

## **Interplay Between Reservation Wage and Unemployment Duration: Evidence From North Macedonia**

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### **Abstract**

Being a country with relatively high unemployment rate of 23.7% (SSO, 2016) and especially high youth unemployment rate of 49.5% (SSO, 2016) peaks the necessity of a research of the causes of these states on the labor market in North Macedonia. The reservation wage is an issue that is very closely related to the unemployment rate, unemployment duration and placement of workers in the labor market. The theoretical background of this research is based on the job search theory of analyzing the frictional unemployment resulting from job hunting by workers (Haurin & Sridhar, 2003). More specifically, the reservation wage is a concept that has a relevance for modeling labor supply decisions, through its influence on transitions from non-employment to employment. Moreover, the reservation wage sets the grounds of the job search theory where a person stops its search for a job under conditions of uncertainty and imperfect information.

This study will assess the determinants of the reservation wage, how the factors influence the fluctuations of the reservation wage, as well as the effects and the relationship among them. The literature review will be developed in three sections, starting with the basic determinants of the reservation wage classified as socio-demographic factors. The second section will cover the other sources of income within the households and the third will review the interplay between the reservation wage and the unemployment duration.

**Keywords:** *Reservation wage; Unemployment; Youth.*



## **Introduction**

### **Socio-demographic factors**

This section explores the most important socio-demographic factors of reservation wage. Malk (2014) and Hofler & Murphy (1994) elaborate the reservation wage fluctuations taking into account the individual characteristics such as age, gender, education, qualifications and experience. They state that the relationship between the age and the reservation wage is opposite. Similarly, Brunel (2014) adds that the older the people get, they exhaust their sources of income, which pushes down the reservation wage. However, as De Coen (2015) tend to widen the analysis showing evidence of positive relationship of education and reservation wage, adding that education may account for the effect of age on the reservation wage making the age variable negligible. In this context, Coen (2010) investigates the effect of the age on the reservation wage independently and reveals a reverse U-shaped relationship between age and the reservation wage via employment efficacy and a U-shaped relationship via work intention. Other studies however, found a reverse U-shaped relationship where the reservation wage increases until individuals are in their 30s and then declines with age (Bloemen & Stancanelli, 2001; Prasad, 2003).

In accordance with Coen (2010), higher education, specifically having a degree (undergraduate or post-graduate), is associated with a lower duration of unemployment and lower unemployment duration is associated with higher reservation wage (Addison et al., 2013). De Coen (2015) also concludes that women have lower reservation wages than man. Opposite to this, Queralt (2006) concluded that when reservation wages are the same for both men and women, highly educated women are able to receive job offers at the same frequency as highly educated men, which equalizes the reservation wages of men and women at the level of high education.

An increase in a person's experience is expected to increase his wage expectations, and this is in line with previous studies since experienced people rationally assume their productivity will be higher than that of inexperienced people. In addition, previous job experience enhances a person's perception about his productivity and raises his wage expectation (Şentürk, 2015).

The reservation wage is dependent on individual characteristics of a person which intends to be placed on the labor market. The more competent a worker is the higher the reservation wage is. Each determinant age, education, qualifications and experience, except for gender have positive relationship with the reservation wage when measured individually, *ceteris paribus*.

### **Other sources of income**

Other factors that the literature treats when considers the determination of the reservation wage are the other sources of income that come within the household of the persons who reported the reservation

wage. The main other sources of income according to Malk (2014) are wealth, income of spouse and other family members and unemployment benefits. The relationship between the other sources of income and the reservation wage is positive. The higher the income in the household the higher the reservation wage.

Lamers (2014) investigates the relationship of wealth and reservation wage, but also the job search, and his results suggest that wealth has a significantly positive effect on reservation wages of both household heads and spouses, and a significantly negative effect on the search effort of household heads. The study of Lentz & Tranaes (2005) suggests that wealth and other income sources may affect search intensity. And so the presence of these alternative sources of income could be expected to affect reservation wages through their effect on the duration of unemployment (Malk, 2014). Furthermore, Prasad (2003) and Maani & Studenmund (1986) analyze the factors that may influence the search period. They conclude that in the first place are the economic resources.

The same reasoning is behind the unemployment benefits. As unemployment benefits increase the reservation wage increases as well (Beladi & Kar, 2013). Theoretically this leads to a point at which sufficiently high unemployment benefits would eventually eliminate all economic activity (Beladi & Kar, 2013). Shimer & Werning (2006) analyzed the length of the unemployment benefits. They state that usually the assumption is that benefits last forever. But in reality most unemployment benefit systems pay only for a specified amount of time. Raising benefits will actually lower such a worker's reservation wage since it encourages one to accept a mediocre job in order to renew eligibility (Carolina & Pau, 2008).

In conclusion, the other sources of income increase the reservation wages. Wealth and the income of a spouse or other family member increase the reservation wages. The higher amount of unemployment benefits pushes the reservation wage to go higher, but, what matters is the duration of the unemployment benefits that is if they are for finite length of time, than the effect is opposite.

### **Unemployment duration and the reservation wage**

What the literature does not weight on either side is the relationship of the reservation wage and the unemployment duration. Addison et al. (2008) stated that there is a positive influence of the unemployment duration on the reservation wage, while they already know the positive influence of the reservation wage on the duration with certainty. Jones (1988) adds to this statement concluding that there is influence of the reservation wage on the unemployment duration, substantial with the literature from earlier periods (e.g. Lancaster, 1985; Nickell, 1979; Narendranathan and Nickell, 1985). Sants (1977) complements to the concept of this relationship by stating: "The higher the reservation wage, ceteris paribus the lower the probability of finding an acceptable wage offer, and the longer would be the expected duration of unemployment." (p.49). Mohanty (2005) and Kiefer and Neumann (1979) do not agree on this, stating that the influence comes from the other side, unemployment duration lowers the

reservation wages. Holfer and Murphy (1994) agree that an increase of the reservation wage reflects higher costs from an extended search and resulting from a longer duration of unemployment. The third view in the literature explains that reservation wages and unemployment duration are simultaneously determined (Addison et al. 2013; Lancaster and Chesher, 1984). The elasticity of unemployment duration is decomposed into two components: one due to the elasticity of the reservation wage (scaled by the slope of the wage offer distribution taken at the level of the reservation wage) and the other one due to the elasticity of the job offer arrival rate (or search effort).

Belzil (1992) in his analysis also show that higher reservation wages predict longer unemployment duration. He introduces the concept of observable and unobservable variables that influence the reservation wage. A concern that he considers in his study is that the empirical relationship between the reservation wage and unemployment duration, controlling for observables, is likely to reflect both the causal effect of the reservation wage on unemployment duration and the influence on the reservation wages of unobservable that are also correlated with unemployment duration. Several empirical studies have examined the question of constant reservation wages. One of those studies is of Prasad (2003) using Dutch data, who found no relationship with a simple ordinary least square (OLS) regression, but a positive relationship with instrumental variables (IV) regression, which could be interpreted as support for the constant reservation wage hypothesis. Addison and Pedro (2004) investigate the relationship between post-unemployment wages and unemployment duration. They use this strategy as an indirect test of the declining reservation wage hypothesis. The impact of unemployment duration on wages can also be interpreted as an indicator of poor productivity, or as a measure of the depreciation of human capital during joblessness. There is no impact of reservation wages on the probability of finding a suitable job. The results contain a clear suggestion that the relationship between accepted wages and duration of unemployment shadows the relationship between reservation wages and unemployment duration, as would be expected from job search theory according to the authors. However, a problem that the literature treats regarding the relationship of the reservation wage and the unemployment duration is the problem of endogeneity. The problem is that the reservation wage and the duration of unemployment could be endogenously determined. Furthermore, optimal search theory (Lammers, 2014), under the assumption of a stationary reservation wage, predicts a positive correlation between these variables. Additionally, in the model of Prasad (2003) the conditional correlation between the reservation wage and unemployment duration appears to be essentially zero. In fact, although not statistically significant, the parameter estimates are slightly negative. At an intuitive level, this might seem reasonable since, one might expect the reservation wage to decline as the non-employment spell duration lengthens. Hence, the interpretation of the positive correlation between reservation wages and unemployment duration as being consistent with optimal search theory requires caution in interpretation and further elaboration.

Contrary to the statements of positive relationship of the reservation wage and the unemployment duration, a recent study of Krueger and Mueller (2014), find that reservation wages appear to influence employment decisions among unemployment insurance recipients in New Jersey, but reservation wages are unaffected by unemployment duration and unemployment insurance exhaustion. In the study of Christiansen (2001), no evidence of an influence of unemployment duration and different kinds of unemployment benefits on reservation wages was found for Germany. Again, this finding is in contrast to theoretical models predicting declining reservation wages with increasing unemployment duration. Only in countries with rapidly declining and exhausting unemployment benefits an obvious decline of reservation wages with duration of unemployment is expected (Dolton and O'Neill, 1995). Therefore, the presented results for Germany, which show no declining reservation wages, may simply indicate a low financial pressure to unemployed persons.

The unemployment duration is closely related to the unemployment rate in one country. The policy implications and recommendations of the issues of unemployment duration and reservation wage will eventually implicate in the rate of unemployment, especially the long term unemployment. Falk et al. (2006) conclude that an introduction of minimum wage would increase the reservation wages suggesting that this economic policy may affect people's behavior by shaping the perception of what is a fair wage. And after the removal of the minimum wage the reservation wages remain high.

## Methodology

The literature when considering the methodology and modeling of the estimation of the reservation wage agrees that a parametric Two-Stage Least Squares (2SLS) approach is suitable for estimation of the reservation wage, by simultaneously resolving the issue of endogeneity of two crucial variables in the model, unemployment duration and reservation wage (Malk, 2014; Brown & Taylor, 2010).

$$\ln RW_i = B_0 + B_1 R_i + B_2 RUR_n + B_3 \ln AW_n + B_4 N_i + B_5 OS_i + B_6 A_i + B_7 UB_i + B_8 UD_i + E_i$$

$\ln RW_i$  - natural logarithm of the reservation wage of the individual

$R_i$  - dummy if the individuals' household receives remittances

$RUR_n$  - regional unemployment rate

$\ln AW_n$  - natural logarithm of the regional average wage

$N_i$  - dummy of the individual falls under the category of NEETS

$OS_i$  - dummy if the individual uses other sources of income

$A_i$  - age of the individual

$UB_i$  - dummy if the individual uses government unemployment help

$UD_i$  – instrumented unemployment duration of the individual

$E_i$  - error terms.

$i$ - refers to each individual surveyed

$n$  – regional data

In the model, the reservation wage is regressed with all the exogenous variables and the instrumented endogenous variable – unemployment duration. The predicted values from this regression replace the original values of the endogenous variable unemployment duration in the second stage regression model. A specific variable that influences the reservation wage are the remittances. The other sources of income also determine the reservation wage, including sources as financial institution and family and friends.

To overcome possible endogeneity problem, in this research we estimate a model using a parametric 2SLS approach. The unemployment duration is one of the endogenous variables that will be regressed by the instrument variables. Hereby, is introduced a linear regression that will explain the unemployment duration. The explanatory variables of the first stage regression must not be correlated with the error term of the regression of the reservation wage – the other endogenous variable. In this data there might be some limitations of the responses on the survey.

The model of this analysis uses the following instruments to determine the unemployment duration: dummy of the financial situation within the household, dummy of whether the individual has graduate degree, dummy of whether the individual has postgraduate degree, experience of the individual expressed in months, gender of the individual and marital status, or more precise whether he/she lives with a partner.

Thus, we define the following equation to estimate the instrumented variable i.e. the unemployment duration:

$$UD_i = B_0 + B_1FS_i + B_2GR_i + B_3PG_i + B_4EX_i + B_5MS_i + B_6G_i + B_7Y_i + E_i$$

$UD_i$  – unemployment duration of the individual  $i$  expressed in months.

$FS_i$  – dummy of the financial situation of the individuals' household

$GR_i$  – dummy if the individual has graduate degree

$PG_i$  – dummy if the individual has postgraduate degree

$EX_i$  – months of experience of the individual

$MS_i$  – dummy of the marital status of the individual

$G_i$  – dummy of gender of the sample

$Y_i$  – year of the sample of the individual

$E_i$  – error term

$i$  - refers to each individual surveyed

## Data

### School to Work Transition Survey

The International Labor Organization (ILO) and the State Statistical Office in North Macedonia implemented a project called Work4Youth, which included conducting the School to work transition survey (hereinafter: SWTS). This survey was conducted twice in North Macedonia, once in 2012 and the second time in 2014 on a random sample. This study uses the SWTS from the two years to examine the relationship between the reservation wage and the unemployment duration. The study pooled the data from the two years, so there are 5018 observations of the sample examined, 2474 observations from 2014 and 2544 observations from 2012. The SWTS is a survey that is labor market designed. It includes labor market information on young people aged 15 to 29 years.

### Descriptive statistics

Descriptively looking at the results of the data from SWTS, the highest average reservation wage is noted in the Northwestern region and it is 14.084 denars and the lowest is noted in the Polog region of 10.323 denars. The shortest unemployment duration is noted in the Vardar region of 29 months, and the longest in the Northwestern region of 39 months

Table 1. Reservation wage and unemployment **duration**

**Table 1. Reservation wage and unemployment duration of the sample**

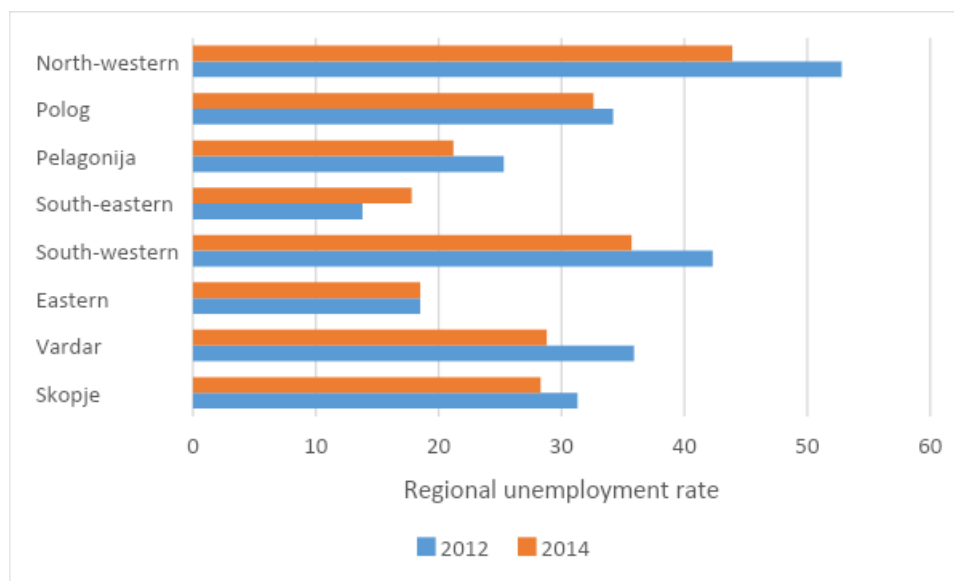
	North Macedonia	Vardar	Eastern	South - West	South-East	Pelagonija	Polog	North-East	Skopje
RW (denars)	12.286	12.500	11.248	10.847	13.476	12.168	10.323	14.084	12.191
UD (months)	35	29	37	38	32	36	36	39	30

Source: ILO, calculation of the author



The Northwestern region keeps the first place of highest regional unemployment rate (RUR) noted in both years of analysis (Graph 1). The Southeastern region notes the lowest regional unemployment rate in North Macedonia for 2012 and 2014.

**Graph 1. Regional unemployment rate in 2012 and 2014**



Source: State Statistical Office of North Macedonia

NEET is a category of the -not in employment, education and training youth. It is included in the model in order to put an accent on the scaring of the wages of this category in the present and future. According to the findings of the survey (Table 2) the overall NEETS increased by 1.9 p.p from 2012 to 2014 (30% and 31.9% of the total population fall under the category of NEETS of youth in 2012 and 2014, respectively). The share of female NEETS is higher than of male NEETS.

**Table 2. NEETS by gender**

NEET rate	2012	2014
Male	28%	29.40%
Female	32.20%	34.40%
Total	30%	31.90%

Source: ILO, calculation of the author

The sample statistics shows that the average reservation wage in North Macedonia is 12.286. The average reservation wage is 34% and 28% higher than the minimum wage in North Macedonia for 2012 and 2014, respectively. According to the Law of minimum wage which was adopted in 2012 in North Macedonia, the minimum wage was set at 8.050 denars and 8.800 denars for 2012 and 2014, respectively. The same sample had reservation wage that is 27% lower than the average wage in 2012 and 42% lower than the average wage in 2014. The median reservation wage of the sample is 12.000 denars. The lowest reported wage was 3.000 denars in Polog region and the highest reported wage was 88.000 denars in Skopje region. Particularly, in 2014 the average reservation wage is 13.561 denars, which is 37% lower than the average net wage reported by the State Statistical Office for 2014. For 2012 the reservation wage recorded is 10.980 denars and the net average wage is 20.903 denars. Table 3 presents the net average wages by regions in North Macedonia for 2014. It can be noted that the Eastern region has the lowest recorded net average wage and Skopje region has the highest.

**Table 3. Average net wage by regions in North Macedonia**

2014, in denars	North Macedonia	Vardar	Eastern	South western	South eastern	Pelagonija	Polog	North eastern	Skopje
Net-wage	21.394	16.936	15.785	19.460	16.729	19.591	20.425	16.524	25.260
Reservation wage	13.562	13.597	12.210	12.519	13.564	13.630	12.733	14.724	13.708

Source: SWTS, calculation of the author

The average unemployment duration of the sample is 35 months, but specific information regarding the duration and how long the respondents have actively looked for a job is that the median unemployment duration and the maximum unemployment duration is the same and it is 4 years.

**Table 4. Youth unemployment rate in North Macedonia**

YUR	2012			2014		
	Total	Male	Female	Total	Male	Female
15-19	58.7	61.9	51.8	63.5	65.6	59.9
20-24	53	53.8	51.8	51	49.2	54
25-29	41.5	42	40.9	39.3	36.5	43.2
15-29	51.07	52.57	48.17	51.27	50.43	52.37

Source: State Statistical Office of North Macedonia

The variables that the model treats are: age, number of children, experience, unemployment duration, reservation wage, regional unemployment rate and regional average wage. Table 5 summarizes the descriptive statistics of all the continuous variables elaborated in this study.

**Table 5. Statistics of the variables**

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	5018	21.60	4.15	15	29
Number of children	5018	0.20	0.60	0	6
Experience (months)	5018	7.50	22.20	0	204
UD (months)	1040	35.00	17.08	0	48
RW	1536	12286.00	5737.48	3000	88000
RUR	5018	29.97	10.26	13.8	52.8
AW	5018	18817.00	2851.49	14957	25260

Source: SWTS, calculation of the author

## Results

Before we turn to the results, the validity of instruments is briefly discussed. Regarding the validity of the variables as instruments: the null hypothesis of the Sargan test for validity of the instruments is not rejected at any reasonable level, which indicates that the instruments and the IV regression, are valid. The Sargan test in this model is 4.343 (Table 7) implied an overidentified model. A model to be overidentified means that there are more instruments than endogenous regressors.

**Table 6. First stage - 2SLS model**

First stage

Unemployment duration - dependent variable	
Financial situation	3.873**
	(1.345)
Graduated	-10.34***
	(2.667)
Postgraduate	-10.42**
	(4.28)
Marital status	2.621
	(1.584)

Year of sample	3.18
	(3.668)
Remittances	-13.321***
	(1.521)
RUR	0.08
	(0.069)
lnAW	-9.57*
	(4.465)
NEETS	-0.891
	(1.955)
Other sources	1.596
	(3.334)
Age	1.698***
	(0.217)
Unemployment government help	-4.076
	(4.11)
constant	84.829
	(44.873)
observations	592
Sanderson-Windmeijer F-test	7.64***

Source: Authors' calculations \*, \*\*, \*\*\* denote statistical significance at the 10, 5, and 1% level, respectively. The number in the brackets represents the standard error of the representative coefficient.

In the first stage of the 2SLS model is regressed the unemployment duration to overcome the issue of endogeneity with the reservation wage. In Table 6 are presented the variables with statistical significance that influence the unemployment duration. Firstly, the good financial situation in the household from where the person surveyed is coming increases the unemployment duration of 3.9 months. Secondly, graduate persons surveyed have 10.3 months lower unemployment duration than the ones without a graduate degree. Thirdly, the impact of the remittances is estimated with negative sign. The explanation for this phenomena indirectly comes from the fact that the households receivers of remittances mainly fall into the category of socially endangered low income households, implying that the

persons interviewed are eager to be placed on the labor market, become active searchers for jobs or employed persons and earn their own income. The last statistically significant variable is the age. Along with the previously elaborated literature an increase in age of one year increases the unemployment duration of 1.7 months. Unexpected is the sign of the variable NEETs indicating that the NEET category of persons have lower unemployment duration than others. Persons that use other sources of income tend to have longer unemployment duration than other, but the ones that use government help tend to have shorter unemployment duration.

The results from the second stage which are of primary interest for us, show that the model has treated 592 observations (Table 7). The p-value of the F-statistic is 0.000 which also proves the validity of the explanatory variables. Regarding the instrumented unemployment duration in the first stage, a one month increase of the unemployment duration decreases the reservation wage by 1.4% implying a countercyclical relationship between these two variables at a confidence level of 99%, along with the most of the theoretical background and conclusion of most of the authors in the literature review. The receiving of remittances and the natural logarithm of the average wage are statistically significant at 95% confidence interval. The results suggest that the receivers of remittances have 12.6% lower reservation wages than the non-receivers. Even though the remittances fall under the category of other sources of income, this case is the opposite of the theory of what most authors argue, that the receiving of other sources of income increases ones' reservation wage. Several aspects can influence these results, first and foremost is that the sample is youth of the age 15-29 years. Most authors come to their conclusion taking into consideration the whole population. Contrary to that, this youth are not direct receivers of the remittances. Usually the receivers of the remittances are the heads of the households, so this income does not make the young person the direct user and spender of it. Petreski et al. (2017) concludes that most of the remittances are used for construction and renovation of real estate in the household implying that they have no impact on the youth and their determination of reservation wage. Second reason is that the youth population is eager to be placed on the labor market and is carrier pursuant regardless the receipt of remittances. The same applies for the coefficient for other sources of income. The variable age of the sample is statistically significant in the second stage of the model indicating that the positive sign of the coefficient states that each additional year of age of the surveyed persons increases their reservation wage for 4%. Bloemen & Stancanelli (2001) and Prasad (2003) found a reverse U-shaped relationship where the reservation wage increases until individuals are in their 30s and then declines with age. The coefficient of the regional wage has also a negative sign indicating that the higher the regional average wage the lower the reservation wage. The perception is that young people get motivated of the increase of the regional average wage, so they get eager to be placed on the labor market, resulting in a decrease of their reservation wage. NEETS have 9% higher reservation wage than the youth that does not fall under

this category. This might be a result of the non-presence of the NEETS on the labor market, education or training and their knowledge and perception of the market wages.

**Table 7. Results of 2SLS model**

Reservation wage- dependent variable	
Unemployment duration	-0.014***
	(0.004)
Remittances	-0.126*
	(0.064)
RUR	0.001
	(0.002)
lnAW	-0.255*
	(0.12)
NEETS	0.099*
	(0.045)
Other sources	-0.164***
	(0.045)
Age	0.045***
	(0.009)
Unemployment government help	-0.123
	(0.102)
constant	11.246***
	(1.178)
observations	592
(uncentered)	0.9983
Second stage F-test	11.73***
LM statistic (Anderson canon.corr)	36.644***
Sargan statistic	4.343

Source: Authors' calculations \*, \*\*, \*\*\* denote statistical significance at the 10, 5, and 1% level, respectively. The number in the brackets represents the standard error of the representative coefficient.

## **Conclusion**

The high unemployment rate in North Macedonia, especially the high youth unemployment rate raises the question of what is the required price to put this youth on the labor market, i.e. the reservation wage. This study elaborates this phenomena and estimates its determinants and the interplay between the reservation wage and the unemployment duration.

The youth has 34% and 28% higher reservation wage than the minimum wage in North Macedonia for 2012 and 2014, respectively and 27% lower reservation wage than the average wage in 2012 and 42% lower reservation wage than the average wage in 2014. The older the person the higher the reservation wage. If the young person comes from a household with good financial situation, he or she will have longer unemployment duration and longer unemployment duration of the youth in North Macedonia decreases the reservation wage. The interplay between the reservation wage and the unemployment duration aligns with the literature, concluding that the longer the unemployment duration the lower the reservation wage. On the contrary, the higher level of education the shorter the unemployment duration. When considering the education, trainings and employment, a paradoxical finding of this study is that the NEETS have higher reservation wage than the youth that does not fall in this category. This might be a result of the non-presence of the NEETS on the labor market, education or training and their knowledge and perception of the market wages

In similar context, this study accesses the remittances and their influence over the reservation wage and unemployment duration. The remittance receivers have lower unemployment duration of 13 months. A young person decreases his/hers reservation wage by 16% if has other sources of income in the household. These indications primarily come from the fact that the sample is youth of the age 15-29 years. This youth are not direct receivers of the remittances.

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