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The Role of Young Employment on the Informal Economy

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Abstract

The informal economy, which emerges from the causes such as economic, political, social and psychological and which is defined as the whole of informal economic activities, has an important place among the economic problems. The relationship between informal economy and the concept of unemployment, which is another important economic problem, is the starting point of the study.

Young unemployment is an important part of the concept of unemployment and an important problem in our country. For this reason, the study focuses on the relationship between young employment and informality. One of the important reasons for young unemployment is the lack of quality in young people. "The effects of the education levels of young people on the informal economy" is also take part in the aim of study by acting this hypothesis.

In the study, the relationship between informal economy size estimated by the monetary rate method and unemployment rates related to education levels of young people will be assessed for Turkey for 2006: Q1 - 2016: Q2 and political evaluations will be made using the causality and cointegration tests.

Keywords: Young Unemployment, Informal economy, Causality, Cointegration

Jel Codes: J13, E24, E26, C22, C32

Introduction

The informal economy simply is defined as the whole of informal economic activities. It is major problem for underdeveloped and developing countries. It affects the whole country's economic indicators, government revenues and the power of competition. (Derdiyok 1993:54).

In empirical studies, the problems of measuring the size and development of the informal economy by different methods have to be examined. Attempting to measure the size of an informal economy is a very difficult and challenging task. The following three methods are useful to measure its size and development (Schneider and Enste 2003:16-30).

The first method is direct approaches. The direct approaches which are microeconomic approaches, employing either well-designed surveys or samples based on voluntary replies, or tax auditing and other compliance methods.

The second method is indirect approaches. The indirect approaches are also called 'indicator' approaches. They use various economic and other indicators as information on the development of the informal economy. There are four indirect indicators. One is based on discrepancies between income and expenditure statistics. This approach is based on inconsistencies between income and expenditure statistics. Accordingly, the income measure of GNP should be equal to the expenditure measure. The second approach is concerned with discrepancy between official labour force and actual labour force in the economy. A decline in labour-force participation in the official economy can be seen as an indication of increased activity in the informal economy. The third approach is the monetary approach. There are two different statistics to measure the informal economy according to the monetary approach. One is that the transactions approach. Feige (1979) assumes a constant relationship over time between the volume of transactions and official GNP (Feige 1990: 20). Another is that the currency demand approach. The currency demand approach was first used by Cagan (1958). He calculated a correlation of the currency demand and tax pressure (as one cause of the informal economy) for the USA for the period between 1919 and 1955 (Schneider 2013: 20). The last indirect approach is the approach of electricity consumption. Measuring all economic activities (formal and informal), the electricity-power consumption is the best physical indicator (Schneider and Enste 2003:23).

The model approaches are the last method. The model approach explicitly considers multiple causes that lead to the existence and growth of the informal economy, and to its multiple effects over time (Schneider and Enste 2003: 26).

Many different methods are used in the estimation of the informal economy because of the various difficulties in measuring the informal economic activities. So many studies have been carried out in Turkey to estimate the size of the informal economy. Some studies examine informal economy as a part of education for Turkey. Sisman (1999:78-79) explains that undereducated and unskilled people tend to work in informal sector in developing country. Akturk (2005:298-299) also explains that undereducated and unskilled people are insufficient to creating employment. Ela (2013:919) emphasizes that the increase of education level is a key element for the decrease of informal economy in Turkey.

The remainder of this paper is divided into three sections. Section-2 features the econometric methodology of cointegration and causality tests. The empirical results are mentioned section-3 and the paper ends with conclusions drawn from the research findings.

Econometric Methology

If a time series has a constant mean and variance for all t and its autocovariance function between two periods depends only on the interval from t_1 to t_2 is named as stationary. If the series is non-stationary, the effect of a shock will be permanent. Non-stationary variables might lead to a problem of spurious regression so it is not possible to use traditional econometric techniques. Because of these reasons, it is important to establish the stationary properties of the series, which can be tested unit root tests.

Unit Root Tests:

Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) Unit Root Tests:

Dickey-Fuller (DF) test is based on independently and identically distributed (iid) errors. Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) tests have been proposed to modify the standard DF test in case of errors which allows some heterogeneity and serial correlations in error. (Kirchgässner and Wolters,2007:168).Both tests have the same null hypothesis is that "there is a unit root".

If there exists a one- time permanent change in data, the tests such as ADF and PP test can be could be biased toward non-rejection of unit root. (Perron, 1989). The tests such as Zivot and Andrews (1992), Perron (1994, 1997), Bai and Perron (2003) and so on have proposed different ways of estimating the time of the break endogenously. Zivot and Andrews (1992) and Perron (1997) also allowed that the date of the change in the series to be unknown.

The Zivot- Andrews (ZA) Test :

The Zivot- Andrews (ZA) test is a developed version of the Perron (1989) test. ZA uses three models to test a unit root. These models are “break in the intercept (A)”, “break in the trend (B)” and “break in both intercept and trend(C)”. The regression form can be written as:

$$y_t = \mu + \theta DU_t + \beta t + \gamma DT_t + \alpha y_{t-1} + \sum_{j=1}^{k} c_j \Delta y_{t-j} + e_t \qquad (1)$$

In equation (1), DU_t is a sustained dummy variable capturing a break in the intercept, and DT_t is another dummy variable representing a break in the trend occurring at time. When TB denotes the time at which the structural break occurs, if t > TB, DUt=1 and zero otherwise and if t > TB, DTt = t-TB and zero otherwise. The lag parameters are determined using AIC.

Perron Unit Root Test with Breakpoint Test:

An alternative unit root test is proposed by Perron (1989) uses the three models such as ZA. This test differs from the ZA test by adding a one-time shock dummy variable. If t=TB+1, $DTB_t = 1$. The lag parameters are determined using AIC. The regression form can be written as:

$$y_t = \mu + \theta DU_t + \beta t + \gamma_1 DT_t + \gamma_2 DTB_t + \alpha y_{t-1} + \sum_{j=1}^{k} c_j \Delta y_{t-j} + e_t \qquad (2)$$

Bai-Perron Multiple Breakpoint Test :

The Bai-Perron (BP) methodology considers the following multiple structural break model with m breaks (m+1 regimes) and they consider estimating multiple structural changes in a linear model and develop three tests: a test of no break versus a fixed number of breaks, a double maximum test and a sequential test.

Cointegration Analyses:

Johansen Cointegration Test:

Johansen and Juselius (1990) have developed the maximum likelihood estimator and likelihood ratio tests for hypothesis testing in a cointegrated system. The cointegration can be defined as a common stochastic trend among two or more economic variables over the long run. Johansen’s methodology takes its starting point in the vector autoregression (VAR) of order p.

According to Johansen Cointegration test to determine for the existence of cointegration uses the trace test (λ_{trace}) and maximum eigenvalue test ($\lambda_{\max}$). The trace statistic for the null hypothesis of at most r cointegration vectors against the alternative hypothesis of $r = k$ cointegrating vectors is computed as follows:

$$\lambda_{trace}(r|k) = -T \sum_{i=r+1}^{k} \ln(1-\lambda_i) \qquad (3)$$

Where λ_i is the i-th largest eigenvalues of the matrix Π. The maximum eigenvalue statistic for testing the null hypothesis of r cointegrating vectors against the alternative of $r+1$ co integrating relations is described as follows:

$$\lambda_{\max}(r|r+1) = -T \ln(1-\lambda_{r+1}) \qquad r = 0,1,\ldots,k-1 \qquad (4)$$

Autoregressive Distributed Lag Model (ARDL):

Autoregressive Distributed Lag (ARDL) model was developed by Pesaran and Shin (1995, 1999), Pesaran et al. (1996) and Pesaran (1997), Pesaran and Smith (1998), and Pesaran et al.. (2001). It was proposed for investigating long-run cointegration among time series variables. The ARDL modelling has an ability to estimate the long and short-run parameters of the model simultaneously. This approach can test on the existence relationship between variables in levels is applicable irrespective of whether the underlying regressors are purely I (0), purely I (1) or mixture of both.

Pesaran et. al. (2001) proposed the bounds test based on the Wald or F-statistic for testing the existence of long-run relationship. When long-run relationship exists, F test indicates which variable should be normalized. The null hypothesis is that “no cointegration among variables”. If the F test statistic exceeds their respective upper critical values, we can reject the null hypothesis. So, there is evidence of a long-run relationship between the variables. If the test statistic is below the upper critical value, we cannot reject the null hypothesis of no cointegration. If the test statistic is between the bounds, a conclusive inference cannot be made.

The diagnostic tests such as serial correlation, functional form, normality and heteroscedasticity are conducted goodness of fit of the ARDL model. ARDL specification of the short-run dynamics can be derived by constructing an error correction model (ECM). The ARDL modelling approach involves estimating the following error correction models:

$$\Delta Y_t = \alpha_{0y} + \alpha_{1y} Y_{t-1} + \alpha_{2y} X_{t-1} + \sum_{i=1}^{m} \beta_i \Delta Y_{t-i} + \sum_{i=1}^{m} \gamma_i \Delta X_{t-j} + u_{1t} \quad (5)$$

$$\Delta X_t = \alpha_{0x} + \alpha_{1x} Y_{t-1} + \alpha_{2x} X_{t-1} + \sum_{i=1}^{m} \theta_i \Delta X_{t-i} + \sum_{i=1}^{m} \delta_i \Delta Y_{t-j} + u_{2t} \quad (6)$$

Gregory and Hansen Cointegration Tests:

The Gregory- Hansen (1996) test is developed within the framework of the Engle-Granger residual-based cointegration analysis. It can be considered as a multivariate extension of the endogenous break univariate tests of Zivot and Andrews (1992). The null hypothesis under these tests is that there is no cointegration with a structural break against the alternative that there is cointegration with a structural break.

Gregory and Hansen present the following three models:

Level shift (C): $$y_t = \gamma_1 + \gamma_2 DU_t + \gamma_3 x_t + \varepsilon_t \quad (7)$$

Level shift with trend(C/T): $$y_t = \gamma_1 + \gamma_2 DU_t + \beta_t + \gamma_3 x_t + \varepsilon_t \quad (8)$$

Regime shift (C/T): $$y_t = \gamma_1 + \gamma_2 DU_t + \gamma_3 x_t + \gamma_4 x DU_t + \varepsilon_t \quad (9)$$

They propose three test statistics as:

$$ADF^* = \inf_{\tau \in T} ADF(\tau) \quad ; \quad Z_t^* = \inf_{\tau \in T} Z_t(\tau) \quad ; \quad Z_a^* = \inf_{\tau \in T} Z_a(\tau) \quad (10)$$

Causality Analysis:

The Granger Causality Test based on the VECM:

The standard Granger causality approach entails estimating the vector autoregression (VAR) model in the first difference form. Therefore, there is an evidence of cointegration; results from this approach will be misleading. Because of this reason, the vector error correction model (VECM) is estimated.

The Granger causality analysis based on the VECM specification allows testing for both the short-run and long-run causality.

Toda-Yamamoto Causality Test:

Toda and Yamamoto (1995) propose a simple procedure requiring the estimation of an augmented VAR. Because of the testing procedure is robust to the integration and cointegration properties of the process, it guarantees the asymptotic distribution of the Wald statistic.

Two steps are involved with implementing the procedure. The first step includes the determination of the lag length (m) and the second one is the selection of the maximum order of integration (dmax) for the variables in the system. Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan-Quinn (HQ) Information Criterion can be used to determine the appropriate lag order of the VAR.

Emprical Results and Discussions

In order to examine the impact of young employment on the informal economy, the relationship between informal economy size estimated by the monetary rate method and unemployment rates related to education levels of young people is assessed for Turkey for the period from 2006: Q1 to 2016: Q2.

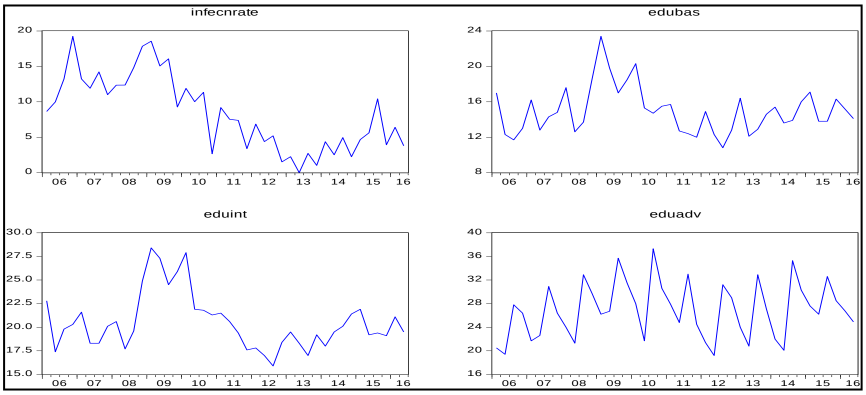
Variables included in the analysis are used in proportion. The proportion for the informal economy is obtained the ratio of informal economy's size to GDP. The related unemployment rates according to education level of young population between 15-24 years old have three levels such as primary education, secondary education and higher education level. These rates are obtained from the International Labor Organization (ILO). The data required to obtain for the size of informal economic was taken from the Central Bank of the Republic of Turkey (CBRT). The names of variables were su*mmarized at the Table 1.*

Table 1: Variables

INFECNRATE	The proportion of the size of informal economy over to GDP
EDUBAS	unemployment rate according to basic education level for ages of 15-24
EDUINT	unemployment rate according to intermediate education level for ages of 15-24
EDUADV	unemployment rate according to advanced education level for ages of 15-24

The first step in testing cointegration is to test time series variables for their stationarity. When we look at the graphs of our variables series on the graph 1, we can see that they are not stable and there are breaks.

Graph 1: The Graphs of the Variables



Necessary tests were carried out to determine their levels of stationaries. The results of the ADF the PP unit root tests for each variable are reported in Table 2.

While the related tests' null hypothesis is that "there is a unit root", the results indicate that the series of INFECNRAT and EDUINT are non-stationary at their level; therefore they are stationary at their first differences. The series of EDUADV is stationary at level, it is only stationary at its first difference for ADF test with constant and trend. The series of EDUBAS is also non-stationary at its first differences, but it is stationary at its second difference.

Table2: The Result s of ADF and PP Unit Root Tests

Variable	ADF		PP	
	With Constant	With Constant & Trend	With Constant	With Constant & Trend
INFECNRATE	-1.4733	-1.7813	-1.9615	-3.6637
ΔINFECNRATE	-3.1148**	-3.1478	-11.4624**	-11.1113**
EDUBAS	-2.828	-3.2754	-3.5775	-3.5338
ΔEDUBAS	-2.259	-2.1907	-10.131	-10.1713
Δ(ΔEDUBAS)	-4.4952**	-4.4249**	-17.8471**	-17.3969**
EDUINT	-2.5594	-4.8495	-2.575	-2.5872
ΔEDUINT	-5.7969**	-5.7237**	-7.7274**	-7.8006**
EDUADV	-3.0944**	-3.0028	-6.9044**	-6.5583**
ΔEDUADV	------	-1.0534***	---------	--------

Note: It is used SIC (Schwarz Information Critter) for lag. *1% level, **5% level and ***10% level

The graphs of the series show the existence of breaks, so the unit root analyzes are detailed with the tests taking these breaks into account.

Firstly, the Zivot Andrews test, which takes into account the breaks, is summarized in Table3. Three models for intercept, trend and trend+ Intercept are estimated and break dates are obtained. The null hypothesis cannot be rejected because the test statistics obtained are smaller than the critical values at the 1% and 5% significance levels. Thus, while the hypothesis "there is a unit root" is accepted. The alternative hypothesis "there isn't a unit root with a structural break in the (intercept/intercept+trend/trend)" cannot be accepted.

Table 3: Zivot-Andrews Unit Root

variable	model	lag	date of break	test statistic	critical value	
					1%	5%
INFECNRATE	A(intercept)	4	2010Q4	-2.877872	-5.34	-4.93
	B(trend)	4	2013Q3	-2.620575	-4.8	-4.42
	C(intercept+trend)	4	2012Q4	-2.597513	-5.57	-5.08
EDUBAS	A(intercept)	4	2010Q4	-3.497116	-5.34	-4.93
	B(trend)	4	2009Q1	-2.880434	-4.8	-4.42
	C(intercept+trend)	8	2010Q4	-3.533445	-5.34	-4.93
EDUINT	A(intercept)	4	2011Q3	-3.519986	-5.34	-4.93
	B(trend)	4	2009Q1	-3.202604	-4.8	-4.42
	C(intercept+trend)	4	2011Q3	-3.57646	-5.34	-4.93
EDUADV	A(intercept)	4	2011Q3	-4.635908	-5.34	-4.93
	B(trend)	4	2009Q3	-2.615098	-4.8	-4.42
	C(intercept+trend)	4	2011Q3	-4.548192	-5.57	-5.08

Because the Zivot Andrews Unit Root Test only tests the stationarity in the null hypothesis, Perron (1997) Breakpoint Unit Root Test, which also takes into account the break effects in the null hypothesis, was tested and the results are summarized in Table 4.

Table 4: Perron (1997) Unit Root Test with Breakpoint

variable	model	lag	date of break	test statistic	critical value	
					1%	5%
INFECNRATE	A(intercept)	0	2009Q1	-8.118223	-5.92*	-5.23**
	B(intercept+trend)	0	2009Q1	-8.039694	-6.32*	-5.59**
	C(trend)	0	2011Q3	-7.343845	-5.45*	-4.83**
EDUBAS	A(intercept)	4	2010Q3	-3.469232	-5.92	-5.23
	B(intercept+trend)	0	2009Q1	-8.039694	-6.32*	-5.59**
	C(trend)	0	2011Q3	-7.343845	-5.45*	-4.83**
EDUINT	A(intercept)	4	2011Q3	-3.47419	-5.92	-5.23
	B(intercept+trend)	4	2011Q3	-3.569266	-6.32	-5.59
	C(trend)	4	2014Q2	-2.872936	-5.45	-4.83
EDUADV	A(intercept)	4	2011Q2	-4.661261	-5.92	-5.23
	B(intercept+trend)	4	2011Q3	-4.408972	-6.32	-5.59
	C(trend)	4	2008Q3	-2.573057	-5.45	-4.83

H_o: The variable has an unit root with a structural break in the (intercept/intercept+trend/trend)
H_1: The variable has not an unit root with a structural break in the (intercept/intercept+trend/trend)

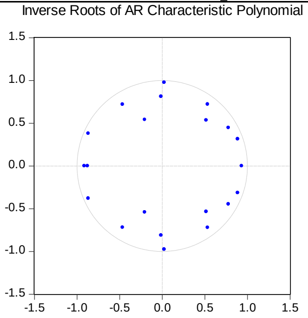
According to the Perron (1997) Breakpoint Unit Root Test, which has the null hypothesis "there is a unit root with a structural break in the (intercept/intercept+trend/trend)", the series of INFECNRATE is stationary with break in the intercept/intercept+trend/ trend. The series of EDUBAS only includes the unit root with break in the intercept. The series of EDUINT and EDUADV are not stationary. They have a unit root with break in intercept/ intercept+trend/ trend.

The cointegration tests with breaks should be done because the variables are affected by breaking. However, if only the ADF-PP unit root tests were taken into consideration, Johansen cointegration test can be used to analyze the long-term relationships between variables. The long term relationships between the variables are examined with Johansen cointegration test without the EDUBAS variable, which was stationary at the second level.

Firstly for Johansen cointegration test, Vector Autoregressive (VAR) model was established by using the level values of the variables. The appropriate number of lag was determined as 7 based on the criteria such as AIC, SIC, HQ. Then, stability condition, the tests of autocorrelation and heteroscedasticity were performed. Their results are on the Table 5. Because all inverse roots are in the unit circle, the VAR model provides the stability condition and there is no problem with autocorrelation and heteroscedasticity.

Table 5: The Results of Stability Condition, Autocorrelation and Heteroscedasticity

AR Roots Graph



Serial Correlation LM Tests

Lags	LM-Stat	Prob
1	0.903214	0.9996
2	12.24891	0.1996
3	9.573565	0.3861
4	5.934066	0.7465
5	10.08818	0.3434
6	6.381949	0.7012
7	3.172345	0.9571
8	10.25029	0.3306

Heteroscadasticity Test

Chi-sq	Prob.
179.3668	0.1663

The cointegration test was performed because the conditions required for the VAR model were obtained. The results are given in Table 6.

Table 6: Results of the Johansen Co-integration Test by the Max-eigenvalue and Trace Methods

Results of Johansen co-integration rank test for INFECNRATE EDUINT EDUADV					
		Max-Eigen		**Trace statistic**	
null hypothesis	**Eigen value**	**statistic**	**critical value**	**statistic**	**critical value**
r = 0	0.496346	23.31945*	21.13	43.40784*	29.7971
r ≤ 1	0.382261	16.37745*	14.26	20.08839*	15.4947
r ≤ 2	0.1034	3.71094	3.841	3.71094	3.84147

* Rejection of the hypothesis at the 5% significance level.

We see that the results of the Johansen co-integration test as determined by the Max-Eigenvalue and Trace tests on the Table 6. It can be seen that the null hypothesis of no co-integration is rejected against the alternative of two co-integrating relationship. The result indicates two cointegrating equation at the 0.05 level.

After the existence of co-integration, it can be found that short-run and long-run Granger causalities using the error correction model (ECM).

The next step after the long-term relationship between the series is identified is to determine the relationships and direction of causalities between the series. The error correction parameter balances model dynamics and forces variables to converge towards long term equilibrium values. In practice, the error correction coefficient is negative.

In the error correction model, the coefficients of the independent variables with delayed values as a whole indicate the significance of the standard F-statistic or the significance of the error correction coefficient show the existence of causality (Aktaş, C.2009).

Table 7: Results of VECM

	lag	Chi-sq	t statistic of ECM_{t-1}
INFECNRATE<---EDUINT	2	3.007	[-7.39718]*
EDUINT<---INFECNRATE	2	3.269	[-4.92318]*
INFECNRATE<---EDUADV	2	3.737	[7.03405]*
EDUADV<---INFECNRATE	2	9.779*	[3.86538]
EDUADV<---EDUINT	2	25.868*	[-7.58484]*
EDUADV<---EDUINT	2	2.213	[-9.18626]*

*5% level of importance

The ECM_{t-1} coefficient is negative and statistically significant for all coefficients except a coefficient. The results show the existence of a one-sided causal relationship from that unemployment rate according to intermediate education level for ages of 15-24 is causal unemployment rate according to advanced level education for ages of 15-24.(EDUADV ←EDUINT). Since the coefficient of ECM_{t-1} isn't negative and significant statistically. For this reason, there is no causality from informal economy to unemployment rate according to advanced level education for ages of 15-24(EDUADV←INFECNRATE). There is only one causality relation from unemployment rate according to intermediate education level for ages of 15-24 to unemployment rate according to education high level for ages of 15-24.

The long term relationship between variables is also examined with ARDL model. However, because of the effect of the breaks in the model, firstly Bai-Perron Multiple Breakpoint Test was performed and then the related breakpoint was added to the ARDL model as a dummy variable. If the any one of the series is stationary at the second difference, ARDL model is not reliable. Although the variable of EDUBAS is stationary at the second difference according to the ADF and PP unit root tests, it is stationary with break in the intercept+trend. For this reason, the variable of EDUBAS is included in ARDL model.

Table 8: Bai-Perron Multiple Breakpoint Test Result

supFt(l)	**supFt(1)**	19.62219*
	supFt(2)	11.99475*
	supFt(3)	10.90002*
	supFt(4)	10.33777*
	supFt(5)	9.329231*
UDMax statistic		78.48874*
WFMax statistics		78.48874*
Schwarz criterion selected breaks		1
LWZ criterion selected breaks		1
Estimated break dates(SC)		2009Q4
Estimated break dates(LWZ)		2009Q4

(Max break:5 , *5% level of importance)

Bai-Perron has detected a break at the 2009Q4 point based on the Multiple Breakpoint Test result. This breakpoint is transformed into a dummy variable and added to the model. The addition of the trend has also reduced the SIC, AIC and HQ statistics in the ARDL model. the ARDL (1, 0, 0, 2) * model was chosen as the most suitable model based on the SIC criterion,. Then, the existence of autocorrelation in the model was tested by the LM test and it was determined that there was no autocorrelation problem. After the necessary steps have been completed, the existence of the cointegration relationship has been tested by performing a Bound test. The results are seen in the Table 9. The null hypothesis "no long-run relationships exist" is cannot rejected at the 1% and 5% significance levels, because the value of F statistic is lower than the lower limit. There is no cointegration relationship between variables for these importance levels. The F statistic remains between the upper and lower limits at the 10%. There is no evaluation of the cointegration relationship at this level of importance.

Table 9: ARDL Bound Test

			Critical Value Bounds		
Test Statistic	**Value**	**k**	**Significance**	**I0 Bound**	**I1 Bound**
↓	↓	↓	10%	3.47	4.45
F-statistic	3.843109	3	5%	4.01	5.07
			1%	5.17	6.36

Finally, the cointegration relation was tested with the Gregory-Hansen cointegration test with Regime Shifts, which makes it possible to perform a cointegration relation analysis taking into account an one shift. The results of the analysis are given in Table 10.

Table 9: The Results of Gregory-Hansen Cointegration Test

	Test	Statistics	Breakpoint Date	Asymptotic Critical Values		
				1%	**5%**	**10%**
Change in Intercept	ADF	-6.40	2009Q2	-5.77	-5.28	-5.02
Change in Intercept and Trend	ADF	-6.31	2009Q2	-6.05	-5.57	-5.33
Change in Regime	ADF	-6.40	2009Q2	-6.51	-6.00	-5.75

*Lags = 0 chosen by Akaike criterion Maximum Lags = 5

According to the Gregory-Hansen Cointegration test results, the null hypothesis "no cointegration" was rejected in all models at the 5%. According to this result, there is a long-term relationship between the rate of informal economy and unemployment rates for young population according to education levels in the intercept break, intercept and trend break and regime break. Three models also give a same breakpoint date as 2009:Q2.

Finally, the Toda Yamamoto Causality test was conducted for causalities between variables. Firstly, the appropriate lag p is determined with the VAR model. Then, the VAR model for the lag (p + dmax) is estimated by adding the highest degree of cointegration (dmax). When the model selection criterion is taken into account, the most appropriate VAR model is determined for 3 delays. Since the largest integration level is I(2), the VAR model was estimated for 5 lag (2 + 3) for Toda Yamamoto Causality Test. Finally, MWALD test was performed for lag p = 4. The results are taken part in Table 10.

When Toda-Yamamoto test results are examined, it is seen that the rate of informal economy is the causal for unemployment rate according to basic level education of youth people. Moreover, it seems that the unemployment rate according to basic level education of young people has a causal role on unemployment rate according to advanced level education of youth people.

Table 10: The Results of Toda-Yamamoto

Dependent variable		Variables	lag	Chi-sq
INFECNRATE	←	EDUBAS	4	0.7924
		EDUINT	4	2.1268
		EDUADV	4	3.1371
EDUBAS	←	INFECNRATE	4	10.076**
		EDUINT	4	3.0836
		EDUADV	4	4.5581
EDUINT	←	INFECNRATE	4	5.3947
		EDUBAS	4	4.6619
		EDUADV	4	0.5431
EDUADV	←	EDUINT	4	4.0431
		EDUBAS	4	10.890**
		INFECNRATE	4	0.5705

**5% level of importance

Conclusions

Our purpose for this study were determined the impact of young employment on the informal economy. So, we examined the relationships for long term, rate of informal economy and the unemployment rates according to educational levels for young people. We tried different methods for the cointegrations and causalities because of differences level for stationarities of the variables.

Firstly, it was established Johansen cointegration tests and it was found two cointegrating relationships. And then, Granger causality test based on VECM was tested. The only one causality was importance significantly. It was found that unemployment rate according to intermediate education level for ages of 15-24 is causal unemployment rate according to advanced level education for ages of 15-24.

Secondly, it was considered effect of breakpoint. And ARDL model with breakpoint, which obtained Bai-Perron multiple breakpoint test 2009:Q4, was analyzed. The results of ARDL model were found that the variables didn't have the relationships for long term.

Finally, the cointegration relation was tested with the Gregory-Hansen cointegration, which makes it possible to perform a cointegration relation analysis taking into account an one shift. According to the results of this test, there was a long-term relationship between the rate of informal economy and unemployment rates according to all education levels for young people in the intercept break, intercept and trend break and regime break. Three models also give a same breakpoint date as 2009:Q2.

Lastly, The Toda Yamamoto Causality test was conducted for causalities between variables. it was that the rate of informal economy is causal for unemployment rate according to basic level education of youth people. Moreover, it seems that the unemployment rate according to basic level education of young people has a causal role on unemployment rate according to advanced level education of youth people.

The results show that the variables have a relationship with the breakpoint dates found as 2009:Q2. The breakpoint date is important for Turkey. After the 2008 crisis, the effects of the crisis appear in the results. When the breakpoint is taken into account, it is possible to deduce consistently about the relationship between informal economy and unemployment rates according to educational levels for young people. The unemployment rate according to basic level education of youth people is important. Because it is causal for the unemployment rate according to advanced level education of youth people and informal economy is causal for it. It shows that the increasing the education level of young people is a major solution for the decreasing of both the unregistered youth employment and informal economy in Turkey.

It is obtained cointegration when considering breaks so the study may be developed with cointegration and causality tests that take into account multiple breaks.

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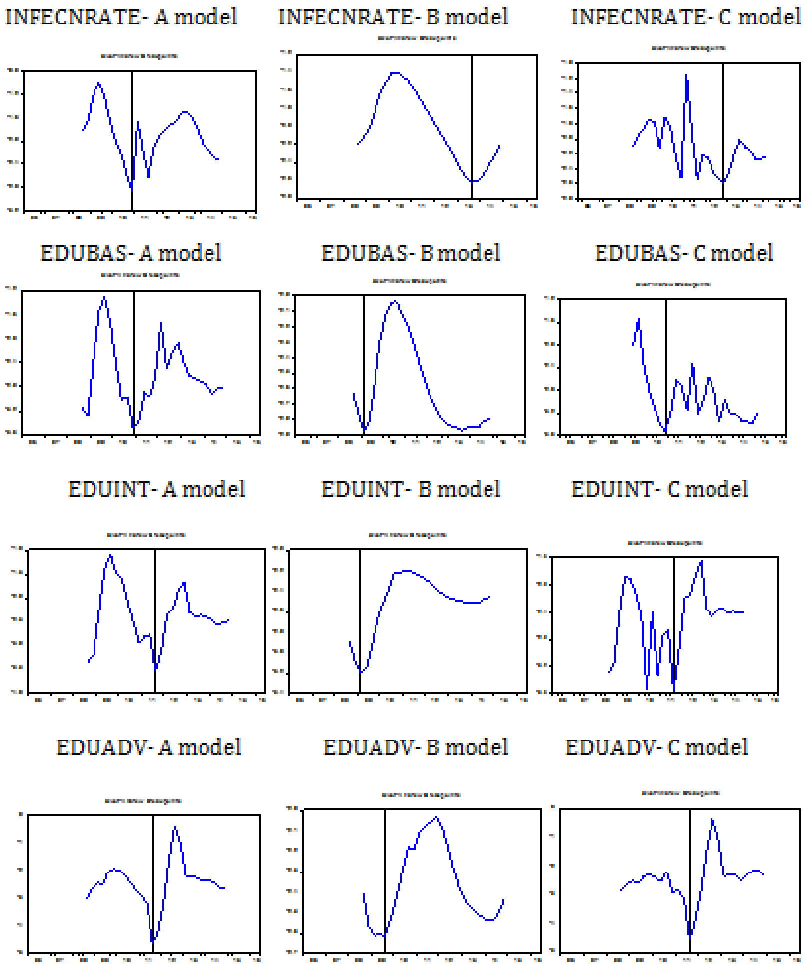
APPENDICES

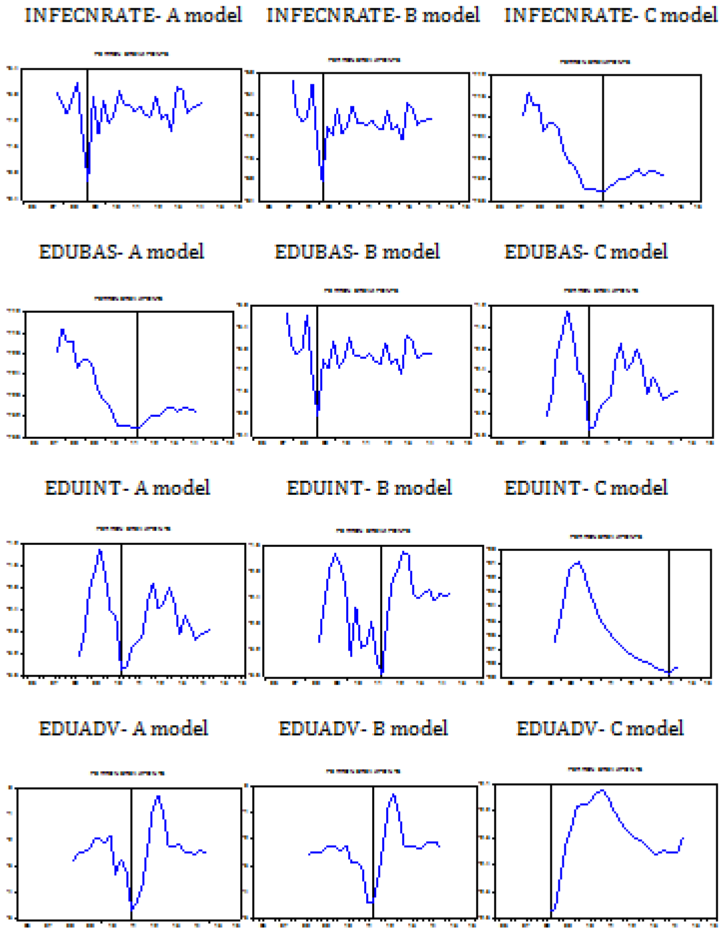
1) Obtaining the size of informal economy according to Monetarist Approach

years	C	D	Yr	C/D	Cr	Yu (size of informal economy)
2006Q1	18907654.00	22353613.00	160072572.19	0.845843	15627226.30	13825563.37
2006Q2	21659425.00	24936339.00	183652122.35	0.868589	17432788.72	18320668.03
2006Q3	21950912.00	23759445.00	213295395.72	0.923882	16610031.84	28218972.26
2006Q4	24589947.00	23967479.00	201370694.94	1.025971	16755466.69	38740683.35
2007Q1	20740768.00	22447970.00	187950694.10	0.923948	15693190.49	24873278.19
2007Q2	23158394.00	25686546.00	203279705.12	0.901577	17957252.24	24225356.32
2007Q3	24476332.00	26022437.00	232256565.98	0.940586	18192070.86	33010904.83
2007Q4	26072505.00	29427691.00	219691456.22	0.885985	20572655.82	24165229.88
2008Q1	26581454.00	29250975.00	215605653.90	0.908737	20449115.12	26602908.16
2008Q2	27790336.00	30564953.00	239363433.42	0.909222	21367706.30	29602618.44
2008Q3	31974600.00	33622672.00	262392169.94	0.950983	23505332.40	38899827.25
2008Q4	30468001.00	30403738.00	233172993.45	1.002114	21255002.22	41584879.83
2009Q1	31909720.00	31459320.00	207925990.91	1.014317	21992950.88	38575611.69
2009Q2	32137996.00	33660590.00	228571898.26	0.954766	23531840.56	34394853.74
2009Q3	34843833.00	35845191.00	261710448.90	0.972064	25059077.09	42045868.75
2009Q4	35251149.00	41154310.00	254350240.75	0.85656	28770638.35	23572694.49
2010Q1	36484854.00	40484049.00	241026016.19	0.901216	28302064.42	28672432.22
2010Q2	40121846.00	46164917.00	265996869.15	0.869098	32273512.33	26614915.69
2010Q3	42762615.00	47953783.00	295995607.36	0.891746	33524093.79	33562014.70
2010Q4	44368280.00	59611531.00	295780855.75	0.74429	41673929.16	7868230.98
2011Q1	46921814.00	54864825.00	289904997.71	0.855226	38355546.19	26640141.19
2011Q2	51099369.00	61777993.00	317392144.02	0.827145	43188484.86	23920517.57
2011Q3	51843611.00	62884048.00	351173121.67	0.824432	43961718.78	25905646.79
2011Q4	49347189.00	65220312.00	339242946.72	0.756623	45594981.66	11486770.77
2012Q1	47720266.00	58519831.00	325184111.11	0.815455	40910730.71	22270342.67
2012Q2	51142850.00	66135556.00	350160525.22	0.773303	46234821.18	15294048.06
2012Q3	54764455.00	69553374.00	377042314.50	0.787373	48624189.53	19590350.63
2012Q4	54565770.00	75304164.00	364411539.00	0.724605	52644519.34	5471927.44
2013Q1	54697872.00	74190512.00	355812713.81	0.737262	51865974.42	7993441.61
2013Q2	61609179.00	88127459.00	387127908.06	0.699092	61609179.00	0.000000
2013Q3	68016851.00	91281396.00	417849258.75	0.745134	63814070.32	11322889.28
2013Q4	67755894.00	94575852.00	406499357.27	0.716419	66117197.31	4145351.37
2014Q1	70572904.00	91276801.00	411207665.89	0.773175	63810857.99	17929248.36
2014Q2	73072351.00	98509923.00	427812471.76	0.741777	68867473.86	10747561.59
2014Q3	80086337.00	102275879.00	462875921.73	0.783042	71500222.61	22870265.67
2014Q4	77420141.00	105042324.00	446271757.23	0.737038	73434221.47	9966594.25
2015Q1	82885303.00	106484919.00	443841493.12	0.778376	74442727.73	20710849.25
2015Q2	88114487.00	110903199.00	482383247.83	0.794517	77531510.80	27091879.40
2015Q3	106281644.20	121313893.10	519443753.94	0.876088	84809541.09	54111022.79
2015Q4	94464629.70	123367891.30	506969914.02	0.765715	86245474.27	19878811.20
2016Q1	96339669.10	119236469.40	497844426.41	0.807972	83357231.33	31902444.45
2016Q2	103986968.10	136222992.50	525932050.19	0.763358	95232369.39	19892924.54

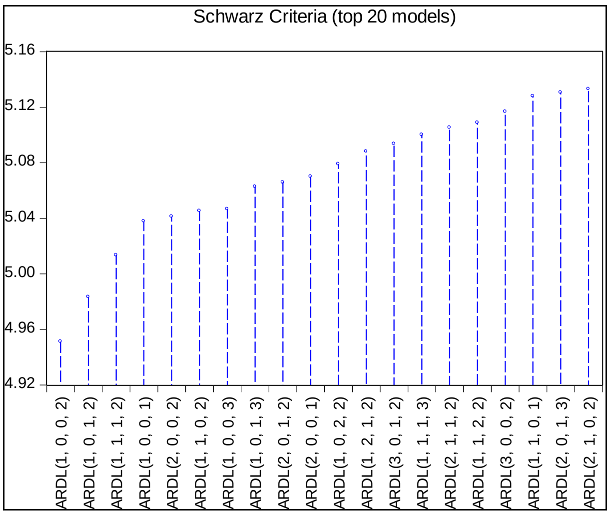
THE GRAPS OF ZIVOT-ANDREWS BREAK POINT



THE GRAPS OF PERRON BREAKPOINT UNIT ROOT



THE SELECTION LAGS FOR ARDL



The results of LM test for ARDL model

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.613798	Prob. F(5,26)	0.6902
Obs*R-squared	4.223040	Prob. Chi-Square(5)	0.5178