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Optimal Informal Employment Ratio for Turkish Economy

Murat Binay^{a*}

^aT.R. Social Security Administration, Ziyabey Cad.No:6 Balgat/Ankara,06520, Turkey

Abstract

This study is an attempt to analyze optimal informal employment ratio for Turkish economy. Informal employment has advantages and disadvantages and there is a study that 1 point increase at informal employment increases the economic growth 0,23 point for Turkish economy. Informal employment causes revenue losses consisting of both tax and social security premium. But also it causes economic growth. In the study, the relationship between the Gross Domestic Product (GDP) and informal employment ratio (IER) for Turkish economy will be analyzed. Monthly data covering the period between January 2005 and December 2013 from TÜİK (Turkish Statistics Institution) were used in the study. The model will be estimated using Engle-Granger Two-Step Estimation Procedure. By the model; at first the relationship between the informal employment ratio and the GDP will be tried to assess the optimal informal employment ratio for Turkish economy and where the Turkish economy stands according to this ratio and the gain of the economy at this optimum rate respectively.

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1. What Is Underground Economy?

In the literature, underground economy is also called second, parallel, unofficial, shadow, black and irregular economy. There is also no agreement on the definition of the underground economy and on its measurement approaches as it has many different names. Therefore, there are many definitions for the underground economy and its measurement approaches.

* Murat Binay Tel.+90-532-7695100.
E-mail address: mbinay@sgk.gov.tr

2. The Main Causes Of Underground Economy

In the economic literature, the most important causes of underground economy are increase of the tax burden and social security contributions, increased regulation in the official economy especially in labor markets, forced reduction of weekly working hours, earlier retirement and the declining of tax morale.

The increase of tax burden and social security contributions is the most important factor behind the increasing underground economic activities. As it is known, taxes affect labor-leisure choices of economic agents and also encourage labor supply towards to underground or untaxed sector of economy. As the difference between total cost of labor for employers in the official economy and after tax earnings of labor increases, we expect increasing underground economic activities. The difference between two items reflects overall tax burden and therefore it depends on social security system. Higher tax and social security contributions can lead lower tax income for employers and so it can create an incentive for employers to work in underground economy where they avoid from lower wage rates.

3. Effects Of Underground Economy

Underground economy has both negative and positive effects on the official or registered economy. The main negative effect of underground economy is seen in the case of economics policy- making process. A high underground economy creates unreliable official macroeconomic aggregates such as unemployment rate and income level. Economic policy decisions that use these official macroeconomics data are likely to be ineffective.

On the microeconomic side, underground economy creates an unfair competition conditions for firms. Firms that are operating in the underground economy have no legal regulations and it can implement and set a more competitive price than registered firms. Underground economy firms can sell their services and products at lower price than general market price and they can increase their sales volume and profit levels.

Underground economy may deteriorate financial position of social security institutions. Unregistered firms do not pay social security contributions. Underground economy also decreases tax revenue of government and decreasing tax revenue may cause limitation on social transfer of government to low-income people.

Limitation on social transfers may cause harder living standards for low-income people and that may increase social tension in the community.

Underground economy has some positive effects on the official economy. It creates employment in the economy of a country. Firms in the underground economy have lower cost structure than registered firms, and so their labor demand can be higher than the firms in the official economy. In addition, society welfare level may increase as a result of underground economy. As mentioned above, underground economy firms may sell their goods and services at a lower price than general market price, and so lower prices may increase purchasing power of society and increase general welfare level of the public.

Underground economy may affect economic growth rate in country positively and negatively. Some researchers thought that there is a positive relationship among growth of underground economy and growth of official economy. Some other researchers found empirical results that show negative relationship among them by using their model. They thought that increasing (decreasing) underground economic activities might decrease (increase) tax revenue of government, and decreasing (increasing) tax revenue may diminish (increase) public infrastructure investments, which are basic element of economic growth. Briefly, there is no consensus on relationship among growth of underground economy and growth of official economy.

4. The Relationship Between The Underground Economy And Economic Growth In Turkey

In Akalin's study, it is tried to test the relationship between the underground economy and economic growth in Turkey for the period of 1975- 2005. In this context, primarily the size of the underground economy is estimated through the basic and advanced monetary rate theory of Fiege. The relationship between the magnitudes of the underground economy and economic growth is tested by Granger Causality Analysis. The effect of underground economy on economic growth is shown by the regression analysis. Regarding the basic rate theory, the size of the underground economy, in Turkey, gets values ranging from 7% to 46%, and regarding the advanced rate theory, it is ranging from 17% to 139%. Granger Causality test results showed that there is one way causality, from underground economy to economic growth. With the regression analysis, it is also found that underground economy has a

positive effect on economic growth.

5. Modelling The Relationship Between The Gdp And Informal Employment Ratio

In Turkish economy Gross Domestic Product (GDP) values are explained quarterly by TUIK (Turkish Statistics Institution) and informal employment ratio by monthly from the datas of TUIK. In this study we used the data GDP-Constant (1998) prices (Thousand) (Quarterly) between 2013 December and 2005 January so the inflation effect got rid of. By getting the average of the monthly informal employment ratios we get the quarterly informal employment ratio. Because of the informal employment has both advantages and disadvantages, it is thought that there is a parabolic relationship between the informal ratio and GDP

The model yielded no significant results when informal employment ratio used alone, but significant results were obtained when the informal employment ratio the previous period were used, which could be attributed to the fact that structural characteristics of a preceding terms determine those of the following terms in an economy. For instance, financial authorities take account of the changes in the tax revenues for the previous year and a higher tax rate is required to meet increasing public expenditures with an increase in the GDP of the previous year.

The model is below:

$$\text{Ln GDP} = 2.822259 \text{ IER} + 0.968453 \text{ Ln GDP}(-1) - 3.459556 \text{ IER}(-2)^2$$

As is seen in model, GDP increased with increasing informal employment IER) and decreased with an increase in the informal employment ratio squared. All the coefficients in the model are statistically significant and have a high explanatory power (R^2). Moreover, the model does not present any problems of autocorrelation, multicollinearity, and heteroscedasticity. All these factors make the estimated model a good model.

By using the coefficients in model, the rate that maximizes GDP was calculated for the periods between 2005 and 2013 with the help of the formula $\text{IER}_{\max} = (\alpha + \beta / 2\lambda)$ that maximizes the Ln GDP and this optimal informal employment ratio is calculated as $2.822259 / (3.459556 * 2) = 0.407893238 = \mathbf{\%40,7893}$. This ratio is the optimal informal employment ratio that maximizes the GDP.

Table 1. Results of the ADF Test

Variables	Level	First Order Difference
LNGDP	-0.32	-20.651*
LNGDP(-1)	-0.2922	-19.95*
IER	0.80	-1.40*
IER ²	-0.0239	-1.77*

* Rejection of the unit root hypothesis at the 1% level. k is the chosen lag length.

As is clear from Table 1, all of the variables are stationary at first order difference. So model was estimated using Engle- Granger Two-Step Estimation procedure. The estimated model is as follows:

$$\text{Ln GDP} = 2.822259 \text{ IER} + 0.968453 \text{ Ln GDP}(-1) - 3.459556 \text{ IER}(-2)^2$$

(0.320447) (0.005851) (0.408461)

$R^2=0.82$ $dw=1.6171$

As seen in the Table 2 when the informal employment ratio was applied there is an improvement amount like 2,599,509,782 TL and nearly %2 increase at GDP in 2013.

Table 2: Realized and Calculated Maximum GDP dependent to IER between 2009-2013

Years	Realized Informal Employment Ratio (%)	Realized GDP with fixed 1998 prices (thousand TL)	Maximum GDP with fixed 1998 prices (thousand TL)	Difference (thousand TL)
2009	0.43748	97,003,115	99,433,492	2,430,377
2010	0.43322	105,885,644	107,395,072	1,509,428

2011	0.41927	115,174,724	117,642,482	2,467,758
2012	0.39034	117,625,021	121,178,619	3,553,598
2013	0.36742	122,476,094	125,075,603	2,599,509

6. Conclusion and Suggestions

The driving idea behind this study was informal employment has both advantages and disadvantages for an economy and it is tried to measure the effect of informal employment for Turkish economy. By the significant model the effect of informal employment and according to the structure of Turkish economy between 2005 and 2013, the optimal informal employment ratio that maximizes the GDP was assessed as %40,7893 and when this ratio is applied there is a real increase at GDP approximately equal to %2 with fixed 1998 prices.

Appendix 1.

Table 3: Maximum Quarterly GDP according to fixed 1998 Prices

Term	GDP-Fixed (1998) prices (Thousand) (Quarterly)	Informal Employment Ratio	Max GDP(Thousand)
2005-1	19,947,282.90	0.468138125	
2005-2	21,577,563.30	0.492339762	#VALUE!
2005-3	25,323,570.10	0.49388692	22,522,275.4313433
2005-4	23,651,314.50	0.475804192	26,299,141.4423673
2006-1	21,133,291.10	0.451005893	24,615,457.3974757
2006-2	23,678,188.10	0.475500915	22,073,034.2252144
2006-3	26,916,390.20	0.487553312	24,642,543.6700033
2006-4	25,010,450.80	0.464917253	27,899,583.1629091
2007-1	22,844,200.30	0.446334164	25,984,156.2907755
2007-2	24,581,028.30	0.461994502	23,801,498.1473511
2007-3	27,772,166.80	0.471454035	25,551,972.2280443
2007-4	26,057,230	0.439114072	28,758,209.7772755
2008-1	24,445,513	0.413084409	27,036,694.7406386
2008-2	25,226,374.60	0.441171162	25,415,536.1911678
2008-3	28,009,691.80	0.450829031	26,201,379.9838540
2008-4	24,240,150.50	0.431282703	28,996,376.7503559
2009-1	20,842,792	0.4096469	25,208,732.8628909
2009-2	23,267,231.30	0.443263369	21,779,125.2527075
2009-3	27,233,059.80	0.458753275	24,228,227.9784486
2009-4	25,660,031.40	0.438294113	28,217,406.3250432
2010-1	23,467,329.70	0.420260216	26,637,470.8065527
2010-2	25,692,251.50	0.439052482	24,429,990.4390173
2010-3	28,669,613.20	0.445973897	26,669,862.4242518
2010-4	28,056,449.60	0.42762776	29,657,749.0933121
2011-1	26,382,817.20	0.410743107	29,043,253.4030280
2011-2	28,082,510.30	0.42774753	27,363,798.8381617

	GDP-Fixed (1998) prices (Thousand) (Quarterly)	Informal Employment Ratio	Max GDP(Thousand)
2011-3	31,176,686.60	0.432779781	29,069,379.2763212
2011-4	29,532,710.10	0.405838087	32,166,050.7840101
2012-1	27,196,829.30	0.378003478	30,522,020.7766873
2012-2	28,854,661.80	0.396907613	28,181,049.7765884
2012-3	31,643,556.50	0.401364911	29,843,117.8706942
2012-4	29,929,973.50	0.385086666	32,632,431.0205805
2013-1	28,026,509.50	0.364587796	30,919,555.7580098
2013-2	30,183,794.20	0.376788889	29,013,237.4829782
2013-3	32,983,071.70	0.376116611	31,173,462.6971440
2013-4	31,282,718.60	0.352222334	33,969,347.8439496

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