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DETERMINANTS OF RESERVATION WAGES IN TURKEY*

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ABSTRACT

Reservation wage is the minimum wage level at which a person is willing to accept work. This wage level represents the starting point of the individual labor supply curve. This study aims to determine the factors which have an effect on an unemployed person's reservation wage. The survey prepared for this purpose was provided to unemployed individuals who applied to the Turkish Labor Agency in 15 cities located in different regions of Turkey. The total number of surveys applied was 2,162. When the number of surveys to be applied in each city was determined, the number of unemployed people living in the region represented by the city was taken into consideration, as was their distribution by gender. The two-stage least squares method was used in the analysis. As a result of the study, the social, demographic and economic determinants of unemployed people's reservation wages were determined. An attempt has also been made to develop various policy recommendations. In addition, it is thought that this study will also help provide a better understanding of labor supply in Turkey.

Keywords: Reservation wage, unemployed, Turkey

JEL Classification: J64, E24, J21

1. INTRODUCTION

Reservation wage is the wage level at which an individual is indifferent between working and not working. At this wage level, the individual thinks that the benefits to be derived from working are equal to the benefits to be derived from not working. Thus people are expected to make the decision to work above the reservation wage and not to work below it. In other words, the minimum wage that the individuals consent to work for is the reservation wage, and it has a key role in labor market analyses (Brown and Taylor 2013). In addition, reservation wage is an important factor for the unemployed person in terms of the possibility of finding a suitable job, and impacts the wage level he/she will receive (Lancaster and Chesher 1983; Jones 1989). Reservation wage constitutes the starting point of the individual labor supply curve because under this wage level the person makes the decision not to work. In other words, the person does not supply services.

Reservation wage is a wage level that exists for everybody. However, the level of reservation wage differs from person to person. The reason for this is that individuals have different characteristics. Individuals with different social, economic and demographic features determine different wage levels as their reservation wage. However, individuals should be realistic when determining this wage level because unemployment usually becomes a significant issue as a result of a high reservation wage (Brown and Taylor 2013). Therefore, a high reservation wage diminishes the probability of working, and results in a longer period of unemployment.

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By understanding the determinants of reservation wage it is possible to obtain information that will shed light on labor supply and job search behaviors (Prasad 2003). Therefore, it is important to determine which factors have an effect on the determination of individuals' reservation wages, and to what extent. However, these factors vary widely. In addition to the macroeconomic environment that the person is in, his/her own economic position can also be influential. However, the effect of macroeconomic factors is open to discussion. For example, Franz (1980) determined that effects of labor demand related variables are low. On the other hand, Jones (1989) found that the effect of regional unemployment rates was uncertain, while Hogan (1999) claimed that the effect was low. In addition to these factors, past educational investments which constitute a person's human capital, and environmental and family factors, along with a person's consumption habits, are also important.

In this study, in accordance with the explanations presented above, in addition to regional unemployment rate, which is one of the macroeconomic variables that affect reservation wage, variables relating to a person's individual characteristics were also used. Examples of such variables are a person's occupation and basic education, the number of children they have, the primary source of income in the family, duration of unemployment, and level of indebtedness.

Reservation wage and its determinants have been analyzed in the context of many different countries. However, no other study has been conducted on this subject in Turkey. The reason for this is most likely that no data exists in regards to reservation wage in Turkey. Therefore, this study is the first to analyze the Turkish example.

In the subsequent sections of the study, first, the theoretical background and previous studies on the subject will be presented. This section is followed by a material and methodology section, in which data and the method used in the study are analyzed. In the next section, on findings, an analysis of our results is provided. The study ends with a conclusion and recommendations.

2. LITERATURE REVIEW

This section presents brief information about the theory behind reservation wage. In labor markets, individuals try to maximize the expected current value of future income streams towards an infinite horizon. In such a case, under the assumption that wage offers are determined independent of known wage offer distribution, Lancaster and Chesher (1983) define the optimal reservation wage as follows:

$$w^r = b + \frac{\lambda}{\rho}\int_{w^r}^{\infty}(x - w^r)dF(w) \quad (1)$$

In this equation, w^r represents reservation wage, b shows net unemployment benefits, λ is job offer rate, ρ is the discount rate of future income streams, *x* denotes wage offer with distribution function *F(w)*. Equation (1) states that the optimal reservation wage is determined at the level at which marginal benefit of the job search is equal to its marginal cost. When a person receives a wage offer and if this offer is greater than or equal to w^r, this person accepts the offer. However, if it is less than w^r, he/she refuses it and keeps on searching for a new job. Besides, as Lancaster and Chesher (1983) mentioned, a person's choice should be rational. In other words, it should satisfy the following condition:

$$b \leq w^r \leq x \quad (2)$$

This condition requires that a person's unemployment benefits (*b*) are less than or equal to reservation wage (w^r) and also that reservation wage (w^r) is less than or equal to expected wage (*x*) shaped with wage offer.

Standard job search models state reservation wage as a function of wage offer, number of job offers received and the cost of the job search. All these factors take a shape depending on a person's characteristics. The first of these includes the wage which the employer offers to a jobseeker depending on the jobseeker's qualifications. The second changes with respect to whether or not the person has the required qualifications for the labor market. The third factor, on the other hand, is shaped by the characteristics of the economic situation that the person is in. The most important among the factors that constitute job search cost is whether the person receives unemployment benefit or not. Other than this, the existence of other working family

members and alternative income sources leads to a reduction in the cost of the job search. As can be seen in Equation (1) an increase in unemployment benefits (b) increases reservation wage.

This result can also be obtained by taking a partial derivative.

$$\frac{\partial lnw^r}{\partial lnb} = \frac{b}{w^r}\frac{x-w^r}{x-b} \tag{3}$$

b and w^r are positive. Besides, since $b \leq w^r \leq x$ will be satisfied for a rational person, $x - w^r$ and $x - b$ are positive. In other words the value of the partial derivative is positive. This shows that an increase in unemployment benefit leads to an increase in reservation wage. Likewise, if the partial derivative of reservation wage (w^r) is taken with respect to job offer (λ) the following result is obtained:

$$\frac{\partial lnw^r}{\partial ln\lambda} = \frac{w^r-b}{w^r}\frac{x-w^r}{x-b} \tag{4}$$

The difference of this partial derivative from the previous one is $w^r - b$. Since this value will be positive under the assumption that the person will be rational, the result is positive. This result shows that an increase in job offers increases reservation wage.

In addition to person specific variables, macroeconomic variables also have an effect on reservation wage. These effects are intertwined with the function mentioned above. For example, a high local unemployment rate decreases the number of job offers a person can receive and leads to a decrease in reservation wage (Prasad 2003).

Another important factor is the duration of the unemployment. Reservation wage can be endogenously determined by the unemployment duration because according to optimal job search theory there is a positive correlation between these two variables under the static reservation wage assumption. This opinion states that an increase in reservation wage leads to a longer period of unemployment. Therefore, when determinants of reservation wage are analyzed, the endogeneity problem that unemployment duration creates should not be disregarded.

The reservation wage that an individual states is usually higher than the wage they would actually accept. The reason for this is that individuals report the wage they consider "fair" for themselves rather than the "right" reservation wage (Zoch 2014). Therefore, the use in previous studies of reservation wages as expressed by individuals can be seen as a problem that diminishes the efficiency of these analyses. Addison et al. (2005) also take note of this problem and state that real reservation wage can only be established when the person receives a wage offer. In this case, how should the right reservation wage data should be obtained? One way could be by bargaining with the individual over the stated wage and making them think that they would receive a fair wage offer. When a person is asked whether he/she would actually work below reservation wage level after that person has quoted a reservation wage, it has been observed that a majority of people accept lower levels of wages. Later on they are offered a still lower wage and asked whether they would accept it. In this way, wages are lowered up to the point at which the person states that he/she will not work for the rate being offered. This wage level is the point at which the person is indifferent between working and not working. In other words, this is the reservation wage.

Another problem related to data gathering should also be noted here. During the interviews, when a person states his/her reservation wage, he/she does not consider many factors that are related to the wage in question, because the person is not receiving an actual job offer. When encountering a real job offer, the person will consider many other factors, such as whether the job is unsafe or if the travel costs are high, etc. Therefore, the data obtained could be different from the wage level at which the person is actually indifferent between working and not working. However, there is no method of preventing this divergence.

The studies discussed below can be given as previous examples of academic work on this subject. However, as mentioned earlier, there is no previous study analyzing the case in Turkey.

Kiefer and Neumann (1979) state that reservation wages can change over time due to various reasons and the distribution of job offers. Fishe (1982) analyzed unemployed people's reservation wages along with the topic of

unemployment insurance. Fishe's findings showed that non-whites and women received lower wage offers than whites and men, and that their reservation wages were also lower. In addition, the study found that when reservation wage decreased by 10% the chance of starting a new job increased by 8%, and that unemployment insurance had an effect on reservation wage directly and over time. Jones (1988) reached the conclusion that in general unemployment is due to reasons such as unemployed people's unwillingness to work, downward rigidity in wages and high reservation wages. In addition, Jones (1989) found that previous wages received had an important effect on reservation wage. A similar finding was also obtained by Hogan (1999). Hui (1991) analyzed the reservation wages of unemployed young people in Australia. He used the two-stage ordinary least squares method in his study, and unlike other studies he used weekly reservation wage data. He also analyzed the effect of place of residence. In this way, the differences between people living in cities, towns and villages were analyzed.

Heath and Swann (1999) also used the two-stage ordinary least squares method. According to this study, reservation wage does not affect unemployment duration. They found that experienced people, those with high skills and seniors have a higher reservation wage. They also found that people who do not live in urban areas have lower levels of reservation wage. In a study by Haurin and Sridhar (2003) the ordinary least squares and two-stage least squares methods were used. They found that men have higher levels of reservation wage than women. Hui (1991) and Jones (1988) reached similar conclusions. Haurin and Sridhar (2003) show that time spent in education had a statistically significant effect on reservation wage. People with a higher number of children have relatively low reservation wages. Living in urban places and cities has a positive but low effect on reservation wage. Unlike other studies, the authors also analyzed the effects of quitting a job or the fear of losing a job on reservation wage. In his study conducted with people in the 17-55 age range in western Germany, Prasad (2003) determined such factors as apprenticeship, vocational training, a university degree, and regional unemployment as the determinants of reservation wage. The study used the ordinary least squares method.

Rööm (2003) analyzed the factors that determine unemployed people's reservation wages. According to the study's findings, unemployed benefits and social aids do not have statistically significant effects on reservation wages in Estonia. Brown et al. (2007) analyzed the relationship between health and reservation wage. Despite it being an important variable, they determined that there was no significant relationship between health and reservation wage. Sestito and Viviano (2008) analyzed determinants of reservation wage in Italy. Using Italy's workforce research and European household panel research data, their aim was to draw attentions to regional differences. They determined that reservation wages in the southern part of the country were 10% higher than in central and northern parts.

Addison et al. (2010) used a data set that comprised 15 EU countries. They used the ordinary least squares method in the analysis. They determined that reservation wages go down during periods of unemployment, and that high reservation wages result in longer unemployment durations.

In the study conducted by Ophem et al. (2011) the researchers analyzed the northern, western and southern regions of the Netherlands; the people they interviewed stated that their perspectives about the market in general determined their reservation wage levels. In this way, market prices and wages significantly affect reservation wages in the same direction. Reservation wages are formed in line with market expectations; however, accepted wages are formed randomly. The researchers found that accepted wages are almost 8% higher than the wages considered acceptable by participants, and that men have 2% higher reservation wages than women. The study also found a positive relationship between age and reservation wage. In other, more developed regions reservation wages are higher. It was also determined that having a degree and having children led to an increase in reservation wage.

3. DATA AND METHODOLOGY

Although the household workforce survey conducted in Turkey provides a very wide set of data, it does not include reservation wage. Therefore, when a study is conducted into reservation wage this data set cannot be utilized. In order to overcome this problem, a survey study was carried out. This survey was conducted at the Turkish Labor Agency on a nationwide scale. In order to ensure that this survey is representative of all the

unemployed people in the country, certain criteria in particular were emphasized. First, the survey was conducted in all of the first degree regions in the nomenclature of territorial units for statistics. In addition, the survey was conducted with respect to number of unemployed people and with respect to their gender (male or female) distribution. In this way, the survey was conducted with a total of 2,162 unemployed people. Out of these 63.6% are male and 36.4% are female. In order to conduct the survey with people who fit well with the definition of being unemployed, special attention was paid to the selection of people "who do not have a job, are looking for a job and can work two days a week". In order to obtain their reservation wage, survey participants were asked "What is the lowest wage you would accept for a job suitable for you?" However, assuming that the answers provided to these kinds of questions are usually higher than actual reservation wages, survey participants were then asked whether they would work at a wage a little lower than the wage level they had just stated. In other words, survey participants were bargained with regarding their reservation wage. This question was repeated until the survey participants gave the answer "I won't work lower than this wage". This way the actual reservation wages, at which participants were indifferent between working and not working, were determined. Participants were also requested to state how many hours they would be willing to work in a week for their reservation wage. After this, reservation wage was divided by the number of hours participants would be willing to work, and thus hourly reservation wages were obtained.

In the survey application those who wanted to establish their own business were excluded. As Sestito and Viviano (2008) point out, the reservation wages of these people contain a risk premium in regards to variability in profit. In addition, another reason for including only unemployed people is that the wage levels current employees are getting affect their reservation wages.

Table 1 presents the explanations of variables obtained as a result of the survey and used in the analysis.

Table 1. Descriptive Statistics for Variables

Variable	***Definition***	***Mean.***	***St. Dev.***
lnRW	Logarithm of hourly reservation wage	3.264	0.327
lnUD	Logarithm of unemployment duration	1.482	1.025
lnHHI	Logarithm of household income	7.099	1.411
lnLW	Logarithm of participant's previous wage	6.432	1.963
lnINS	Logarithm of insurance period in months	3.009	1.605
GENDER	Gender (0 = male, 1= female)	0.363	0.481
EDUC	Education (0 = under or equal to 12 years, 1= under or equal to 13 years)	0.316	0.465
PSINC	Primary source of income for the family (0 = no, 1= yes)	0.352	0.478
DEGR	Graduate degree from most recently attended school	0.736	0.141
APPRNT	Has ever been apprenticed? (0 = no, 1= yes)	0.238	0.426
FRGLANG	Number of foreign languages spoken	0.385	0.537
RENT	Paying rent (0 = no, 1= yes)	0.384	0.486
Uİ	Receiving unemployment benefit? (0 = no, 1= yes)	0.087	0.283
CARE	Has a family member in need of care? (0 = no, 1= yes)	0.113	0.317
WRKMEMB	Number of working people in the family	4.136	1.541
UNEMP	Unemployment rate in the respondent's region of residence	10.098	2.145
SMOKER	Smoker (0 = no, 1= yes)	0.458	0.498
ALCOHOL	Drinks alcohol (0 = no, 1= yes)	0.104	0.305
RESID	Place of residence (1= city or grand city, 0 = other)	0.759	0.427
OWE	Owe money (0 = no, 1= yes)	0.469	0.499
DEPCHILD	Dummy variable (1= women with dependent child, 0 = other)	0.059	0.235
JOBOFFER	Number of job offers received	0.493	1.103

3.1. Methodology

In economic models, exogenous variables are believed to change endogenous variables. The assumption that other conditions are constant prevents any problems occurring. However, the assumption that other conditions are constant is quite restrictive when used to construct a model of a real-world situation. When it is desired that these restrictions be eliminated, exogenous variables can in some cases be determined by endogenous variables. The determination of an exogenous variable by an endogenous variable, in other words, an exogenous variable becoming an endogenous variable in the model, is referred to as the endogeneity problem. In the model used in this study there is an endogeneity problem. This is because, according to the theory, some variables which need to be exogenous are in an endogenous position. This situation causes these variables to be associated with an error term. In other words, $cov[x'u] \neq 0$. In such a case, the coefficients obtained from OLS estimation will be divergent.

In order to eliminate the endogeneity problem it is appropriate to use instrumental variables. Instrumental variables to be used should satisfy certain conditions. Katchova (2013) has itemized the z instrumental variables vector as follows:

- *z* is correlated with the regressors *x*, $\mathrm{E[z'x]} \neq 0$ (*z* predicts or causes *x*)
- *z* is uncorrelated with the error term *u*, $\mathrm{E[z'u]} = 0$ (*z* is not endogenous)
- *z* is not a direct cause of the dependent variable *y*, $\mathrm{cov[y, z|x]} = 0$ (*z* is not in the *y* equation)

Let us assume that we have an equation such as the following:

$$y_1 = \beta_1 y_2' + \beta_2 x_1' + u \tag{5}$$

where y_1 represents an independent variable, y_2 represents an endogenous variable, and x_1 represents an exogenous variable. In this case, we need to find a set of instruments $z = [x_1, x_2]$ in which x_1 is an instrument for itself and x_2 is an instrument for y_2. After finding such a set of instruments, in order to overcome the endogeneity problem the two-stage least squares method (2SLS) can be used. In this method, instead of the endogenous variable, the estimated values of the endogenous variable are used. In other words, the below equation is constructed for y_2:

$$y_2 = \gamma_1 x_1' + \gamma_2 x_2' + e \tag{6}$$

For $\hat{y}_2$ which was derived from this equation, estimated values are calculated and in the first equation these values are used. In this case, the model turns into the following form:

$$y_1 = \beta_1 \widehat{y_2'} + \beta_2 x_1' + u \tag{7}$$

If the number of instrumental variables is equal to the number of endogenous variables then the model is fully defined. In such a case, estimators will be without divergence as shown below. Because, as mentioned above, $E[z'u] = 0$.

$$b_{IV} = (z'x)^{-1} z'y = (z'x)^{-1} z'(x\beta + u) = \beta + (z'x)^{-1} z'u \tag{8}$$

Since $z'u = 0$, it leads to $b_{IV} = \beta$.

Because the model used in the study contains an endogeneity problem, instrumental variables, which represent the endogenous variables, were used. The model is presented below:

$$\ln RW_i = \alpha_0 + \alpha_1 lnUD_i + \alpha_2 \ln HHI_i + \alpha_3 \ln LW_i + \alpha_4 \ln INS_i + \alpha_{5i} X_i + \varepsilon_i \tag{9}$$

The dependent variable *lnRW* represents the natural logarithm of hourly reservation wage, *lnHHI* represents the natural logarithm of household income, *lnUD* represents the natural logarithm of unemployment duration, *lnLW* represents the natural logarithm of previous wage and *lnINS* represents the natural logarithm of insured period. The *X* vector, on the other hand, is the vector that contains explanatory variables which are determinants of reservation wage. Using logarithms in the regression equation allows useful results to emerge. In the regression equation, α_1, α_2, α_3 and α_4 show the elasticity of reservation wage with respect to unemployment duration, expected wage, previous wage and working time with social security coverage. In other words, α_1 shows the percentage change in reservation wage in response to a 1% change in

unemployment duration, α_2 shows the percentage change in reservation wage in response to a 1% change in household income, α_3 shows the percentage change in reservation wage in response to a 1% change in previous wage and α_4 shows percentage change in reservation wage in response to a 1% change in working time with social security coverage.

4. FINDINGS AND DISCUSSIONS

In order to determine whether there was an endogeneity problem, we first conducted Durbin and Wu-Hausman tests. In these tests the null hypothesis states that the variables are exogenous. The test results were 14.572 (p = 0.0001) and 14.515 (p = 0.0001) respectively. Given this result the null hypothesis is rejected and it is concluded that there indeed exists an endogeneity problem. In order to prevent this problem, the two-stage ordinary least squares method was used.

Table 2 shows the findings from the two-stage least squares model in which reservation wage is a dependent variable. Our findings show that, contrary to expectations, an increase in unemployment duration (*lnUD*) leads to an increase in reservation wage. Compared to women, men have a higher reservation wage level. Those who have university or graduate degrees (*EDUC*) have a higher reservation wage than those who have lower levels of educational qualification. As the level of degree (*DEGR*), which is an important indicator of achievement in educational life, increases, reservation wage also increases. Those who had done an apprenticeship (*APPRNT*) had a higher level of reservation wage. Likewise, an increase in the number of foreign languages spoken (*FRGLANG*) increases reservation wage. As the reason for the findings in regards to education, it can be suggested that people want to get a return for their additional educational investments and educational lives.

Table 2. Two-stage Least Squares Method Findings

	Coefficient	St. Error	t value	P value
lnUD	0.317*	0.115	2.750	0.006
lnHHI	0.010	0.007	1.420	0.155
lnLW	0.044*	0.014	3.170	0.002
lnINS	0.035*	0.010	3.480	0.000
GENDER	-0.043***	0.023	-1.850	0.064
EDUC	0.116*	0.028	4.180	0.000
PSINC	0.025	0.024	1.060	0.289
DEGR	0.152***	0.087	1.740	0.083
APPRNT	0.051**	0.024	2.160	0.031
FRGLANG	0.059*	0.022	2.610	0.009
RENT	0.041***	0.021	1.940	0.052
Uİ	0.124*	0.036	3.420	0.001
CARE	-0.065**	0.030	-2.170	0.030
WRKMEMB	-0.018*	0.006	-2.830	0.005
UNEMP	0.033*	0.006	5.270	0.000
SMOKER	0.037	0.022	1.640	0.101
ALCOHOL	0.038	0.035	1.090	0.276
RESID	-0.091*	0.031	-2.900	0.004
OWE	0.092*	0.025	3.700	0.000
DEPCHILD	-0.042	0.042	-1.010	0.313
JOBOFFER	0.002	0.010	0.250	0.805
CONSTANT	1.922*	0.348	5.520	0.000

Note: *, ** and *** show statistical significance of the coefficient with respect to 1%, 5% and 10% significance levels, respectively.

An increase in working time with social security coverage (*lnINS*), which is one of the variables related to the previous work life of a person and an indicator of their experience, and increase in previous wage (*lnLW*),

increase a person's reservation wage. People want to transfer their previous experiences and wage levels to their new jobs. People who have been receiving unemployment benefit (*Uİ*) have higher levels of reservation wage acceptance. Likewise, people who owe money (*OWE*) have higher reservation wage levels. The reason for this could be that they want to get rid of their debts quickly. Another unexpected finding is that unemployment rate in the region in which the person lives in (*UNEMP*) has an increasing effect on reservation wage.

Some factors which have a decreasing effect on reservation wage have also been determined. Paying rent (*RENT*) increases reservation wage, because thanks to owning a home or living with parents the person does not have to make rent payments and cost of job search decreases. This makes him/her willing to accept a lower wage. The existence of dependent family members (*CARE*) could drive the person to find a job faster. This can be interpreted as suggesting that the existence of a dependent family member is a factor that leads to lower levels of reservation wage. An increase in the number of working family members (*WRKMEMB*) is a decreasing factor for reservation wage. As the number of working family members increases, the share of common expenses that falls on the shoulders of any one family member will decrease, and the person will be willing to work for a lower wage. Finally, people living in cities or grand cities (*RESID*) have lower reservation wages than people living in other residential regions. This can be explained by the fact that there is more intense competition between the people who supply labor in cities and grand cities.

It is also possible to interpret some findings as elasticity. A 1% increase in unemployment duration (*lnUD*), working time under social security coverage (*lnINS*), and previous wage (*lnLW*) increase reservation wage by 0.317%, 0.044% and 0.035% respectively. According to these findings, it is understood that among the variables in question, duration of unemployment has the biggest effect on reservation wage.

5. CONCLUSION

This study analyzed the factors that affect reservation wages in Turkey. This is the first study to analyze reservation wage and its determinants in Turkey. When the data obtained from the survey, which was conducted in 15 cities with 2,162 people, was analyzed, important results were obtained. First, it was determined that an increase in unemployment duration leads to an increase in reservation wage. This finding in particular is notable, as it is not in line with the related theory. The second finding is about human capital. It was determined that increases in education led to an increase in reservation wage. On the other hand, the factors affecting the cost of the job search are paying rent and number of working family members. In line with the theory first of these is positively and the second is negatively correlated with reservation wage. However, no significant relationship was found between unemployment benefits and reservation wage. This study is the first on this topic to be conducted in Turkey. In addition, it uses a unique and comprehensive data set, and this further increases the importance of the study. It is believed that this study will make contributions to both the supply side and the demand side of the workforce market alike. In addition, it is expected that this study will be of great use to policy makers during their efforts to develop policies for the workforce market.

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