Journal of
Economics and Political Economy
www.kspjournals.org
Volume 5 December 2018 Issue 4

Does economic growth support the minimum wage? Evidences based in Turkey

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Abstract. The effects of the growth performances over minimum wages are examined in this study. Minimum wage is a level of income which is determined by the government in order people to be able to maintain humanitarian consumption rate under the economic conditions in which they survive. Such an partial interference to competitive economics can affect many macroeconomic variables. In this study, the relationship between minimum wage and the growth performance is investigated within fast growing Turkish economy. The effects of minimum wage over employment and how the employment rate changes by the effects of minimum wage increases reflect to the growth processes is depicted. After the applied tests, the results are acquired as there is co-integration relationship in the long run between minimum wage and the growth and Granger causality occurred in double direction.
Keywords. Economic growth, Minimum wage, Employment, Unemployment.
JEL. F43, E24, J31.

1. Introduction

In 1950's and 60's, economic growth not only built its theoretical structure but also became primary level economic policy intention. Especially neo-classical economy created a unique growing literature. This literature is getting forward as an internal growing theory. However, economic growth cannot be reduced only capital stock and it requires (1) human capital which is accompanied with capital stock (2) and corporate/ legal regulations (3). This should not be regarded as a partial Keynesian approach. However, it is obvious that over production crises can emerge when the actors in the market behave without having control and audit. Therefore such periods can be experienced that supply cannot be matched with internal demand sufficiently so that economies get into crises. As a result, it seems that both of the suggestions "Every supply creates its own demand." and "Every demand creates its own supply." depend on (4) a consistent income level. Moreover, wages are not only pointing out a dividing problem but also they are important bases for economies to sustain a potential growth trend. This study focuses the condition of "a consistent wage level" which is regarded as the base of a stable and consistent growth trend. Wages can be determined through labor supply and demand in the well-organized markets. However, the factors, which affect and even distort the market structure of in particularly developing economies, are the most important obstacles to determine the wage levels under the market conditions. Many factors like unregistered employment, accounting fraud, the illegal employment of immigrants, high unemployment and indirectly occurred low bargaining capacity can distort the

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market mechanism. Additionally, labor force markets can be negatively affected by the policies which are determined by economy administrates. Furthermore, the level of minimum wage in the developing countries can be effective in many variables of the economy. Unemployment, firm profitability, economic growth, inflation (Cuong, 2011) and poverty/ income distribution are primary variables which are affected.

Wages are the most effective factor of the production costs. First of all, an interference, which is done with the minimum wage that is determined centrally and externally by the government for the competitive markets, creates a direct effect to company costs. Furthermore, companies would have to lay off the workers or decrease their profitability. The first option will create unemployment and the latter one will lead to low economic growth (decrease of the profits will reduce the companies' new investment capacities). The studies which are conducted about minimum wages are analyzed this basic process. However, this process is not always a straight forward process depending on firstly the companies' development levels. There are not many studies that focus on fast growing countries, such as Turkey.

The main hypothesis of this study is whether "the necessity of a stable and consistent wage level" is valid for minimum wage or not. As also mentioned above, the necessity of a stable and consistent wage level is one of the three necessities for a consistent growth trend. Because, minimum wage is accompanied with the growth in the developed countries. However, this hypothesis has not been tested much for the developing countries.

Table 1 in which the minimum wage is depicted with other macroeconomic variables will help to understand the relationship between minimum wage and other macroeconomic variables. Data of the selected countries from OECD are shown in Table 1.

Table 1. *Minimum wage and some macroeconomic variables of the selected OECD countries*

	Real Minimum Wage (Avr. Wage)	Unemployment (Employment)	Growth (GDP) Per Capita GDP	Inflation
USA	15080 (56340)	7,37 (68,2)	2,2 (17,276) 45.665	1,6
Japan	13947 (35405)	4,02 (72,8)	1,6 (4,937) 31.840	2,7
UK	16557 (41190)	7,53 (72,0)	1,7 (1,748) 34.776	1,5
France	19414 (40242)	9,85 (64,1)	0,3 (2,145) 31.082	0,5
Canada	16314 (46911)	6,91 (72,2)	2,0 (1,924) 37.466	1,9
Australia	20743 (50449)	6,06 (71,6)	2,5 (1,4.588) 37.907	2,5
Belgium	21116 (48082)	8,42 (61,9)	0,3 (0,389) 33.845	0,3
Korea	14402 (36354)	3,12 (65,5)	3,0 (1,356) 31.015	1,3
Turkey	9107 (17608)*	10.1 (49,2)	4,1 (0,822) 13.953	8,9

Note: The data are obtained from OECD. Stat database and they belong to 2013-2014. Real minimum wage and GDP per capita are PPP typed. There is no minimum wage implementation in Italy and Germany. GDP are calculated through spending method and billion dollar typed. (*) Estimated.

Low inflation and low unemployment in the developed countries make important contribution for minimum wage to be high. Moreover, the magnitude of GDP of those countries leads both the minimum wage and annual average wages to the upper level.

Minimum wage threatens the employment and is regarded as a fighting tool with poverty because it will increase the income of low wage takers. Therefore minimum wage can be shown as a paradox, too (Card & Krueger, 1995; Shepherd, 2000). A classification about minimum wage effects can be done as follows: i) positive effects; ii) negative effects. These effects are brought forward as theoretically. However conducted empirical studies have given many detailed information.

One of the most evident negative effects of minimum wage is observed on the youth unemployment. In a study which is done within USA economy, there are empirical evidences in the direction of when 0,8 point increase is occurred in the

unemployment rate, 2,8 points increase will be happen among the workers which are in the 15-24 age groups (Gorry, 2013). UNDP made a target about decreasing the world poverty up to 50% in 2015. Therefore one of the suggestions about UNDP's meeting this target is about minimum wage regulations (Ashta, 2013).

The increase in minimum wage has negative effects over employment in particularly in the underdeveloped and developing countries' economies.

It is claimed that if minimum wage is higher than market balance wage level, it will decrease the employment level in the competitive markets. On the other hand, (effective wage approach) higher wage will increase the workers' loyalty and their productivity in the work so that it can create positive effects (Butcher, 2012). Therefore, minimum wage subject included a perspective problem. The most obvious example for this is the survey study which was conducted by Card & Krueger (1994). Authors obtained that minimum wage does not affect employment negatively as a result of the study. However the results are criticized by the other authors as findings can only be experienced in the retail sector (Bechtold, 2014). Moreover, some authors claimed and criticized that those findings such as "it does not create negative effects on employment" or "there is only a limited negative effect" are evidences only about big economies like USA and cannot be acceptable for the developing countries' economies (Freeman & Freeman, 1992; Gindling & Terrell, 2007; Maloney & Mendez, 2004; Montenegro & Pagés, 2004). Therefore, minimum wage effects are related not only with the studied countries' economies' magnitude but also economies' structural regulations.

On the other hand, if we think from the perspective of the governments that specify the minimum wage, we see that politicians think about minimum wage through different ways. There are opinions about the requirement that governments must directly interfere to minimum wages in order to improve nations' life standards and move them above the poverty level (Kotval *et al.,* 2012) while the majority of USA politicians believe that the increase of the minimum wages will create an unavoidable unemployment (Bechtold, 2014). However, the opposite directed relationship between the increase of the minimum wage and the unemployment is a preference which is directly related to electoral processes for politicians in case of "voter myopia hypothesis" is taken into account.

2. Literature review

There is an extensive literature about minimum wage studies in which many different results about its effects are obtained due to the factors that are mentioned before about perspective differences. Therefore, the studies which are focused on the minimum wage are trying to find evidences about its relationship with the four basic variables: Unemployment and employment, Inflation, Poverty and Company Profitability. Other than these four subjects, there are studies about more specific subjects such as union effects, wages' social effects, social security, youth unemployment.

In this study, I focus on the effects of the minimum wage on the growth and employment and the minimum wage taker worker's cost to an employer. Therefore, I present the findings which are obtained recently through the studies conducted about the selected country and country groups about these subjects in Table 2.

Table 2. *Selected studies for selected country/country groups*

Author(s)	Period	Country(s)	Findings
Addison & Blackburn (1999)	1983-96	USA and selected states	The increase in the minimum wage decreased the poverty in 1990s however it had not decreased the poverty in 1980s.
Addison & Ozturk (2012)	1970-08	16 OECD countries	Low women employment increases the minimum wage.
Addison *et al.,* (2012)	1995-02	USA	Low minimum wage affects positively especially the retail sector.
Alaniz *et al.,* (2011)	1998-06	Nicaragua	The decrease in minimum wage lowers the employment. This affects the workers at that moment.
Azam (2012)	1983-04	India	There is relationship between high growth and the wage inequity.
Bazen & Gallo (2009)	1984-97	USA	The increase in the minimum wage did not create any negative effects.
Bird & Manning (2008)	1991-03	Indonesia	The increase in the minimum wage is not effective on the fight against poverty.
Bosch & Manacorda (2010)	1980-00s	Mexico	It is effective on determining the company profitability.
Cuong (2011)	1994-08	Vietnam	The increase in the minimum wage does not create inflation.
Draca *et al.,* (2011)	1993-02	England	The increase in the minimum wage lowers the company profitability.
Fairris *et al.,* (2008)	1980-90s	Mexico	The increase in the minimum wage lowers the company profitability with a great rate.
Gidling & Terrell (2007)	1988-00	Costa Rica	10% increase in the minimum wage lowers the employment at a rate of 1.09%.
Gidling & Terrell (2007)	1990-04	Honduras	When the minimum wage increases at a rate of 1%, average wage increases at a rate of 0.29% and employment decreased with the rate of 0.46%
Gidling & Terrell (2010)	2001-04	Honduras	Minimum wage does not affect the poverty in the sectors which it is not applied. It could be used as a decreasing tool for poverty in the formal sectors which entered the global competition. The increase in the minimum wage at a rate of 10% can decrease 2.2 point of the poverty.
Grossberg & Sicilian (1999)	1980-82	USA States	The increase in the minimum wage is least increase than the other wages. Education level is effective on this result.
Han *et al.,* (2011)	2006-08	China	Minimum wage is implemented under the subsistence minimum wage in the fast growing country, China.
Jayasooriya (2009)	1960-07	Sri Lanka	Minimum wage is related to inflation in the long term and they affect each other as structurally, too.
Larrain & Poblete (2007)		14 Developing Countries	Minimum wage which is implemented for young workers decreases the youth unemployment. However it creates negative effects on the less qualified young workers.
Lemos (2007)	1982-00	Brazil	Minimum wage does not affect the employment negatively. It could be used as a fighting tool for poverty.
Lemos (2009a) (2009b)	1982-04	Brazil	Minimum wage does not affect the employment in the formal and informal sectors.
Marginean & Chenic (2013)	2001-12	USA and EU	Little increases in the minimum wage never affect the employment.
Magruder (2013)	1990s	Indonesia	The increase in the minimum wage increases the demand on the local products in the industrializable industries.
Metcalf (2008)	1998-07	UK	There could not be found any relationship between minimum wage and employment.
Morris *et al.,* (2005)		UK	There could not be found any evidence about the traditional hypothesis of "minimum wage affects negatively the small enterprises".
Neumark *et al.,* (2006)	1996-01	Brazil	Minimum wage does not create any effects to improve the income level of low income groups.
Neumark *et al.,* (2004)	1979-97	USA	Minimum wage highly affects the workers who receive low income while does not affect the workers who receive high salary.
Neumark & Wascher (1992)	1973-89	USA	The increase in the minimum wage at a rate of 10% decreases the youth employment at a rate of 1-2%.
Pacheco & Cruickshank (2007)	1984-04	New Zeland	It has an unimportant effect on the young workers (16-24 age group).
Papps (2012)	2002-05	Turkey	The stoppages from the minimum wage (tax, insurance Premium) have more effects than the increase in the minimum wage on the workers.
Pauw & Leibbrandt (2011)	2006-06	South Africa	Minimum wage is not politic tool to eliminate the poverty.
Ra (2014)	2012-13	South East Asia	Minimum wage is dramatically increasing. However, this increase is highly affected by the nonpolitical and noneconomic factors instead of the variables that determine the minimum wage.
Rohlin (2011)	1997-07	USA	The increase in the minimum wage deters new business set-ups especially in retail and production industries (in less educated workers employment areas).
Tonin (2011)	2000-02	Hungary	Minimum wage can be shown as less in accounting records so that some workers can adopt with the increase in disposable incomes.

Therefore, quite different results can be obtained through a study which focused on the minimum wage. As also could be understood from the above listed literature review; different results can be found according to i) economic conjuncture, ii)

countries' development levels, iii) in what perspective the authors examine the minimum wage.

3. Data and method

Quarterly data which belong to the period of 2000:01–2014:04 is used in the research. The variables which belong to minimum wage and the workers' cost to employers are obtained from TR-Ministry of Labor and Social Security. Employment/ Unemployment data are obtained through Turkish Statistical Institute and economic growth data are provided from Central Bank of Turkey.

5 variables are used in the study: Minimum wage (mw), workers' cost to employer (ce), employment (em), unemployment (ue), and economic growth (g). The main hypothesis which is examined among these variables is "the direction of the relationship between economic growth and the minimum wages". Additionally, evidences about the effects of minimum wage to unemployment and employment levels are also investigated through the analyses. This research's main contribution to the literature is the relationship among the minimum wages' "total costs to employers" and the growth and the increase in the minimum wages about the SMEs which constitute more than 90% of Turkish economy firm structure. Therefore, long term relationship among the variables is investigated.

The analysis is applied in two phases. Firstly, introductory statistics related to all the variables are presented. In the second phase, the analyses related to the hypothesis which is mentioned above will be done using the time series. Thus, Granger (1969) causality test is utilized. Dickey-Fuller (1979) and Phillips-Perron (1988) unit root tests are used to verify the condition of that series must be constant for Granger causality. (The error correction model is also applied to sustain the short term balance and to eliminate data loss which is happened because the first differences are taken in case of that the series are not constant in their level values.) Engle-Granger (1987) two phased co-integration test and Johansen-Juselius (1990) co-integration test are applied to test the second hypothesis.

4. Empirical analysis and results

Firstly, four different regression models are built. In Model 1, other variables are used as the indicators of economic growth. In Model 2, dependent variable is minimum wage and its explainable strength with other variables is investigated. In all models, a_0 is constant term and u is error term.

Model 1:

$$g = a_0 + a_1\mathrm{mw} + a_2\mathrm{ce} + a_3\mathrm{em} + a_4\mathrm{ue} + \mathrm{u}$$

Model 2:

$$mw = a_0 + a_1\mathrm{g} + a_2\mathrm{ce} + a_3\mathrm{em} + a_4\mathrm{ue} + \mathrm{u}$$

Model 3 is set as to explain what degree minimum wage is affected by only unemployment and employment. Model 4 shows the regression relationship between minimum wage and the growth.

Model 3:

$$g = a_0 + a_1\mathrm{mw}$$

Model 4:

$$mw = a_0 + a_1\mathrm{g}$$

The results which are obtained through these four models are shown in Table 3.

Table 3. *Regression models*

Model 1	$g = a_0 + a_1 mw + a_2 ce + a_3 em + a_4 ue + u$				
	Coef.	Std. Error	t-Stat.		
α_0	-15.06106	11.25328	-1.338371	R^2	0.090752
mw	-0.057949	0.025035	-2.314718	Adj R^2	0.024625
ce	0.043358	0.018614	2.329336	S.E of Regr.	2.232000
em	0.258881	0.200513	1.291097	F-Stat	1.382393
ue	0.190538	0.238004	0.800569	D-Watson	1.666395
Model 2	$mw = a_0 + a_1 g + a_2 ce + a_3 em + a_4 ue + u$				
α_0	-285.9510	44.38357	-6.442723	R^2	0.990609
g	-1.531851	0.661787	-2.314718	Adj R^2	0.989926
ce	0.739901	0.010440	70.87191	S.E of Regr.	11.47572
em	4.750657	0.827453	5.741302	F-Stat	1450.453
ue	3.401477	1.142141	2.978159	D-Watson	0.848140
Model 3	$g = a_0 + a_1 mw$				
α_0	0.984950	0.794625	1.239516	Adj. R^2	-0.017083
mw	0.000246	0.002595	0.094901	D-Watson	1.533932
Model 4	$mw = a_0 + a_1 g$				
α_0	283.7556	16.45331	17.24611	Adj. R^2	-0.017083
g	0.630377	6.642450	0.094901	D-Watson	0.043275

In Model 1, 1 unit increase in mw affects the economic growth as -0.057949 unit. In other words, the increase in mw affects the g in negative direction. The other variables in the model affect the growth positively. Especially em has the biggest positive effect on g with (0.258881). In Model 2 1 unit increase in g affects the minimum wage with -1.531851 units. Therefore, this results indicates that the growth does not support the minimum wage. When R^2 value is examined, the built model can explain minimum wage with the level of 0.989926. In this way, Model 2 shows that it includes the most powerful variables which affect the minimum wage.

Model 3 indicates only the relationship between g and mw. 1 unit increase in mw affects the growth in positive direction. However this positive effect is very small (0.000246) and even can be regarded as unimportant. According to Model 4, 1 unit increase in g affects mw with the level of 0.630377. When comparing this result with the result of Model 1, we can say that the growth supports minimum wage however this positive effect is eliminated due to especially unemployment and employment data.

In the second phase of the analysis, time series are used for analysis of the variables' long term relationships. The results of three different unit-root tests which are done to test whether the series constant or not is shown in Table 4. The columns which are shown as "Δ" in Table 4, are the test results which are obtained when the first differences of the series are taken.

Table 4. *ADF, PP and KPSS Unit Root Tests*

	ADF	ADFΔ	PP	PPΔ	KPSS	KPSSΔ
mw	-0.979434	-8.660388	-0.858017	-8.764626	0.885278	0.158657
	(-3.546099)	(-3.548208)	(-0.546099)	(-3.548208)	(0.739000)	(0.739000)
g	-2.303568	-8.283162	-2.335183	-17.81210	0.061014	0.060693
	(-2.604746)	(-2.606163)	(-2.604746)	(-2.605242)	(0.739000)	(0.739000)
ce	0.747334	-8.094982	0.854032	-8.094027	0.846021	0.115821
	(-2.604746)	(-2.605442)	(-2.604746)	(-2.605442)	(0.739000)	(0.739000)
em	-0.016022	-3.384740	-0.107925	-9.920295	0.317875	0.331461
	(-2.607686)	(-2.607686)	(-2.604746)	(-2.605442)	(0.739000)	(0.739000)
ue	0.076401	-2.988134	0.545325	-8.959023	0.174975	0.259532
	(-2.608490)	(-2.608490)	(-2.604746)	(-2.605442)	(0.739000)	(0.739000)

Note: The values in brackets are the critic values for all three tests with 1% significant level.

All the series include unit root according to unit-root tests results shown in Table-4. However the series became constant when taking their first differences. Therefore time series can be applied for constant series from the same level.

Table-5 shows the two phased co-integration test results of Engle-Granger which takes the variables as dependent variable one by one as considering the mw variable as dependent variable. In the first phase, AR models are set. In the second phase it is tested whether VAR models' error terms series (u) are constant or not with ADF and PP unit root tests.

Table 5. *Engle-Granger co-integration test*

Equation	Coefficient	t-Stat.	u → ADF	u → PP
mw=f(g)	2.726765	2.544438	-8.464019 (-3.548208)	-8.470941 (-3.548208)
mw=f(ce)	0.620858	23.89236	-8.384948 (-3548208)	-9.146019 (-3.548208)
mw=f(em)	-2.575597	-1.302157	-8.393240 (-3.548208)	-8.591366 (-3.548208)
mw=f(ue)	0.339298	0.110691	-8.597562 (-3.548208)	-8.698309 (-3.548208)

Note: The values in brackets and under the coefficients are t-Stat Values. The values in brackets and under ADF and, PP test statistics are the critical values for 1% meaning level.

The first part of Table 5, Coef. and t-Stat values which belong to VAR models are shown. The error terms series are constant with their level values according to ADF and PP tests results which are applied to error terms series (u) obtained through the models. Therefore, minimum wage is co-integrated with the selected four other variables in the long run.

However, the causality direction should also be determined in the long run co-integration relationships. Moreover, Granger Causality test results are depicted in Table 6. The causality relationship of each variable with minimum wage is examined.

Table 6. *Granger causality test*

Hypotheses (Ho)	Chi-sq	Prob.	Result
(*mw*) does not Granger Cause (*g*)	7.409214	0.0246	Hypothesis reject
(*g*) does not Granger Cause (*mw*)	6.421020	0.0403	Hypothesis reject
(*g*) does not Granger Cause (*ce*)	8.074060	0.0176	Hypothesis reject
(*g*) does not Granger Cause (*ue*)	6.303315	0.0428	Hypothesis reject
(*ce*) does not Granger Cause (*g*)	7.322488	0.0257	Hypothesis reject
(*ue*) does not Granger Cause (*em*)	8.213578	0.0165	Hypothesis reject

The results related to the variables which only have causality relationship are shown in Table-6 through Granger Causality Test. According to 2 delayed VAR models; Ho hypothesis is set as there is no causality relationship among the variables (for example, mw is not Granger reason of g.) the alternative hypothesis is as "It is Granger reason.". Accordingly, Ho hypothesis will be rejected in the test results when prob. value is smaller than 0.05. Therefore, the accepted hypothesis will be the one which claims that there is Granger causality.

The results in Table-6 show the variable which has Granger causality. Accordingly, minimum wage is Granger reason of the growth. Moreover, the growth is Granger reason of minimum wage. Therefore, there is double directed causality relationship between these two variables. On the other hand, there could not be found Granger causality relationship of minimum wage with any other variables.

5. Conclusion

This study investigated the relationship between minimum wage and the growth. These two variables are co-integrated in the long run according to the obtained results. Moreover, there is double directed causality relationship between two variables. On the other hand, the biggest effect on minimum wage is unemployment and employment variables according to regression results. 1 unit increase in employment increases minimum wage with 4.750657 units while 1 unit increase in unemployment affects minimum wage as 3.401477 units. The result is obtained through Model 1 that the increases in minimum wage affect the growth negatively. However it is shown that this effect is very small and unimportant in Model 3.

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