model 6. According to result of model 7, a 1% raise in the government size would increase the youth unemployment rate approximately by 0.69% in the short run. In model 8, a 1% change in the size of government will result in the short run change of approximately 0.82 % in the youth unemployment rate. There is no statistically significant relationship in the short term between the youth unemployment rate and the rest of the variables that are explained for these four models.

The diagnostic tests are also performed for short-term error correction models and are presented in Table 20. According to the diagnostic test results of the models provide strong evidence that the estimations are successful. The statistics obtained from autocorrelation, heteroskedasticity and normality tests are convenient.

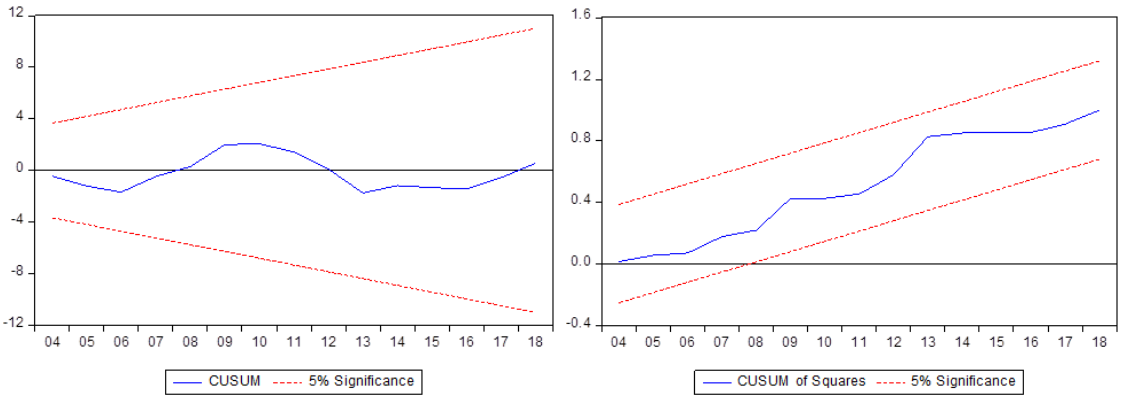
Table 20: Diagnostic Tests of Short Run or Error Correction Models of 5, 6, 7 and 8

Diagnostic tests statistics (probability)				
	Model 5	**Model 6**	**Model 7**	**Model 8**
R-squared	0.748681	0.554985	0.487526	0.481716
Breusch-Godfrey LM	0.748935 (0.4014)	0.882361 (0.4342)	0.026294 (0.9741)	0.058629 (0.9433)
Jarque-Bera	0.795430 (0.671854)	1.370642 (0.503929)	1.712176 (0.424821)	1.395573 (0.497686)
Breusch-Pagan-Godfrey	0.629476 (0.7415)	0.378047 (0.8829)	0.178710 (0.9671)	0.125959 (0.9846)

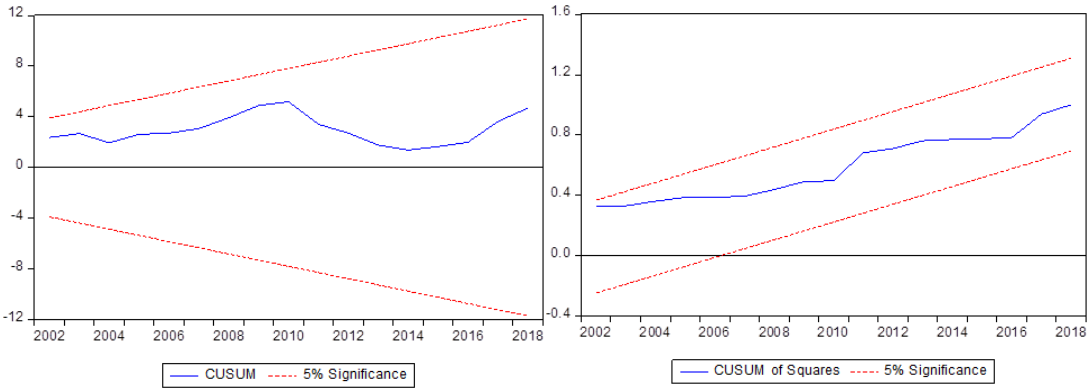
The parentheses indicate the probability values.

To further confirm the stability of the estimated short run or error correction model, once again, CUSUM and the CUSUMSQ test methods are used to examine the recursive residuals, which are indicated in Figure 12. Both the CUSUM and CUSUMSQ remain within the area restricted by the lines at the 5% significance level; therefore, the estimated short run or error correction models are effective with stable recursive residuals for models 5, 6 and 7. The results of these tests for model 8 show that the residual variance is somewhat stable since the CUSUM and CUSUMSQ are generally within the 5 % significance lines.

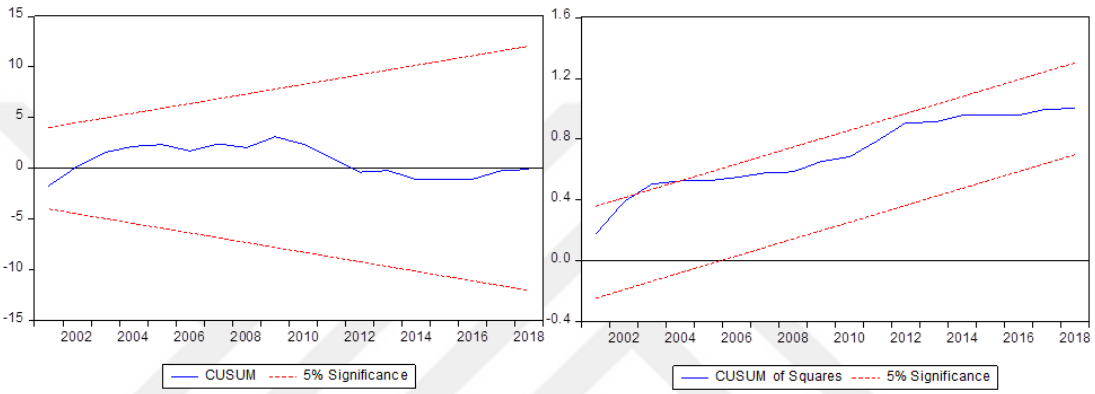
Figure 12: Plot of CUSUM and CUSUMSQ Tests of the Short Run or Error-Correction Models for Models of 5, 6, 7 and 8



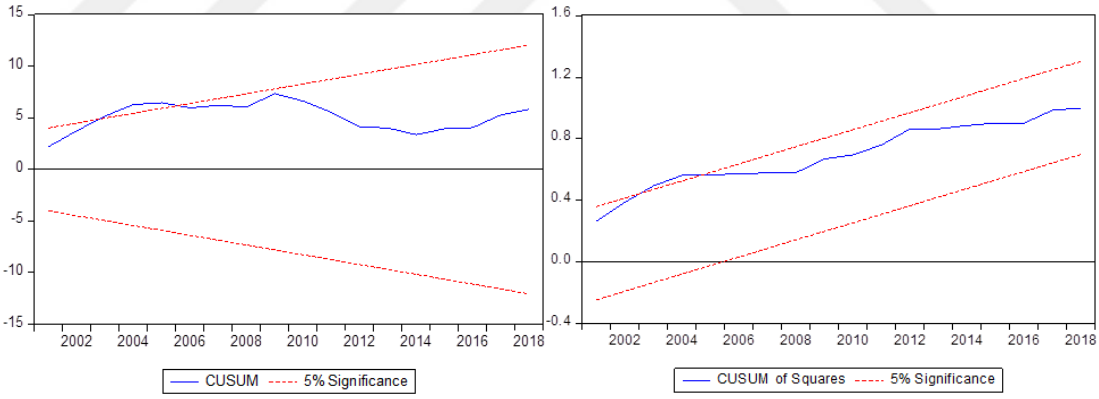
Model 5



Model 6



Model 7



Model 8

5.3.2. Granger Causality Test Results for Models of 5, 6, 7 and 8

For the models created for the youth unemployment rate, the same steps taken for the models created for the unemployment rate were followed. For model 5 that have all variables, VEC Granger causality test is not implemented in consequence of insufficient number of observations warning in EViews program. Thus, the one another Granger causality test is used for model 5 (Table 21). This test

is also made for the rest of the models and its results are presented in Appendix 4, 5, and 6.

According to the Table 21, it exists one-way Granger causality from the youth unemployment rate to GDP per capita. It is found that there is unidirectional relationship from inflation and interest rate to government size at 5% significance level. There is bilateral relationship between government size and schooling ratio. Furthermore, interest rate Granger-causes the exchange rate and exchange rate Granger-causes school enrollment for model 5. There are one-way causal relationships from inflation to schooling ratio and from schooling ratio to interest rate.

Table 21: Pairwise Granger Causality Test for Model 5

Null Hypothesis	F-Statistic	Prob.
gov_size does not Granger Cause d(youth) d(youth) does not Granger Cause gov_size	0.46785 0.39067	0.5018 0.539
d(gdpper_capita) does not Granger Cause d(youth) d(youth) does not Granger Cause d(gdpper_capita) **	0.31025 5.45372	0.5837 0.0301
d(exch_rate) does not Granger Cause d(youth) d(youth) does not Granger Cause d(exch_rate)	1.03950 1.25682	0.3201 0.2755
inf does not Granger Cause d(youth) d(youth) does not Granger Cause inf	0.46079 0.33519	0.505 0.5691
int_rate does not Granger Cause d(youth) d(youth) does not Granger Cause int_rate	0.8672 2.65188	0.3628 0.1191
d(school) does not Granger Cause d(youth) d(youth) does not Granger Cause d(school)	0.079 0.03097	0.7815 0.8621
d(sch_ratio) does not Granger Cause d(youth) d(youth) does not Granger Cause d(sch_ratio)	0.09459 0.29208	0.7616 0.5949
d(gdpper_capita) does not Granger Cause gov_size gov_size does not Granger Cause d(gdpper_capita)	0.37517 0.00483	0.5471 0.9453
d(exch_rate) does not Granger Cause gov_size gov_size does not Granger Cause d(exch_rate)	2.68111 2.49914	0.1172 0.1296
inf does not Granger Cause gov_size ** gov_size does not Granger Cause inf	6.32819 0.02172	0.0201 0.8843
int_rate does not Granger Cause gov_size ** gov_size does not Granger Cause int_rate	5.61936 0.00446	0.0274 0.9474
d(school) does not Granger Cause gov_size gov_size does not Granger Cause d(school)	0.00343 0.09181	0.9539 0.765
d(sch_ratio) does not Granger Cause gov_size ** gov_size does not Granger Cause d(sch_ratio) *	6.10165 3.11611	0.0226 0.0928
d(exch_rate) does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause d(exch_rate)	0.13191 0.46992	0.7203 0.5009
inf does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause inf	0.11463 2.45699	0.7385 0.1327
int_rate does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause int_rate	0.59197 0.92822	0.4507 0.3468
d(school) does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause d(school)	0.36603 0.54236	0.552 0.47
d(sch_ratio) does not Granger Cause d(gdpper_capita) d(gdpper_capita) does not Granger Cause d(sch_ratio)	0.12372 0.97981	0.7287 0.3341

inf does not Granger Cause d(exch_rate) d(exch_rate) does not Granger Cause inf	1.86239 0.14686	0.1875 0.7056
int_rate does not Granger Cause d(exch_rate) * d(exch_rate) does not Granger Cause int_rate	3.64544 0.73621	0.0707 0.401
d(school) does not Granger Cause d(exch_rate) d(exch_rate) does not Granger Cause d(school) *	0.00061 3.84865	0.9805 0.0639
d(sch_ratio) does not Granger Cause d(exch_rate) d(exch_rate) does not Granger Cause d(sch_ratio)	0.07031 1.60371	0.7936 0.2199
int_rate does not Granger Cause inf inf does not Granger Cause int_rate	0.00248 2.90488	0.9608 0.1031
d(school) does not Granger Cause inf inf does not Granger Cause d(school)	0.03793 1.16584	0.8476 0.2931
d(sch_ratio) does not Granger Cause inf inf does not Granger Cause d(sch_ratio) *	1.03901 2.98464	0.3202 0.0995
d(school) does not Granger Cause int_rate int_rate does not Granger Cause d(school)	0.26150 0.20923	0.6147 0.6523
d(sch_ratio) does not Granger Cause int_rate *** int_rate does not Granger Cause d(sch_ratio)	11.4401 1.87954	0.003 0.1856
d(sch_ratio) does not Granger Cause d(school) d(school) does not Granger Cause d(sch_ratio)	0.00083 0.01807	0.9773 0.8944

(**) denotes the rejection of the hypothesis at 5% significance level, (*) denotes the rejection of the hypothesis at 10% significance level. Rejection means there is causality between the variables. Lag value is 2.

VEC Granger causality tests that are applied for model 6, model 7 and model 8 are indicated in Table 22. Test results show that there is one-way causality from the exchange rate to the government size at 1% significance level in model 6. Moreover, there are unidirectional relationships from inflation rate to the exchange rate, from inflation to school enrollment.

In model 7, the exchange rate Granger-causes to government size at 1% significance level just as model 6. In model 8, there is one-way causality from the youth unemployment rate to GDP per capita at 10% significance level. Apart from this, there is not any causal relationship between the other variables in these three models.

Table 22: VEC Granger Causality Test Result for Model 6, Model 7 and Model 8

Model 6 lag:1			
Dependent Variable: d(youth)		**Dependent Variable: d(gov_size)**	
	Chi-sq		Chi-sq
d(gov_size)	2.525848	d(youth)	1.8569
d(exch_rate)	0.001997	d(exch_rate)	6.871766***
d(inf)	1.55489	d(inf)	0.226813
d(school)	0.218618	d(school)	0.109178
d(sch_ratio)	8.72E-05	d(sch_ratio)	0.220134
Dependent Variable: d(exch_rate)		**Dependent Variable: d(inf)**	
	Chi-sq		Chi-sq
d(youth)	0.033159	d(youth)	0.320501

d(gov_size)	1.829554	d(gov_size)	0.021858
d(inf)	4.412817**	d(exch_rate)	0.361714
d(school)	0.400564	d(school)	0.615099
d(sch_ratio)	0.045112	d(sch_ratio)	0.056383
Dependent Variable: d(school)		**Dependent Variable: d(sch_ratio)**	
	Chi-sq		Chi-sq
d(youth)	0.300067	d(youth)	0.263840
d(gov_size)	0.080227	d(gov_size)	0.586606
d(exch_rate)	3.931294	d(exch_rate)	0.137462
d(inf)	2.765545*	d(inf)	0.000352
d(sch_ratio)	0.095101	d(school)	0.361432
Model 7 lag:1			
Dependent Variable: d(youth)		**Dependent Variable: d(gov_size)**	
	Chi-sq		Chi-sq
d(gov_size)	0.284977	d(youth)	0.587521
d(exch_rate)	0.428626	d(exch_rate)	8.36027***
d(school)	0.023355	d(school)	0.034647
d(sch_ratio)	0.001115	d(sch_ratio)	0.280483
Dependent Variable: d(exch_rate)		**Dependent Variable: d(school)**	
	Chi-sq		Chi-sq
d(youth)	1.080515	d(youth)	0.008914
d(gov_size)	2.32822	d(gov_size)	0.109825
d(school)	0.084519	d(exch_rate)	2.06549
d(sch_ratio)	0.001124	d(sch_ratio)	0.174332
Dependent Variable: d(sch_ratio)			
	Chi-sq		
d(youth)	0.006199		
d(gov_size)	0.011074		
d(exch_rate)	0.829017		
d(school)	0.268301		
Model 8 lag:1			
Dependent Variable: d(youth)		**Dependent Variable: d(gov_size)**	
	Chi-sq		Chi-sq
d(gov_size)	1.790121	d(youth)	0.412436
d(gdpper_capita)	0.579984	d(gdpper_capita)	0.491454
d(school)	0.548558	d(school)	1.347402
d(sch_ratio)	0.251622	d(sch_ratio)	0.455119
Dependent Variable: d(gdpper_capita)		**Dependent Variable: d(school)**	
	Chi-sq		Chi-sq
d(youth)	3.184987*	d(youth)	0.017021
d(gov_size)	1.28288	d(gov_size)	0.540922
d(school)	0.101818	d(gdpper_capita)	0.207929
d(sch_ratio)	0.365487	d(sch_ratio)	0.008431
Dependent Variable: d(sch_ratio)			
	Chi-sq		
d(youth)	0.035435		
d(gov_size)	0.000154		
d(gdpper_capita)	0.080448		
d(school)	0.049134		

***, ** and * denote probability significant at the 1%, 5%, 10% levels, respectively.

CONCLUSION

Unemployment occurs when individuals cannot find a job although, they are looking for in the current market conditions despite their ability and desire to work. It is a multidirectional problem that brings with many inefficiencies such as injustice of income, regional disequilibrium and inefficient allocation of resources (Çelikay, 2017: 207). High unemployment leads to production below the potential production level. This situation causes labor to remain ineffectual, which is a valuable factor for production in economies with insufficient resources, especially for developing countries. Thus, unemployment is seen as a priority problem for developing economies. States try to take measures to solve unemployment, which is one of the common problems of both developed and developing economies.

There is no consensus about the debate on government interventions and on the phenomenon of unemployment in schools of economic thought. According to the classical approach, there will be a supply that constitutes its own demand in the market thus unemployment will not be a long-term phenomenon. It will only arise depending on short-term fluctuations. According to the Keynesian view, the reason for unemployment is the inadequacy of demand and the supply in the labor market is not met by the current labor demand. According to the Neo-classical approach, which defines unemployment as temporary and voluntary, the problem of unemployment will be solved in the market spontaneously without the need for government intervention (Bölükbaş 2018a: 6)

In addition to different theoretical approaches to government size and unemployment, there are also studies that directly investigate the relationship between size of government and unemployment empirically. Abrams (1999) is a precursor of study investigating the direct relationship between the economic size of the government and unemployment. In the study for 20 OECD countries during the period of 1984-1993, Abrams (1999) found that unemployment increased parallel to the raise of the government size. This phenomenon, referred to as the Abrams curve, is based on a positive relationship between government size and unemployment. This study investigated whether the Abrams curve is valid in Turkey or not.

In this study, the relationship between the government size and unemployment and also youth unemployment is examined by using annual data from 1994 to 2018. Four models were created by adding and subtracting various variables for impact of government size on unemployment and four models were also created in the same

way for youth unemployment. Diagnostic tests were performed for all models and it was concluded that there was not a problem. Unit root, cointegration estimation and causality procedures were used to draw reliable conclusions about the Abrams curve. According to unit root tests results, series of government size, inflation and interest rate are stationary at level while the rest of the variables are integrated of order one.

The ARDL bounds tests were examined for cointegration of first four unemployment models and cointegration was found in all of them (models of 1, 2, 3 and 4). In the long run relationship between government size and unemployment was found positive for each four models and statistically significant for model 2, model 3 and model 4. Thus, first hypothesis which is there is positive relationship between government size and unemployment in Turkey was not rejected for three models. In addition, error correction models were created for the models of 1, 2, 3 and 4 and short-term relationship were analyzed. According to these results, increasing of government size will result to an increase the unemployment rate for model 2, model 3 and model 4. The coefficient of government size of model 1 is also positive but is not statistically significant. Therefore, Abrams curve is valid for model 2, model 3 and model 4 in the long run and short run. This finding corresponds with many studies in the literature such as Abrams (1999), Christopoulos and Tsionas (2002), Christopouls et al. (2005), Feldmann (2006, 2009, 2010), Bayrakdar (2014), Sa (2011) and Topal and Günay (2018). Thus, it is also worthwhile considering in terms of the macroeconomic impact of the government size in Turkey. Furthermore, if the long run relationships with other variables were evaluated, in the model 1, the relationship between inflation and unemployment is negative and relation between interest rate and unemployment is positive as expected. In model 2, there is positive relationship between school enrollment and the unemployment rate as expected also. In model 3 and model 4, the increase in school enrollment increases unemployment as anticipated and the increase in schooling ratio decreases unemployment. The remaining variables were not found to be statistically significant even if they met the expectation as a sign. Finally, the directions of relationships were determined by using Granger causality test for all models. It is found that there is unidirectional causal relationship from government size to unemployment in models 1, 2 and 4. These Granger causality results coincide with the studies of Erdoğan et al. (2018) and Christopoulos and Tsionas (2002).

The same analyzes were conducted for the youth unemployment models. According to results of ARDL bounds test, there is cointegration in models of 5, 6, 7

and 8. It was found that the relationship between government size and youth unemployment is positive and statistically significant in last four models in the long run. Therefore, second hypothesis is that there is positive relationship between government size and youth unemployment in Turkey was not rejected for models of 5, 6, 7 and 8. In the short run error correction models of 6, 7 and 8, increasing in government size will result higher youth unemployment. To sum up, the results for models of youth unemployment, the Abrams curve is valid for model of 5, 6, 7 and 8 in the both long and short run. Moreover, according to Granger causality tests, any causal relationship was not found between youth unemployment and size of government in these models. In model 6, there are one-way causalities from inflation to exchange rate and school enrollment. In model 6 and model 7, unidirectional causal relationship was found from exchange rate to government size. In addition, in model 5 and model 8, there is unidirectional causality from youth unemployment rate to GDP per capita as in the study of Günaydın and Çetin (2015).

As a conclusion, in this study, the results confirming the validity of the Abrams curve were reached, but it was not found that has significant results for some models. This demonstrates that there may be differences in results depending on the variables added to the models as explanatory variables. Nevertheless, the results are very important in terms of considering the effect of government size on unemployment and youth unemployment.

When considering that the size of government increases unemployment, the optimal size of government can be calculated closely for Turkey. Then, it can be determined where the expenditure will be predominantly taking into account the economic effects of the government expenditure types. Since, the types of expenditures such as current, investment and transfer and the financing of these expenditures have different effects on the labor market. For instance, as mentioned before, if government expenditures are financed by borrowing from the domestic market, private sector investments will be decreased due to the crowding out and employment will be affected negatively. Moreover, the increase in tax burden of individuals due to the increase in government size adversely affects the investments of entrepreneurs. For this reason, the government should use its government expenditures to encourage economic development and growth while it makes legal and administrative regulations to provide the necessary environment for foreign and domestic investors.

In order to prevent youth unemployment, which is significant for our country, secondary schooling policies may include more vocational education and technological development-oriented education. For instance, USA and EU countries have launched programs and projects for an educational approach that provides students with technical knowledge and skills and prioritizes the needs and skills of modern business life. The newest of these programs is STEM (Science, Technology, Engineering, Mathematics) education and applications (MEB, 2016:10). It has been accepted as an interdisciplinary approach that comprise the entire education process from pre-school education to higher education. TÜSİAD (2014) emphasized that STEM education is significant for Turkey and strategy of this education should be determined (MEB, 2016:24). In the light of these arguments, STEM education should be extended in every region of Turkey. However, if suitable job opportunities are not created for graduates who have received this education, there will be no point providing this education. Therefore, jobs opportunities should be created for high-tech graduates. Besides, before enrollment to higher education, institutions providing guidance services can be established to lead the student to the appropriate areas for his / her knowledge and skills. Thus, it will be easier to recruit the youth who have high potential in the production of the country. In addition, the government can direct its expenditures to the incentives to be ensured to the firms for young people to gain work experience.

As a result, policy makers should not ignore that policies may affect many macroeconomic variables negatively or positively, especially unemployment, when preparing and implementing government expenditure policy in the economy.

REFERENCES

Abrams, B. A. (1999). The Effect of Government Size on the Unemployment Rate. *Public Choice.* 99: 395-401.

Adam, G. (2016). *Türkiye'de Eğitimin Ekonomik Etkileri ve Eğitim-İşsizlik İlişkisi.* (Unpublished Master Dissertatiton). Aydın: Adnan Menderes University, Graduate School of Social Sciences.

Adamu, F.M. and Doğan E. (2017) Trade Openness and Industrial Growth: Evidence from Nigeria. *Panoeconomicus*. 64(3): 297-314.

Afonso A., Sen H., Kaya A. (2018) Government Size, Unemployment, and Inflation Nexus in Eight Large Emerging Market Economies. *Research in Economics and Mathematics*. Working Paper No. 38.

Akgün, M. (2019). *Türkiye'de Genç İşsizlik Sorunu ve Bu Sorunun Çözümüne Yönelik İstihdam Politikaları.* (Unpublished Master Dissertatiton) İstanbul: Maltepe University, Graduate School of Social Sciences.

Aslan, A. and Kula, F. (2010). Kamu Sektör Büyüklüğü İşsizlik İlişkisi: Abrams Eğrisi'nin Türkiye Ekonomisi İçin Testi. *Maliye Dergisi.* (159): 155-166.

Ayhan, F. (2019). Türkiye Ekonomisinde İşsizliğin Belirleyicisi Olan Temel Makroekonomik Değişkenlerin Tespitine İlişkin Bir Uygulama. *Uluslararası İktisadi ve İdari İncelemeler Dergisi.* (25): 235-252.

Aysu, A. and Dökmen, G. (2011). An Investigation on the Relationship between Government Size and Unemployment Rate: Evidence from OECD Countries. *Sosyoekonomi.* (2): 180-190.

Bağcı, E. (2018). Eğitim Düzeyinin İşsizlik Üzerindeki Etkisi: Gelişmiş ve Gelişmekte Olan Ülkelerin Karşılaştırılması. *Finans Ekonomi ve Sosyal Araştırmalar Dergisi*. 3(1): 348-358.

Bayrakdar, S. (2014). *Kamu Büyüklüğü ve İşsizlik Arasındaki İlişkinin Analizi: Türkiye Örneği.* (Unpublished Doctoral Dissertation). İstanbul: İstanbul University, Graduate School of Social Sciences.

Bekiroğlu, C. (2010). *Türkiye'de İşsizlik Sorununun Çözümlenmesinde Uygulanan Ekonomi Politikalarının Analizi.* (Unpublished Master Dissertatiton). İstanbul: Kadir Has University, Graduate School of Social Sciences.

Bilgin, M. H. (2004). Döviz Kuru İşsizlik İlişkisi: Türkiye Üzerine Bir İnceleme. *Kocaeli Üniversitesi Sosyal Bilimler Enstitüsü Dergisi.* 8(2): 80-94.

Birol, Ö. H. and Gencer A. H. (2014). Neo-Klasik İktisat ve Neo-Klasik Sentez. *Trakya Üniversitesi Sosyal Bilimler Dergisi.* 16(1): 259-280.

Bölükbaş, M. (2018a). Kamu Büyüklüğü İşsizliğin ve Genç İşsizliğin Nedeni Midir?Türkiye Örneği. *Aydın İktisat Fakültesi Dergisi.* 3(2): 1-17.

Bölükbaş, M. (2018b). Devletin Nihai Tüketim Harcamaları ve İşsizlik Arasındaki Nedensellik İlişkisi: Türkiye İçin Bir Analiz. *International Conference on Applied Economics and Finance & Extended with Social Sciences* (564-574). Edited by Bandırma Onyedi Eylül University and Social Sciences University of Ankara. Kuşadası. 28th-29th-30th November 2018.

Brown, R. L., Durbin, J. and Evans, J. M. (1975). Techniques for Testing the Constancy of Regression Relationships over Time. *Journal of the Royal Statistical Society*. 37(2): 149-192.

Chakraborty, S. K. (2010). *Macroeconomics.* Mumbai: Himalaya Publishing House.

Christopoulos, D.K., Loizidesb, J., (2005). The Abrams curve of government size and unemployment: evidence from panel data. *Applied Economics.* 37: 1193–1199.

Christopoulos, D.K., Tsionasc, E.G. (2002). Unemployment and Government Size: Is there any Credible Causality? *Applied Economics Letters.* 9(12): 797–800.

Çelikay, F. The Causal Relationship between Unemployment, Public Spending and Internal Migration: *A Review on Turkey. Research Journal of Public Finance.* 3(2): 205-219.

Çondur, F. and Bölükbaş, M. (2014). Türkiye'de İşgücü Piyasası ve Genç İşsizlik Büyüme İlişkisi Üzerine Bir İnceleme. *Amme İdaresi Dergisi*. 47(2): 77-93.

Demekas, D. G. and Kontolemis, Z. G. (1999). Government Employment and Wages and Labor Market Performance. *IMF Working Paper.* Working Paper No. 55.

Dickey, D. A. and Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association.* 74(336): 427-431.

Dikmen, N. (2018). *Ekonometriye Giriş.* Ankara: Seçkin Yayıncılık.

Doğan, T. T. (2012). Macroeconomic Variables and Unemployment: The Case of Turkey. *International Journal of Economics and Financial Issues*. 2(1): 71-78.

Doğrul, H. G. and Soytaş, U. (2010). Relationship between Oil Prices, Interest Rate, and Unemployment: Evidence from an Emerging Market. *Energy Economics.* 32(6): 1523-1528.

Durak, Ş. and Kaya, V. (2014). Türkiye'de İşsizlik ve İşsizliği Azaltmaya Yönelik Politikalar: Tarihsel Bir Bakış. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*. 28(2): 55-73.

Durkaya, M. and Ceylan, S. (2016). İşsizliğin Azaltılmasında Kamu Kesimi Büyüklüğünün Rolü. *Finans Politik & Ekonomik Yorumlar.* 53: 23-40.

Engeloğlu, Ö., Meral, İ.G. and Genç, K. (2015). Türkiye İçin Yapılan Nedensellik Uygulamaları Üzerine Literatür Araştırması. *Social Sciences Research Journal*. 4(2): 142-154.

Erdoğan, A., Erdoğan, S. and Erdaş, H. (2018). Kamu Büyüklüğünün Türkiye Ekonomisine Yönelik VAR Analizi. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi.* 55: 119-131.

Feldmann, H. (2006). Government Size and Unemployment: Evidence from Industrial Countries. *Public Choice.* 127: 443-459.

Feldmann, H. (2009). Government Size and Unemployment: Evidence from Developing Countries. *The Journal of Developing Countries.* 43(1): 315-330.

Feldmann, H. (2013). Real Interest Rate and Labor Market Performance. *Southern Economic Journal.* 79(3): 659-679.

Feldmann, H. (2010). Government size and unemployment in developing countries. *Applied Economics Letters.* 17(3): 289-292.

Friedman, M. (1977). Nobel Lecture: Inflation and Unemployment. *Journal of Political Economy*. 85(3): 451-472.

Gali J. (2013). Notes for a New Guide to Keynes (1): Wages, Aggregate Demand, and Employment. *Journal of the European Economic Association.* 11(5): 973-1003.

Granger, C. W. J. (1969). Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica*. 37(3): 424-438.

Göktaş, A. and İşçi, Ö. (2010). Türkiye'de İşsizlik Oranının Temel Bileşenli Regresyon Analizi İle Belirlenmesi. *Selçuk Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi*. 14(20): 279-294.

Gujarati, D. N. (2002). *Basic Econometrics*. New York: McGraw-Hill.

Günaydın, D. and Çetin, M. (2015). Genç İşsizliğin Temel Makroekonomik Belirleyicileri: Ampirik Bir Analiz. *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*. 22: 17-34.

Holden, S. and Sparrman, V. (2011). Do Government Purchases Affect Unemployment? *University of Oslo Memorandum.* Working Paper No. 17/2011.

Karataş, Ö. (2016). *Türkiye'de İşsizliği Etkileyen Makroekonomik Faktörlerin Analizi.* (Unpublished Master Dissertatiton). Samsun: Ondokuz Mayıs University, Graduate School of Social Sciences.

Kanca, O. C. and Bayrak, M. (2015). The Relations Between the Components of Government Expenditures and Unemployment (The Case of Turkey). *Gazi Journal of Economics and Business.* 1(2): 55-74.

Karaca, E. (2019). *Türkiye'de Genç Nüfusta İşsizlik Sorunu ve Mücadele Politikaları*. (Unpublished Master Dissertatiton). İstanbul: Yıldız Technical University, Graduate School of Social Sciences.

Kaya, D. G., Kaygısız, A. D. and Altuntepe, N. (2015). Türkiye'de Kamu Harcamalarının Toplam İstihdama Etkisi Üzerine Bir Değerlendirme. *Journal of Economics and Administrative Sciences*. 17(1): 83-96.

Keynes, J. M. (1936). *The General Theory of Employment, Interest, and Money.* London: Palgrave Macmillan.

Kočenda, E., Černý, A. (2015). *Elements of Time Series Econometrics: An Applied Approach.* Prague: Karolinum Press.

Mankiw, N. G. (2009). *Macroeconomics*. New York: Worth Publishers.

Milli Eğitim Bakanlığı (MEB) (2016). STEM Eğitim Raporu. http://yegitek.meb.gov.tr/STEM_Egitimi_Raporu.pdf (12.01.2020).

Murat, S. and Şahin, L. (2011). Nedenleri ve Sonuçları Bakımından Gençler Arasında Yaygınlaşan İşsizlik. *Istanbul Journal of Sociological Studies.* 44: 1-48.

Nkoro, E. and Uko, A.K. (2016). Autoregressive Distributed Lag (ARDL) Cointegration Technique: Application and Interpretation. *Journal of Statistical and Econometric Methods.* 5(4): 63-91.

O'Higgins, N. (1997). The challenge of youth unemployment. *International Social Security Review* 50(4): 63-93.

Pesaran, M. H. (1997). The Role of Economic Theory in Modelling the Long Run. *The Economic Journal*. 107: 178-191.

Pesaran, M. H., Shin, Y. (1998) An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis. *Econometric Society Monographs*. 31: 371-413.

Pesaran, M. H., Shin, Y. and Smith, R. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*. 16(3): 289–326.

Phelps, E.S. (1967). Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time. *Economica*. 34(135): 254-281.

Phillips, A. W. (1958). The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957. *Economica.* 25(100): 283-299.

Phillips, P. C. B. and Perron, P. (1988). Testing for a Unit Root in Time Series Regression. *Biometrika*. 75(2): 335-346.

Rahmat, M. and Saeidi, K. (2017) The Effect of Government Development Expenditures on Unemployment Rate in the Provinces. *International Journal of Economics and Financial Issues.* 7(5): 71-77.

Samuelson, A. P. and Solow, R. (1960). Problem of Achieving and Maintaining a Stable Price Level: Analytical Aspects of Anti-Inflation Policy. *American Economic Association*. 50 (2): 177-194.

Sa, Y. (2011). Government Size, Economic Growth and Unemployment: Evidence from Advanced and Developing Economy Countries (A Time Series Analysis, 1996-2006). *International Review of Public Administration.* 16(2): 95-116.

Selim, S. and Güven, E. T. A. (2014). Türkiye'de Enflasyon, Döviz Kuru ve İşsizlik Arasındaki İlişkinin Ekonometrik Analizi. *The International Journal of Economic and Social Research.* 10(1): 127-146.

Şentürk, E. (2017). *İşsizlikle Mücadelede Aktif İstihdam Politikaları: Türkiye Örneği.* (Unpublished Master Dissertatiton). Edirne: Trakya University, Graduate School of Social Sciences.

T.C. Kalkınma Bakanlığı (2015). Sosyal ve Ekonomik Göstergeler. http://www.sbb.gov.tr/temel-ekonomik-gostergeler-veritabani/ (26.09.2019).

T.C. Merkez Bankası (2019). Elektronik Veri Dağıtım Sistemi. https://evds2.tcmb.gov.tr/index.php?/evds/serieMarket/collapse_2/5868/DataGroup/turkish/bie_rktufey/. (30.08.2019).

Topal, M. H. and Günay, H. F. (2018). Türkiye'de Abrams Eğrisi Hipotezinin Geçerliliği. *International Congress on Political, Economic and Social Studies, Proceedings* (pp.284-305), Volume 2: Economic Studies Niğde. October 2018.

Topal, M. H. (2017). Türkiye'de Kamu Yatırımlarının İstihdam Üzerindeki Etkisi: Bölgesel Bir Analiz (2004-2016). *Global Journal of Economics and Business Studies*. 6(12): 186-204.

Tunalı, H. N. (2017). *Türkiye'de Ekonomik Büyüme ve İşsizlik İlişkisi*. Bursa: Uludağ University, Graduate School of Social Sciences.

TurkStat (2016). Results of The Research on The Entry of Young People into the Labour Market.

TurkStat (2019). Labor Force Statistics. https://biruni.tuik.gov.tr/isgucuapp/isgucu.zul (26.09.2019).

TurkStat (2019). Labor Force Statistics. https://biruni.tuik.gov.tr/medas/?kn=72&locale=tr (26.09.2019).

TurkStat (2019). http://www.tuik.gov.tr/PreTablo.do?alt_id=1007 (26.09.2019).

Wang, S. and Abrams, B. A. (2006). The Effect of Government Size on the Steady State Unemployment Rate: A Structural Error Correction Model. *University of Delaware Working Paper Series.* Working Paper No. 2006-05.

Wang, S. and Abrams, B. A. (2011). The Effect of Government Size on the Steady-State Unemployment Rate: A Dynamic Perspective. *University of Delaware Working Paper Series.* Working Paper No. 2011-12.

WorldBank (2019). https://databank.worldbank.org/home.aspx (28.08.2019).

Yıldız, K. (2014). İşsizlik Türleri, Her Bir İşsizlik Türünün Toplam İşsizlikteki Payı ve Çeşitli Demografik Parametrelerle İlişkisi. *Akademik Bakış Uluslararası Hakemli Sosyal Bilimler Dergisi.* 45: 1-26.

Yuan, M. & Li, W. (2000). Dynamic Employment and Hours Effects of Government Spending Shocks. *Journal of Economic Dynamics and Control.* 24: 1233-1263.

APPENDICES

APPENDIX 1: Pairwise Granger Causality Tests of Model 2

Null Hypothesis	F-Statistic	Prob.
GOV_SIZE does not Granger Cause DUNEMP *	2.92353	0.0811
DUNEMP does not Granger Cause GOV_SIZE	0.29747	0.7465
DGDPPER_CAPITA does not Granger Cause DUNEMP	0.8923	0.4281
DUNEMP does not Granger Cause DGDPPER_CAPITA	2.15906	0.146
DSCHOOL does not Granger Cause DUNEMP	1.30211	0.2977
DUNEMP does not Granger Cause DSCHOOL	0.12714	0.8814
DSCH_RATIO does not Granger Cause DUNEMP ***	7.28548	0.0052
DUNEMP does not Granger Cause DSCH_RATIO	0.81722	0.4583
DGDPPER_CAPITA does not Granger Cause GOV_SIZE	0.64486	0.5371
GOV_SIZE does not Granger Cause DGDPPER_CAPITA	1.67071	0.2176
DSCHOOL does not Granger Cause GOV_SIZE	0.00854	0.9915
GOV_SIZE does not Granger Cause DSCHOOL	0.10777	0.8984
DSCH_RATIO does not Granger Cause GOV_SIZE	2.56654	0.1062
GOV_SIZE does not Granger Cause DSCH_RATIO	0.85248	0.4438
DSCHOOL does not Granger Cause DGDPPER_CAPITA	0.18291	0.8345
DGDPPER_CAPITA does not Granger Cause DSCHOOL	1.52599	0.2457
DSCH_RATIO does not Granger Cause DGDPPER_CAPITA	1.38546	0.2771
DGDPPER_CAPITA does not Granger Cause DSCH_RATIO	0.5461	0.589
DSCH_RATIO does not Granger Cause DSCHOOL	0.04946	0.9519
DSCHOOL does not Granger Cause DSCH_RATIO	0.03919	0.9617

(**) denotes the rejection of the hypothesis at 5% significance level, (*) denotes the rejection of the hypothesis at 10% significance level. Rejection means there is causality between the variables. Lag value is 2.

APPENDIX 2: Pairwise Granger Causality Tests of Model 3

Null Hypothesis	F-Statistic	Prob.
GOV_SIZE does not Granger Cause DUNEMP *	2.92353	0.0811
DUNEMP does not Granger Cause GOV_SIZE	0.29747	0.7465
DEXCH_RATE does not Granger Cause DUNEMP	0.61207	0.5538
DUNEMP does not Granger Cause DEXCH_RATE	2.42218	0.1187
DSCHOOL does not Granger Cause DUNEMP	1.30211	0.2977
DUNEMP does not Granger Cause DSCHOOL	0.12714	0.8814
DSCH_RATIO does not Granger Cause DUNEMP ***	7.28548	0.0052
DUNEMP does not Granger Cause DSCH_RATIO	0.81722	0.4583
DEXCH_RATE does not Granger Cause GOV_SIZE	1.44173	0.2640
GOV_SIZE does not Granger Cause DEXCH_RATE **	4.46265	0.0277
DSCHOOL does not Granger Cause GOV_SIZE	0.00854	0.9915
GOV_SIZE does not Granger Cause DSCHOOL	0.10777	0.8984
DSCH_RATIO does not Granger Cause GOV_SIZE	2.56654	0.1062
GOV_SIZE does not Granger Cause DSCH_RATIO	0.85248	0.4438
DSCHOOL does not Granger Cause DEXCH_RATE	0.06504	0.9373
DEXCH_RATE does not Granger Cause DSCHOOL	2.54571	0.1079
DSCH_RATIO does not Granger Cause DEXCH_RATE	0.01522	0.9849
DEXCH_RATE does not Granger Cause DSCH_RATIO	0.82680	0.4543
DSCH_RATIO does not Granger Cause DSCHOOL	0.04946	0.9519
DSCHOOL does not Granger Cause DSCH_RATIO	0.03919	0.9617

(**) denotes the rejection of the hypothesis at 5% significance level, (*) denotes the rejection of the hypothesis at 10% significance level. Rejection means there is causality between the variables. Lag value is 2.

APPENDIX 3: Pairwise Granger Causality Tests of Model 4

Null Hypothesis	F-Statistic	Prob.
GOV_SIZE does not Granger Cause DUNEMP*	2.92353	0.0811
DUNEMP does not Granger Cause GOV_SIZE	0.29747	0.7465
DEXCH_RATE does not Granger Cause DUNEMP	0.61207	0.5538
DUNEMP does not Granger Cause DEXCH_RATE	2.42218	0.1187
INF does not Granger Cause DUNEMP	0.97821	0.3962
DUNEMP does not Granger Cause INF*	2.92168	0.0812
DSCHOOL does not Granger Cause DUNEMP	1.30211	0.2977
DUNEMP does not Granger Cause DSCHOOL	0.12714	0.8814
DSCH_RATIO does not Granger Cause DUNEMP***	7.28548	0.0052
DUNEMP does not Granger Cause DSCH_RATIO	0.81722	0.4583
DEXCH_RATE does not Granger Cause GOV_SIZE	1.44173	0.2640
GOV_SIZE does not Granger Cause DEXCH_RATE**	4.46265	0.0277
INF does not Granger Cause GOV_SIZE	2.29606	0.1294
GOV_SIZE does not Granger Cause INF	0.33084	0.7226
DSCHOOL does not Granger Cause GOV_SIZE	0.00854	0.9915
GOV_SIZE does not Granger Cause DSCHOOL	0.10777	0.8984
DSCH_RATIO does not Granger Cause GOV_SIZE	2.56654	0.1062
GOV_SIZE does not Granger Cause DSCH_RATIO	0.85248	0.4438
INF does not Granger Cause DEXCH_RATE*	3.85680	0.0416
DEXCH_RATE does not Granger Cause INF	0.08772	0.9164
DSCHOOL does not Granger Cause DEXCH_RATE	0.06504	0.9373
DEXCH_RATE does not Granger Cause DSCHOOL	2.54571	0.1079
DSCH_RATIO does not Granger Cause DEXCH_RATE	0.01522	0.9849
DEXCH_RATE does not Granger Cause DSCH_RATIO	0.82680	0.4543
DSCHOOL does not Granger Cause INF	0.43503	0.6543
INF does not Granger Cause DSCHOOL	2.00187	0.1657
DSCH_RATIO does not Granger Cause INF	1.92078	0.1770
INF does not Granger Cause DSCH_RATIO	0.84800	0.4456
DSCH_RATIO does not Granger Cause DSCHOOL	0.04946	0.9519
DSCHOOL does not Granger Cause DSCH_RATIO	0.03919	0.9617

(**) denotes the rejection of the hypothesis at 5% significance level, (*) denotes the rejection of the hypothesis at 10% significance level. Rejection means there is causality between the variables. Lag value is 2.

APPENDIX 4: Pairwise Granger Causality Tests of Model 6

Null Hypothesis	F-Statistic	Prob.
GOV_SIZE does not Granger Cause DYOUTH	1.50993	0.2491
DYOUTH does not Granger Cause GOV_SIZE	0.07639	0.9268
DEXCH_RATE does not Granger Cause DYOUTH	0.47989	0.6270
DYOUTH does not Granger Cause DEXCH_RATE	1.11391	0.3511
INF does not Granger Cause DYOUTH	1.24741	0.3123
DYOUTH does not Granger Cause INF*	3.24457	0.0640
DSCHOOL does not Granger Cause DYOUTH	1.69318	0.2135
DYOUTH does not Granger Cause DSCHOOL	0.40612	0.6725
DSCH_RATIO does not Granger Cause DYOUTH***	7.20519	0.0054
DYOUTH does not Granger Cause DSCH_RATIO	0.72012	0.5010
DEXCH_RATE does not Granger Cause GOV_SIZE	1.44173	0.2640
GOV_SIZE does not Granger Cause DEXCH_RATE**	4.46265	0.0277
INF does not Granger Cause GOV_SIZE	2.29606	0.1294
GOV_SIZE does not Granger Cause INF	0.33084	0.7226
DSCHOOL does not Granger Cause GOV_SIZE	0.00854	0.9915
GOV_SIZE does not Granger Cause DSCHOOL	0.10777	0.8984
DSCH_RATIO does not Granger Cause GOV_SIZE	2.56654	0.1062
GOV_SIZE does not Granger Cause DSCH_RATIO	0.85248	0.4438
INF does not Granger Cause DEXCH_RATE**	3.85680	0.0416
DEXCH_RATE does not Granger Cause INF	0.08772	0.9164
DSCHOOL does not Granger Cause DEXCH_RATE	0.06504	0.9373
DEXCH_RATE does not Granger Cause DSCHOOL	2.54571	0.1079
DSCH_RATIO does not Granger Cause DEXCH_RATE	0.01522	0.9849
DEXCH_RATE does not Granger Cause DSCH_RATIO	0.82680	0.4543
DSCHOOL does not Granger Cause INF	0.43503	0.6543
INF does not Granger Cause DSCHOOL	2.00187	0.1657
DSCH_RATIO does not Granger Cause INF	1.92078	0.1770
INF does not Granger Cause DSCH_RATIO	0.84800	0.4456
DSCH_RATIO does not Granger Cause DSCHOOL	0.04946	0.9519
DSCHOOL does not Granger Cause DSCH_RATIO	0.03919	0.9617

(**) denotes the rejection of the hypothesis at 5% significance level, (*) denotes the rejection of the hypothesis at 10% significance level. Rejection means there is causality between the variables. Lag value is 2.

APPENDIX 5: Pairwise Granger Causality Tests of Model 7

Null Hypothesis	F-Statistic	Prob.
GOV_SIZE does not Granger Cause DYOUTH	0.99267	0.4248
DYOUTH does not Granger Cause GOV_SIZE	0.40673	0.7506
DEXCH_RATE does not Granger Cause DYOUTH	0.97735	0.4313
DYOUTH does not Granger Cause DEXCH_RATE	1.11956	0.3745
DSCHOOL does not Granger Cause DYOUTH*	2.74564	0.0823
DYOUTH does not Granger Cause DSCHOOL	2.19368	0.1342
DSCH_RATIO does not Granger Cause DYOUTH**	3.88839	0.0326
DYOUTH does not Granger Cause DSCH_RATIO	1.12655	0.3719
DEXCH_RATE does not Granger Cause GOV_SIZE	0.96896	0.4349
GOV_SIZE does not Granger Cause DEXCH_RATE*	3.12448	0.0598
DSCHOOL does not Granger Cause GOV_SIZE	0.08336	0.9680
GOV_SIZE does not Granger Cause DSCHOOL	0.23687	0.8692
DSCH_RATIO does not Granger Cause GOV_SIZE	2.50659	0.1014
GOV_SIZE does not Granger Cause DSCH_RATIO	0.52843	0.6700
DSCHOOL does not Granger Cause DEXCH_RATE	0.02557	0.9942
DEXCH_RATE does not Granger Cause DSCHOOL*	2.81972	0.0773
DSCH_RATIO does not Granger Cause DEXCH_RATE	0.47867	0.7022
DEXCH_RATE does not Granger Cause DSCH_RATIO	0.79124	0.5187
DSCH_RATIO does not Granger Cause DSCHOOL	0.21164	0.8867
DSCHOOL does not Granger Cause DSCH_RATIO	0.05434	0.9826

(**) denotes the rejection of the hypothesis at 5% significance level, (*) denotes the rejection of the hypothesis at 10% significance level. Rejection means there is causality between the variables. Lag value is 3.

APPENDIX 6: Pairwise Granger Causality Tests of Model 8

Null Hypothesis	F-Statistic	Prob.
GOV_SIZE does not Granger Cause DYOUTH	0.99267	0.4248
DYOUTH does not Granger Cause GOV_SIZE	0.40673	0.7506
DGDPPER_CAPITA does not Granger Cause DYOUTH	0.14792	0.9293
DYOUTH does not Granger Cause DGDPPER_CAPITA**	4.08023	0.0282
DSCHOOL does not Granger Cause DYOUTH*	2.74564	0.0823
DYOUTH does not Granger Cause DSCHOOL	2.19368	0.1342
DSCH_RATIO does not Granger Cause DYOUTH**	3.88839	0.0326
DYOUTH does not Granger Cause DSCH_RATIO	1.12655	0.3719
DGDPPER_CAPITA does not Granger Cause GOV_SIZE	0.25483	0.8566
GOV_SIZE does not Granger Cause DGDPPER_CAPITA	1.58812	0.2368
DSCHOOL does not Granger Cause GOV_SIZE	0.08336	0.9680
GOV_SIZE does not Granger Cause DSCHOOL	0.23687	0.8692
DSCH_RATIO does not Granger Cause GOV_SIZE	2.50659	0.1014
GOV_SIZE does not Granger Cause DSCH_RATIO	0.52843	0.6700
DSCHOOL does not Granger Cause DGDPPER_CAPITA	0.17383	0.9123
DGDPPER_CAPITA does not Granger Cause DSCHOOL	2.19048	0.1346
DSCH_RATIO does not Granger Cause DGDPPER_CAPITA	1.43998	0.2733
DGDPPER_CAPITA does not Granger Cause DSCH_RATIO	0.75318	0.5386
DSCH_RATIO does not Granger Cause DSCHOOL	0.21164	0.8867
DSCHOOL does not Granger Cause DSCH_RATIO	0.05434	0.9826

(**) denotes the rejection of the hypothesis at 5% significance level, (*) denotes the rejection of the hypothesis at 10% significance level. Rejection means there is causality between the variables. Lag value is 3.