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Analysis of labor supply and labor demand in Türkiye with SVAR models

Yavuz Özek[a], Şerife Merve Koşaroğlu[b*]

[a] Assoc. Prof., Fırat University, Vocational School of Social Sciences, Department of Finance-Banking and Insurance, Elazığ, 23119, Türkiye. E-mail: yozek@firat.edu.tr, ORCID: https://orcid.org/0000-0003-4517-4875.

[b] Assoc. Prof., Sivas Cumhuriyet University, Cumhuriyet Social Sciences Vocational School, Department of Finance-Banking and Insurance, Sivas, 58140, Türkiye. E-mail: mkosaroglu@cumhuriyet.edu.tr, ORCID: https://orcid.org/0000-0002-2563-5753.

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ABSTRACT

The main objective of sustainable economic growth policy is to achieve full employment in the labor market. While classical economic theory considers labor supply and demand as a function of the real wage, Keynesian economics argues that only labor demand is a function of the real wage. Therefore, determining the factors affecting labor supply and demand in emerging economies will help to formulate policies for the labor market. In this study, labor supply and demand functions in the Turkish economy are estimated with structural vector autoregression models using annual data for the period 1990-2022. According to the results of the empirical analysis, it is found that the minimum wage level is effective in labor demand, but average minimum real wages are not effective on labor supply. In the labor demand function, the views of Classical economics and Keynesian economics on the labor market are valid in the labor supply function. In line with these results, it is concluded that labor productivity is high in the Turkish economy, but real wages do not contribute to economic growth through aggregate demand and employment growth due to the institutional structure in the labor market.

Türkiye'de işgücü arzı ve işgücü talebinin SVAR modelleri ile analizi

MAKALE BİLGİSİ

ÖZ

Sürdürülebilir ekonomik büyüme politikasının temel amacı işgücü piyasasında tam istihdam hedefini sağlamaktır. Klasik iktisat teorisi emek arz ve talebini reel ücretin bir fonksiyonu olarak düşünürken, Keynesyen iktisat ise yalnızca emek talebinin reel ücretin bir fonksiyonu olduğunu öne sürmektedir. Bu nedenle gelişmekte olan ekonomilerde

Anahtar Kelimeler:
Emek arzı, Emek talebi, Yapısal var

işgücü arz-talebini etkileyen faktörlerin belirlenmesi, işgücü piyasasına yönelik politikaların ortaya konulmasına yardımcı olacaktır. Bu çalışmada, 1990-2022 dönemine ait yıllık veriler kullanılarak Türkiye ekonomisinde emek arzı ve emek talebi fonksiyonları yapısal vektör otoregresyon modelleri ile tahmin edilmektedir. Yapılan ampirik analiz sonuçlarına göre, minimum ücret seviyesinin emek talebi üzerinde etkili olduğu ancak ortalama asgari reel ücretlerin emek arzı üzerinde etkili olmadığı tespit edilmiştir. Emek talebi fonksiyonunda Klasik iktisadın, emek arzı fonksiyonunda ise Keynesyen iktisadın işgücü piyasasına yönelik görüşleri geçerlidir. Bu sonuçlar doğrultusunda, Türkiye ekonomisinde işgücü verimliğinin yüksek olduğu ancak işgücü piyasasında kurumsal yapı nedeniyle reel ücretin, toplam talep ve istihdam artışı üzerinden ekonomik büyümeye katkı sağlamadığı sonucuna ulaşılmaktadır.

1. Introduction

Labor markets have a different structure from other markets because they are based on the supply and demand for labor, and this structure is based on the fact that labor cannot simply be bought and sold like a commodity. Unlike other markets, the labor market is influenced by social factors. The labor market has a social dimension as well as an economic one, and its basic element is 'labor'. In addition to the fact that the supply of labor is the main way for individuals to earn income for themselves, in macro terms, labor supply is one of the main determinants of the production capacity of an economy. While the quantity dimension of labor supply, which has both quality and quantity dimensions, shows the number of people working in labor markets or the sum of their working hours, the quality dimension shows the degree of qualification of the labor force. The basic concept that determines the labor supply in a country is the labor force. While the factors that shape the supply of labor, which is the human resource that plays a role in economic activities, include the general size of the population, labor force participation rate, sectoral, occupational and gender-based distribution, the education level of the labor force plays a decisive role (Aslan, 2010, pp. 40-41). Similarly, 'Production and demand conditions in a country play a decisive role in shaping labor demand. Therefore, in order to understand the structure of labor demand, important issues such as the sectoral distribution of employment, the organizational structure of firms within the sector, and informal employment should be examined in detail (Şen, 2006, p. 104). The labor market has a dynamic structure. Technological advances and changes in individuals' preferences cause preferences to change over time. The main factors driving labor markets are the behavior on the supply and demand sides. The key factor determining these behaviors is the price for both. In labor markets, the price is often referred to as the wage. In the price-setting process, traditional economic analysis usually does not take technology and preferences into account. However, the price-setting process shows that preferences and technology indirectly influence income distribution and resource allocation. Labor demand refers to the quantity of labor that firms demand to employ in a given market. Demand is usually shaped by the demand in the goods market. Recently, technological advances have weakened the relationship between output and labor demand. Labor demand, which is a decreasing function of the real wage, is subject to diminishing returns in the short run as output increases. An important determinant of labor demand is the situation where product revenue and cost are equal. This is based on the assumption that the product produced by the marginal worker is equal to the wage and that workers are substitutable for each other (Ataman, 1999, pp. 19-86).

2. Theoretical background and literature review

After the 1929 Great Depression, one of the most important reasons for questioning and revising economic policies was the high unemployment rate. The negative effects of unemployment on the social structure and the economy have made the problem of employment an area that needs to be carefully analyzed in terms of social policy and economics. While narrow approaches to the concept of employment focus on the elimination of unemployment, broad approaches have revealed that it should

be evaluated differently and effectively within economic policies. One of the most important indicators of economic stability is whether the economic structure provides jobs for everyone who wants to work. The participation of labor, one of the most important factors of production in an economy, in production at high rates will increase the amount of goods and services produced, as well as the national income and welfare level. Although the first measure that comes to mind to increase labor supply is population growth, changes in macroeconomic indicators affect employment. Employment affects price stability and economic stability by affecting macroeconomic variables and is also significantly affected by macro aggregates (Çolak and Kara, 2017, p. 259). Work, which is the basic activity of the economy, has various and complementary meanings in societies. Work, as a value production and status within the political and social order, constitutes the cornerstone of the organization of capitalist societies. With the concept of labor, measurable productivity and the perception of work that affects social life have been created. Labor has been reduced to the concept of work, that is, abstract work that can be measured over time. Labor is a bridge between the individual and the capitalist in terms of value production. Therefore, the transformations in production activities in industrial society have contributed significantly to the development of labor (Kapukaya and Durmaz, 2023, p. 134). Globalization has positive and negative effects on markets in general. When the labor market is considered as labor supply and labor demand, it is significantly affected by the results of globalization and the accompanying technological changes. Developments emerging with the globalization process change the structure of labor markets and employment opportunities. Increasing unemployment is among the most important macroeconomic problems of countries. The goal of achieving full employment has an important place among the objectives of economic policies. While some of the objectives of economic policies can be implemented together, some of them are contradictory policies. The gradual increase in unemployment in the world makes the goal of achieving full employment a priority when implementing economic policies. When the economic, social and psychological aspects of unemployment are taken into account, the importance of the issue increases even more. These changes necessitate some reforms in the labor market (Çondur and Bölükbaş, 2014, p. 78). A developing country's ability to achieve rapid and stable development depends on the full and efficient use of its resources. National product is a function of resource utilization. Growth in the national product at higher rates from year to year can be realized through the more efficient use of a larger share of resources in production. First of all, labor as a factor of production cannot be considered separately from human beings, who are the basic element of economic and social events. Underemployment of the labor factor directly affects those who live off their labor and leaves them without income. On the other hand, in developing countries, the supply of labor is relatively more abundant than the supply of capital goods. Each economy has a natural growth rate that is determined by the available factor endowment, capital accumulation, the technologies available to it, and the level of education of its people. One of the most important goals in economics is not to fall behind this natural growth rate, but to exceed it for a long period of time, to the extent possible. Exceeding the natural growth rate is usually possible through the use of advanced technologies and the strain on resources. The problem of unemployment arises from the imbalance between the supply of labor arising from population growth and the demand for labor created by the volume of economic activity in society. Every economy that is unable to balance labor supply and labor demand faces the problem of unemployment to one degree or another. However, the problem of unemployment reaches much more serious dimensions in some countries. This is because the problem is social as well as economic. Türkiye is one of the countries where the unemployment problem is serious (Şahin, 2011, pp. 335-336).

There are many studies on the labor market in the economic literature. In these studies, researchers have tried to explain the causes of unemployment and unemployment by focusing on different methods. When empirical studies on the labor market are examined with different methods, Aykaç (2010) examined the effects of labor market regulations on labor supply and demand in Türkiye and 18 European Union member countries. The analysis using the panel data method covers data for the period 1998-2008. According to the results of the study, it is concluded that labor market regulations do not follow a clear axis, and regulations for the protection of employment cause a decrease in labor demand and an increase in labor supply. Bhattacharya et al. (2011) examined the long-run relationship between labor productivity, employment, and real wages in the manufacturing sector in India. The analysis using panel data methodology covers data for the years 1973-1974 and 1999-2001. According to the findings, it is concluded that both employment and real wages have a positive effect on labor

productivity. Apaydın (2019) analyzed the structural sources of unemployment in Türkiye. The analysis period using the Structural Vector Error Correction Model (SVECM) covers quarterly data for the period 2005:Q1-2018:Q2. The results show that increases in productivity and labor demand reduce the unemployment rate in the long run, but labor supply shocks increase unemployment. He stated that unemployment in Türkiye is significantly affected by labor supply, labor demand, and technology shocks in the long run. Ağazade (2014) examined the long-run relationship between labor force participation rate and unemployment in Türkiye. In the study with monthly data for the period 2005:Q1-2013:Q9, linear and nonlinear exponential smooth transition cointegration techniques were used as the analysis method. According to the results, no long-run relationship was found between the labor force participation rate and the unemployment rate. The results support the validity of the unemployment invariance hypothesis in Türkiye. Sigeze et al. (2019) examined the unemployment hysteria hypothesis for European Union countries and Türkiye. In the study conducted with data from 1991-2016, the Fourier-KPSS panel stationarity test was used as the analysis method. According to the results, the unemployment hysteria hypothesis is valid in all countries except Belgium, Sweden, Cyprus, and Latvia. In their study, Akkuş and Topuz (2019) examined the course of unemployment in the five most fragile emerging economies, including Türkiye. Conventional and fractured unit root tests were used in the analysis with data from 1980-2016. According to the test results, the unemployment hysteresis hypothesis is valid in these economies. Pata (2020) examined the validity of the unemployment hysteresis hypothesis for 15 OECD countries. The analysis period covers 1991:Q1-2019:Q2. According to the results of the study using the Fourier panel stationarity test, the unemployment hysteresis hypothesis is valid in Türkiye, Germany and Spain. In the other 12 OECD countries included in the analysis, the natural rate hypothesis is valid. Bayat et al. (2013) examined the asymmetric behavior of the unemployment rate in Türkiye. Using linear unit root tests and a Markov regime switching model, the analysis period covers the data for the years 1923-2011. According to the findings, it was emphasized that the unemployment rate showed downward rigidity in the period under review, that is, unemployment changed regime and the increases gained a permanent character. Tanrıöver and Biçer (2015) estimate the dynamics of non-employment generating economic growth in Türkiye using the Beveridge curve. Using monthly data for 2005-2015, the study was analyzed using TAR and M-TAR asymmetric cointegration method. In line with the findings, it is found that there is no long-run asymmetric relationship between open job and unemployment rates. Köse and Avcı (2023) examined the relationship between real wages, labor productivity and employment in the manufacturing sector in Türkiye. The analysis using the ARDL bounds test covers data for the period 2009:Q1-2021:Q4. According to the findings, there is a positive relationship between employment, real wage and labor productivity in the short run. In the long run, there is a positive relationship between employment and real wages, while there is no statistical relationship between employment and labor productivity. Özçelik and Akıncı (2020), in their study on Türkiye, show that the Beveridge curve in the labor market.

3. Empirical results

This study attempts to estimate the labor supply and labor demand functions in the Turkish economy. The analysis period covers the years between 1990 and 2022. The total number of labor force is used as a proxy variable for labor supply (Ls) and the total number of employed, real minimum wage (W_M), total factor productivity (A), real fixed capital investments (K), real average wage (W) and the ratio of consumption expenditures to gross domestic product (C) are used as proxy variables for labor demand (L_D). Annual data for the variables are obtained from the World Bank dataset. The natural logarithm of the total labor force, the total number of employed, the real minimum wage, real fixed capital investments, and real average wage variables are taken. The variables are adjusted using the gross domestic product deflator with base year 2009.

Table 1

ADF (1981) and PP (1988) Unit Root Test

	Variables	ADF	PP		ADF	PP
Levels	K	-1.389 (0) [0.575]	-1.380 (1) [0.579]	First Differences	-4.925 (0) [0.00]***	-4.925 (0) [0.00]***
	A	-1.809 (3) [0.368]	-1.587 (8) [0.477]		-3.531 (2) [0.014]**	-5.492 (5) [0.00]***
	Ls	-0.867 (0) [0.785]	-0.867 (0) [0.785]		-5.648 (0) [0.00]***	-5.650 (2) [0.00]***
	C	-1.809 (3) [0.367]	-1.587 (8) [0.477]		-3.531 (2) [0.014]**	-5.492 (5) [0.00]***
	W	-2.531 (4) [0.119]	-1.291 (0) [0.621]		-3.489 (3) [0.016]**	-6.405 (1) [0.00]***
	L_D	-1.501 (0) [0.520]	-1.489 (3) [0.525]		-5.277 (0) [0.00]***	-5.277 (4) [0.00]***
	W_M	2.567 (6) [0.99]	-2.089 (1) [0.249]		-1.871 (5) [0.339]	-4.520 (1) [0.00]***
	K	-1.987 (0) [0.585]	-2.031 (1) [0.562]		-4.859 (0) [0.00]***	-4.859 (0) [0.00]***
	A	-1.636 (3) [0.753]	-1.740 (3) [0.709]		-3.787 (2) [0.032]**	-6.223 (9) [0.00]***
	Ls	-1.943 (0) [0.608]	-1.957 (1) [0.601]		-5.678 (0) [0.00]***	-5.731 (4) [0.00]***
	C	-1.636 (3) [0.753]	-1.740 (3) [0.709]		-3.787 (2) [0.032]**	-6.223 (9) [0.00]***
	W	-1.084 (4) [0.914]	-1.623 (2) [0.760]		-4.378 (3) [0.00]***	-8.665 (5) [0.00]***
	L_D	-1.794 (0) [0.684]	-1.794 (0) [0.684]		-5.252 (0) [0.00]***	-5.306 (5) [0.00]***
	W_M	-0.048 (6) [0.99]	-3.330 (2) [0.079]*		-3.77 (5) [0.035]**	-0.394 (5) [0.983]

Notes: ***, ** and * denote stationarity of the series at 1%, 5% and 10% levels of significance, respectively. () denotes the lag lengths chosen according to the Schwarz information criterion in the ADF (1981) test and the Newey-West estimator in the PP (1988) test, [] denotes probability values.

Real fixed capital investments, real consumption expenditures and labor force are stationary at first difference in the alternative model and tests. According to the PP (1988) test, real minimum wage is stationary at 10% significance level in the model with constant and trend. It is stationary at first difference in other alternative models and tests. In order to test whether there are structural breaks in the variables in the model, Zivot and Andrews (ZA, 1992) single-internal and Lee and Strazicich (LS, 2003, 2004) double-internal break tests are added.

Table 2

ZA (1992) and LS (2003, 2004) Test Results

Panel A. Zivot and Andrews (1992)		
	Model A	Model C
K	-6.992*** (2010)	-5.623*** (2010)
A	-8.244*** (2010)	-7.802*** (2010)
Ls	-2.779 (2001)	-5.067* (2009)
C	-2.042 (2013)	-10.441*** (2005)
W	-4.592* (2002)	-5.830*** (2007)

L_D	-6.790*** (2014)	-6.491*** (2012)
W_M	-6.714*** (2012)	-7.519*** (2011)
Panel B. Lee and Strazicich (2003, 2004)		
K	-2.583 (2003 and 2010)	-9.075*** (2010 and 2019)
A	-2.832 (2003 and 2007)	-7.067*** (2004 and 2014)
Ls	-2.521 (2003 and 2012)	-6.918*** (2004 and 2018)
C	-1.930 (2008 and 2017)	-9.226*** (2007 and 2015)
W	-4.462*** (2001 and 2003)	-8.487*** (2001 and 2011)
L_D	-4.599*** (2014 and 2017)	-8.885*** (2003 and 2014)
W_M	-4.157*** (2005 and 2018)	-9.854*** (2000 and 2011)

Notes: : ***, ** and * indicate acceptance of the alternative hypothesis at 1%, 5% and 10% levels of significance, respectively. Critical values for 1%, 5% and 10% are -5.34, -4.80 and -4.58 for Model A, -5.57, -5.08 and -4.82 for Model C in ZA (1991) test, respectively. In the LS (2003) test, they are -3.77, -3.34 and -3.05 for Model A and -4.54, -4.02 and -3.74 for Model C.

In the ZA (1992) test, *K* and *A* variables experience structural breaks in 2010, *Ls* variable in 2009 in Model C, *C* variable in 2005 in Model C, *W* variable in 2002 in Model A and 2007 in Model C, L_D variable in 2014 in Model A and 2012 in Model C, W_M variable in 2012 in Model A and 2011 in Model C. In the LS (2003,2004) test, *K, A, Ls* and *W* variables experience structural breaks in Model C in 2004, 2010, 2007, 2014, 2015, 2018 and 2019. The *W* variable experiences structural breaks in Model A and C in 2001 and 2003, 2011, and the L_D variable experiences structural breaks in Model A and C in 2003, 2014 and 2017. Finally, the W_M variable experiences structural breaks in 2005 and 2018 in Model A and in 2000 and 2011 in Model C. The *K* and *A* variables are thought to reflect the structural transformations caused by the lagged impact of the 2008 global economic crisis on short-term capital flows and production capacity. This may be a sign of a new trend in production and thus productivity growth after the crisis (Fernald, 2015). The *Ls* variable refers to the period when the reforms towards the EU process started in the Turkish economy (2004) and the 2018 exchange rate shock occurred. The break dates in the *C* variable indicate the years of high growth rates in the pre-crisis period and the subsequent stabilization of domestic demand. *W* and W_M bear the signs of nominal rigidity and indexation behavior of wage policy in the labor market. The L_D variable reveals the slowdown in international trade and the difficulties of the national growth structure in the process of job creation in the period between 2012 and 2017. These findings reveal that labor demand was shaped by a new labor-production equilibrium in the post-crisis period (Elsby et al., 2013). When the break dates are evaluated as a whole, it shows that the stationarity of labor supply and demand can change over time and that these transformations are concentrated on certain dates. These findings support the view that the industrial sector reaches its optimal production level at the point where nominal wages stabilize in Lewis (1954) type dual economies. Moreover, Calmfors and Driffill (1988) suggest that the nominal wage adjustment process in institutional labor market models is driven by political intervention.

The labor supply and labor demand models are based on Kim and Lim (2018). In this context, the labor demand model;

$$L_D = \beta_0 + \beta_1 W_M + \beta_2 A + \beta_3 K \tag{1}$$

L_D stands for labor demand, W_M for minimum wage level, *A* for total factor productivity and *K* for real fixed capital investments. Economic theory expects the coefficient β_2 of total factor productivity to be negative and the coefficient β_3 of real fixed capital investments to be positive.

Table 3

Long run SVAR parameters for the labor demand model

	L_D	W_M	A	K
L_D	C(1)	0	0	0
W_M	C(2)	C(5)	0	0
A	C(3)	C(6)	C(8)	0
K	C(4)	C(7)	C(9)	C(10)

The coefficient C(2) is the parameter β_1 and the effect of minimum wage level on labor demand in the above model, the coefficient C(3) is the parameter β_2 and the effect of total factor productivity on labor demand, and C(4) is the parameter β_3 and the effect of real fixed capital investments on labor demand. Labor supply model;

$$L_S = \beta_0 + \beta_1 W + \beta_2 C \tag{2}$$

L_S is labor supply, W is real average wage and C is the ratio of consumption expenditures to gross domestic product. Both β_1 and β_2 coefficients are expected to have positive signs.

Table 4

Long run SVAR parameters for the labor supply model

	L_S	W	C
L_S	C(1)	0	0
W	C(2)	C(4)	0
C	C(3)	C(5)	C(6)

Coefficient C(2) indicates the effect of average real wage on labor supply, while coefficient C(3) shows the effect of the ratio of consumption expenditures to gross domestic product on labor supply. The variables are included in the vector autoregression (VAR) model by taking the first difference. For VAR models, the optimal lag length should be determined first. The optimal lag length is chosen as 3 for the labor demand model and 4 for the labor supply model. The long-run structural vector autoregression (SVAR) model proposed by Blanchard and Quah (1988) is used for parameter estimation. The long-run structural vector autoregression model reveals the reflections of the permanent effects of economic shocks on the parameters. By imposing restrictions on the vector autoregression model, the structural vector autoregression model is obtained by normalizing vt with unit variance (Güneş et al., 2013, p. 7).

The simultaneity constraints in the SVAR method allow for the separation of endogenous/exogenous shocks. From this point of view, SVAR differs from other VAR models in terms of revealing the effect of structural shocks (especially on macro indicators such as wages and consumption). The main reason for choosing SVAR is that it can theoretically decompose both simultaneous and lagged effects of the variables in the study on each other. For the SVAR model to provide robust results, some econometric assumptions must be met. Since the SVAR model is ultimately a VAR model, the variables in the model should be stationary. In order to detail the shocks in the SVAR model, simultaneity constraints need to be defined. These constraints should be based on economic theory. Finally, the optimal lag length should be chosen correctly to obtain robust and consistent estimators (Amisano & Giannini, 2012).

Table 5

Long run SVAR parameters for the labor demand model

	L_D	W_M	A	K
L_D	C(1) -2.586 (0.00)***	0	0	0
W_M	C(2) -2.771 (0.00)***	C(5) 0.591 (0.00)***	0	0
A	C(3) 0.102 (0.00)***	C(6) -0.021 (0.00)***	C(8) 0.032 (0.00)***	0
K	C(4) 0.167 (0.00)***	C(7) -0.036 (0.00)***	C(9) 0.051 (0.00)***	C(10) 0.026 (0.00)***

Notes: *** denotes the level at which the coefficients are statistically significant at the 1% significance level.

In the model where labor demand is the dependent variable, all parameters are statistically significant at the 1% level. In the model, if the minimum wage increases by 1%, labor demand decreases by approximately 2.7%. If total factor productivity increases by 1%, labor demand increases by 0.1%. If real fixed capital investments increase by 1%, labor demand increases by 0.16%. As stated before, the coefficient β_2 of total factor productivity is expected to have a negative sign, while the coefficient β_3 of real fixed capital investments is expected to have a positive sign. Both coefficients are consistent in terms of economic theory. In the labor demand model, the predictions of classical economics for the labor market are valid. As the minimum wage level is flexible, the labor force remains relatively low and labor demand increases. With increasing labor demand, total real fixed capital investments increase. The positive effect of total factor productivity on labor demand indicates that the labor force in the Turkish economy is more efficient and productive in terms of quality rather than quantity.

Table 6

Long run SVAR parameters for labor supply model

	L_S	W	C
L_S	C(1) 0.590 (0.00)***	0	0
W	C(2) -0.140 (0.011)**	C(4) 0.285 (0.00)***	0
C	C(3) -0.025 (0.015)**	C(5) 0.024 (0.0104)**	C(6) 0.050 (0.00)***

Notes: *** and ** denote the level at which the coefficients are statistically significant at the 1% and 5% levels of significance, respectively.

The variables real average wage and the ratio of consumption expenditures to gross domestic product are statistically significant at the 5% level of significance. If the average real wage increases by 1%, labor supply decreases by 0.14%. If the ratio of consumption expenditures to GDP increases by 1%, labor supply decreases by 0.025%. In this model where labor supply is the dependent variable, the coefficients β_1 and β_2 are expected to have positive signs. However, both signs are negative. There are several reasons why the labor supply model yields results contrary to the expectations of economic theory. According to Bakır and Eryılmaz (2020), crises in the Turkish economy have an increasing effect

on unemployment, Bayat et al. (2013) argue that the unemployment rate also has a hysteria effect, and Koçyiğit et al. (2011) show that the unemployment rate persists to increase above a certain threshold. The increase in real wages does not create employment and the resulting decrease in effective demand does not contribute to economic growth through spending. The reason for the unemployment in the Turkish economy stems from the inflexibility of real wages, at least in the downward direction. Classical economics tries to explain this situation with reasons arising from the institutional structure such as minimum wage and unionization rate.

Table 7

Pairwise Granger Causality

	Panel A. Causality in labor demand model			
	L_D	W_M	A	K
L_D	-	0.167 (0.919)	0.195 (0.906)	0.063 (0.968)
W_M	0.697 (0.705)	-	0.600 (0.740)	0.164 (0.921)
A	0.533 (0.766)	0.310 (0.856)	-	0.214 (0.898)
K	0.285 (0.866)	0.297 (0.861)	0.022 (0.988)	-
	Panel B. Causality in labor supply model			
	L_S	W	C	
L_S	-	0.639 (0.727)	0.367 (0.832)	
W	0.685 (0.709)	-	7.632 (0.022)**	
C	0.286 (0.866)	0.140 (0.932)	-	

Notes: ** $p < 0.05$

According to SVAR causality results, there is no causality relationship in the regression model modeled by labor demand. These results indicate that labor demand is not affected by independent variables in the short run. This is because according to Bertola et. al. (2007), the dynamic structure of labor demand depends on exogenous/complex shocks rather than endogenous/past values. On the other hand, the absence of a causality relationship is explained by the fact that labor demand is rigid according to Nickell (1997) and firms decide on labor demand based on long-run economic expectations and the share of fixed costs in total costs. Aidt and Tzannatos (2020) attribute this to the endogenous character of the wage/productivity relationship with its strong union structure and institutional arrangements. A similar situation applies to the labor supply model. In the labor supply model, there is causality only from W to C at the 5% significance level. This finding reveals the decisive role of the income effect on labor consumption decisions according to Carroll et. al. (2007). Increases in real wages increase the marginal consumption of households (especially at low income levels). This supports the Keynesian approach that changes in real income in the short run will change aggregate demand.

4. Conclusion

The main objective of economic policy is to achieve sustainable economic growth leading to full employment. In economic theory, the debate between Classical and Keynesian economists on the supply and demand of labor in the short and long run has been the subject of empirical applications for a long time. The conceptual framework of classical economics on flexible wages conflicts with the practical reality of Keynesian economics. The main purpose of this study is to analyze the ongoing debate between Classical and Keynesian economics on wages in the context of the Turkish economy. On the other hand, it is necessary to contribute to this debate by applying the structural vector autoregression model among the alternative parameter estimation methods that have emerged in econometric methodology. In this study, labor supply and demand in the Turkish economy are estimated using data covering the period 1990-2022. The empirical analysis reveals that Keynesian efficient wage models provide more consistent results in the Turkish economy. Therefore, since aggregate expenditures are not affected by real wages, there is no relationship between real wages and employment. This is because real wages have an adverse effect on labor supply and do not have the expected effect on the long-run natural rate of unemployment. When real wages decline, labor demand increases at the minimum real wage level, but there is no institutional structure to ensure that labor supply accepts this wage level. In the final analysis, since Keynesian economics is concerned with underemployment markets, changes in aggregate demand affect labor supply and demand. There are many theoretical and

empirical studies on labor markets. In future studies, sectoral and regional labor supply and demand functions should be revealed with the developments in econometric theory.

Author statement

Research and publication ethics statement

This study has been prepared in accordance with the ethical principles of scientific research and publication.

Approval of the ethics board

Ethics committee approval is not required for this study.

Author contribution

All authors have contributed to the study equally.

Conflict of interest

There is no conflict of interest arising from the study for the authors or third parties.

Declaration of support

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Appendix 1

Autocorrelation of Labor Demand Model

Lags	LM-Stat	Prob
1	13.57598	0.6303
2	14.91715	0.5307
3	14.32791	0.5743

Heteroscedasticity of Labor Demand Model

Joint test:		
Chi-sq	df	Prob.
146.5162	160	0.7699

Appendix 2

Autocorrelation of Labor Supply Model

Lags	LM-Stat	Prob
1	3.955656	0.9143
2	3.442298	0.9442
3	5.257803	0.8113

Heteroscedasticity of Labor Supply Model

Joint test:		
Chi-sq	df	Prob.
66.73802	72	0.6531