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Unionization and informal economy

Ceyhun Elgin
Bogazici University

Abstract

In this paper I investigate the relationship between unionization and the size of the informal economy. Using a cross-country panel data for 30 countries over the period from 1960 to 2009, I find a strong and robust negative correlation between unionization and the size of the informal economy.

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Contact: Ceyhun Elgin - ceyhun.elgin@boun.edu.tr.
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1. Introduction

Unionization, generally defined as the proportion of workers belonging to trade unions, is experiencing a secular decline in the last 50 years throughout the world. (See Blaschke, 2000; Kleiner, 2001, Farber and Western, 2001; Magnani and Prentice, 2002; and more recently Addison et al. 2010 among many others.) This declining trade is generally viewed as a worldwide phenomenon. However, due to the lack of data, cross-country studies of unionization are usually rare and the literature generally consists of country-specific (or sector-level) micro-level studies. (Chappel et al. 1992; Dewatripont, 1998; DiNardo and Lee, 2002; Lee and Mas, 2009 are a few examples.)

Another important and worldwide issue is the presence of a large informal sector in national economies. Informal sector or economy, sometimes also titled shadow, hidden, black, parallel, second or underground economy (or sector) is defined by Hart (2008) as a set of economic activities that takes place outside the framework of bureaucratic public and private sector establishments. Another paper by Ihrig and Moe (2004) gives a similar definition of informality as a sector which produces legal goods, but does not comply with government regulations. Informality is a widespread phenomenon across the world and poses serious social, economic, cultural and political challenges; however many issues regarding its nature and consequences still remain largely under-explored or unresolved. (See Schneider, 2005, 2007; Schneider and Enste, 2000; Buehn and Schneider, 2012 and Elgin and Oztunali, 2012 among many others.) As the number of papers in the growing literature on informality indicates, there is an increasing attention on the economic analysis of the shadow economy in recent years.

In addition to various other dimensions of economic outcomes, informality would potentially have distinct and crucial effects in the labor market as well. Considering the fact that the informal sector, compared to the formal economy, is a highly labor intensive sector and is not obeying most (if not all) of the government regulations (including but not limited to social security payments, minimum wage regulations, union coverage and protective rules for labor force), this is not surprising. This indicates that there is a strong need for empirical analysis. Analyzing the link between unionization and the informal economy and understanding whether the variation in the latter is significantly correlated with the variation in the former would be especially appealing.

Aiming to bring these two streams of literature together and to further our understanding of variation of unionization across countries and over time, in this paper I examine the relationship between unionization and the size of the informal economy. Using a panel data for 30 countries over the period from 1960 to 2009 I find a strong and robust negative correlation between unionization and the size of the informal economy.

The rest of the article is organized as follows. Section 2 shortly outlines the motivation for this paper and reviews the theoretical framework. Next, section 3 outlines the econometric model and reports the empirical results. Finally, section 4 provides concluding remarks.

2. Motivation

As mentioned in the introduction, the informal economy is generally characterized as a highly labor intensive sector, not affected by most of the regulation (such as the minimum

wage, labor standards, unionization requirements etc.) set by the government. In that context, from the firms' perspective, there are less distortions in the informal sector as opposed to the formal economy.

Formalizing these ideas, Zenou (2008) characterizes a model in which wages in the formal economy are determined by a bargaining between workers and firms which together with search frictions potentially creates unemployment. However, in the informal sector, wages are paid at the marginal productivity of workers and there is full employment. Similarly, Chaudhuri and Mukhopadhyay (2009) provide a similar model when investigating trade liberalization's effect on wage inequality in a dynamic general equilibrium framework.

Alternatively, one could also write a two-sector (formal and informal) model where with the presence of labor unions in the formal sector, wages are determined at the end of a process with collective bargaining. The presence of a union premium for union members in the formal sector would lead one to expect to have a negative correlation between unionization and informal economy size. This expectation would be in line with the results of Carneiro and Henley (1998) where the authors study the effects of formal sector bargaining power in Brazil between 1980 and 1993. Their results indicate the existence of a negative long run relationship between formal sector wages and the size of informal economy.

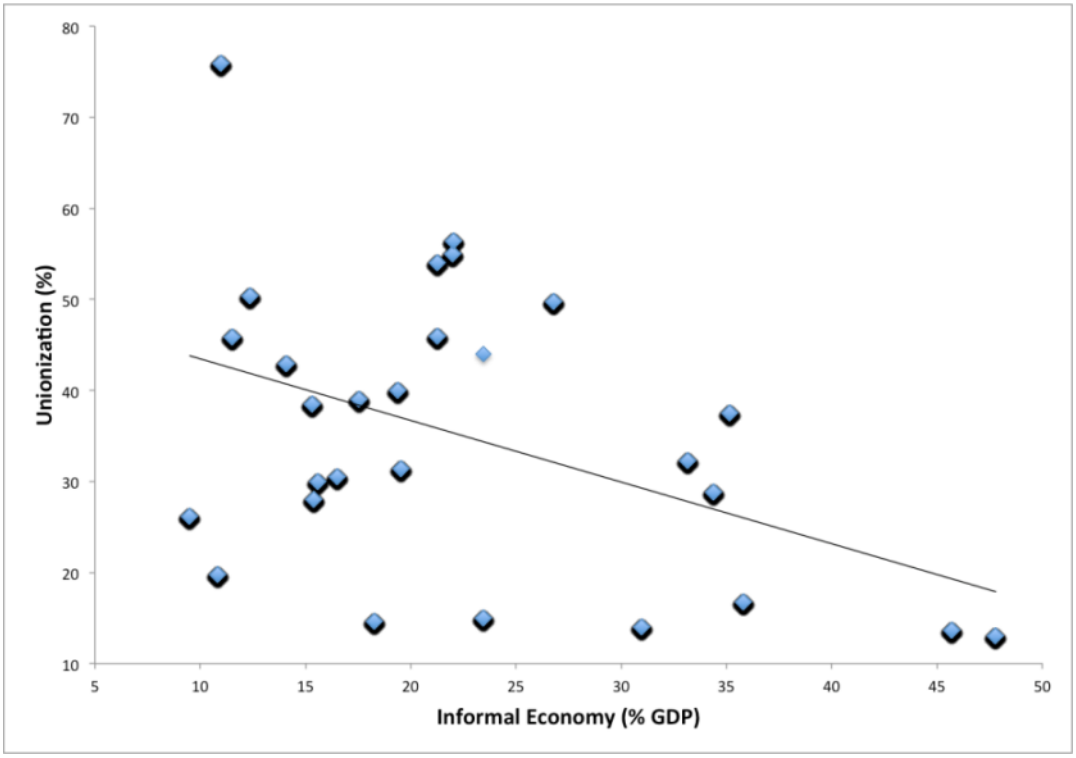

Figure 1: Unionization and Informal Economy

Motivated by the absence of any cross-country study about the relationship between unionization and informal economy, I want to analyze whether there indeed exists a negative correlation between these two variables. For the first step, Figure 1 illustrates the plain correlation between unionization (percentage of unionized workers) and informal economy

size as % of GDP using average data for 30 countries[1] over the period from 1960 to 2009. Even though, a clear negative correlation is evident from the figure, one needs further econometric analysis (with panel data) to check the robustness of this observation. This I will conduct in the next section.

3. Empirical Analysis

To see whether there is a robust correlation between the unionization and the size of the informal economy and provided that there exists one, what the sign of that correlation is, the following equation is estimated using a panel data framework:

$$Union_{i,t} = \beta_0 + \beta_1 IS_{i,t} + \sum_{k=2}^{n} \beta_k X_{k_{i,t}} + \theta_i + \gamma_t + \epsilon_{i,t}$$

In this specification, for country i in year t, $Union_{i,t}$ represents the union density (i.e. percentage of labor force belonging to a labor union), IS stands for the informal sector size as % of GDP, $X_{k_{i,t}}$ are various control variables included in the regression. These are used to control for other potential explanations made in the literature to account for the variation in unionization. θ_i and γ_i represent country and period fixed-effect respectively. Finally, $\epsilon_{i,t}$ is the error term. Moreover, to address any potential endogeneity issues I have also run a regression using the GMM estimator of Arellano and Bond (1991). In that case, I also included one-period lagged value of the dependent variable among the dependent variables. I also used lagged values of all the independent variables as instruments.

Moreover, to see the long-run effects (if there exists any) I also conduct estimations using the panel ordinary least-squares (OLS) estimator. Moreoever, time-series averages of the cross-section will also be estimated using an OLS estimator in a cross-section framework, i.e. I will estimate the following:

$$Union_i = \beta_0 + \beta_1 IS_i + \sum_{k=2}^{n} \beta_k X_{k_i} + \epsilon_i$$

Noticeably, in every case, the coefficient of interest in the empirical analysis will be β_1.

The regressions in this section will use informal sector size as % of GDP as the key independent variable. These I obtain from the panel estimates of Elgin and Oztunali (2012). These estimates are constructed from a two-sector dynamic general equilibrium model using national income data from Penn World Tables 7.0. This is the largest available cross-country panel data in the literature on informality especially with its large time-series dimension. There are also some other informal sector series available in the literature; however these are available only for significantly shorter time intervals. [2]

[1] Sources of the data will be made clear in the next section.

[2] The data reported by Buehn and Schneider (2012) reports informal economy estimates for a large number of countries for the years between 1999 to 2007. I also conducted estimations using this data (with only 9 years reported by the authors) and obtained qualitatively very similar results. These are available upon request.

Table 1: Complete Dataset Summary Statistics: 1960-2009

	Mean	Std. Dev.	Minimum	Maximum	Observations
Informal Sector Size (% GDP)	22.22	10.16	8.08	72.08	1476
Unionization (%)	38.89	20.14	5.80	96.36	1145
GDP per-worker (thousand USD)	44.70	18.69	6.00	120.60	1476
Openness (%)	56.80	47.43	3.94	327.09	1470
Government Exp. (% GDP)	9.09	3.09	2.09	24.11	1480
Growth (%)	2.74	3.66	-19.93	22.89	1478
Urbanization (%)	71.73	14.36	27.70	97.38	1500

Data for unionization, defined as the percentage of unionized workers[3], is obtained from World Development Indicators (WDI). Unfortunately, the fact that the unionization data is only available for OECD economies severely limits the data size. One particular drawback of this is that the cross-country variation is limited due to the low number of countries in the data. However, a relatively large time-series dimension in my dataset aims to offset this drawback.

Other control variables used in the regressions are GDP per-worker, openness (defined as the ratio of the sum of exports and imports to GDP), government spending to GDP ratio, growth rate of GDP per-worker and urbanization. (defined as the percentage of urban population) GDP per-worker, growth government spending and openness data are obtained from Penn World Tables 7.0 and urbanization is from WDI.

At the end, I end up with a highly balanced panel data for 30 countries over the period from 1960 to 2009. Table 1 provides descriptive statistics of all the series used in the regressions.

Estimation results are presented in tables 2 and 3. First six columns of Table 2 reports results of fixed-effects estimations and the last column (denoted by GMM) reports results of the dynamic panel data estimation[4]. One can observe that the estimated coefficient of the informal sector size is significantly and robustly negative all cases. That is, a larger (smaller) informal economy size is associated with a smaller (larger) degree of unionization.

Moreover, in Table 3, I report results of OLS regressions. In the first six columns, I use OLS with panel data and in the last column I simply run a cross-sectional regression with time-series average data for 30 countries. Again, in all cases the estimated coefficient of the informal sector size is significantly negative.

[3]When constructing labor force statistics governments may estimate and include some (if not all) informal workers within the labor force; however these estimations should be imperfect by definition. Therefore the unionization measure used in the paper might also be interpreted as unionized workers as percentage of formal workers in labor force.

[4]Further estimations has been conducted to address potential existence of a two-directional causality between informal sector size and business cycles. These are available upon request from the author.

Table 2: Unionization and Informal Economy: Panel Regressions

Dep. Var.: Unionization

	(1)	(2)	(3)	(4)	(5)	(6)	GMM
IS	-0.27**	-0.34**	-0.37**	-0.34**	-0.39**	-0.31**	-0.81**
	(0.14)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.41)
GDP per-worker		-0.09*	-0.04	-0.00	-0.02	-0.01	0.02
		(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.09)
Openness			-0.07*	-0.06*	-0.06*	-0.06*	-0.04**
			(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Gov. Exp.				0.36**	0.41**	0.40**	0.30**
				(0.17)	(0.18)	(0.18)	(0.16)
Growth					0.02	0.01	-0.04***
					(0.02)	(0.02)	(0.02)
Urbanization						0.33**	0.28**
						(0.13)	(0.15)
Union(-1)						0	0.1.14*
							(0.16)
R-squared	0.03	0.01	0.03	0.03	0.03	0.04	
Observations	1107	1107	1107	1107	1106	1106	967
F-Test	3.12	6.12	10.49	9.02	7.44	7.31	
J-Test							0.09
AR(2) Test							0.11

Robust standard errors are reported in parentheses. *, **, *** denote 1, 5 and 10% confidence levels, respectively.

4. Conclusion

In this paper using a panel data for 30 countries over the period from 1960 to 2009 I find a strong and robust negative correlation between unionization and the size of the informal economy. This result indicates a strong need for further research on the analysis of economic mechanisms behind this relationship.

Table 3: Unionization and Informal Economy: OLS Regressions

Dep. Var.: Unionization

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IS	-0.29*	-0.29*	-0.37*	-0.43*	-0.42*	-0.38*	-0.22*
	(0.05)	(0.06)	(0.06)	(0.07)	(0.07)	(0.06)	(0.05)
GDP per-worker		-0.01	-0.18*	-0.29*	-0.30*	-0.32*	0.03
		(0.03)	(0.05)	(0.05)	(0.05)	(0.05)	(0.07)
Openness			-0.10*	-0.14*	-0.15*	-0.14*	-0.14*
			(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Gov. Exp.				2.42*	2.42*	2.29*	0.71*
				(0.26)	(0.25)	(0.25)	(0.21)
Growth					-0.35***	-0.27	0.47
					(0.20)	(0.20)	(0.70)
Urbanization						0.18*	0.36*
						(0.05)	(0.05)
R-squared	0.02	0.02	0.04	0.13	0.18	0.19	0.23
Observations	1134	1134	1134	1134	1134	1133	30
F-Test	29.87	15.20	36.57	43.38	70.15	34.53	11.02

Robust standard errors are reported in parentheses. *, **, *** denote 1, 5 and 10% confidence levels, respectively.

Appendix

List of Countries included in Regressions: Australia, Austria, Belgium, Canada, Chile, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea (South), Luxemburg, Malta, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, UK, USA

References

1. Addison, J. T., Bryson A., Pahnke A., and Teixeira, P. (2010). "Slip Sliding Away: Further Union Decline in Germany and Britain", CEP Discussion Papers dp0971, Centre for Economic Performance, LSE.

2. Arellano, M. and Bond, S. (1991) "Some Test of Specification for Panel Data: Monte Carlo Evidence and Application to Employment Equations". *Review of Economic Studies* 58: 277-297.

3. Blaschke, S. (2000). "Union Density and European Integration: Diverging Convergence", *European Journal of Industrial Relations*, 6 (2), 217-236.

4. Buehn, A. and Schneider, F. (2012). "Shadow economies around the world: novel insights, accepted knowledge, and new estimates" *International Tax and Public Finance* 19 (1), 139-171.

5. Carneiro, F. and Henley, A. (1998). "Wage determination in Brazil: The growth of union bargaining power and informal employment", *Journal of Development Studies*, 34 (4), 117-138.

6. Chaudhuri, S. and Mukhopadhyay, U. (2009) *Revisiting the Informal Sector: A General Equilibrium Approach* Springer; Ch.7. 1 edition.

7. Chappell, W.F., Kimenyi, M.S., and Mayer, W.J. (1992). "The Impact of Unionization on the Entry of Firms: Evidence from US Industries". *Journal of Labor Research*, 13(3), 273-283.

8. Dewatripont, M. (1998.) "The Impact of Trade Unions on Incentives to Deter Entry". *RAND Journal of Economics*, 19 (2), 191-199.

9. DiNardo, J. and Lee, D. S. (2002). "The Impact of Unionization on Establishment Closure: A Regression Discontinuity Analysis of Representation Elections". NBER Working Paper 8993.

10. Elgin, C. and Oztunali, O. (2012). "Shadow Economies around the World: Model Based Estimates", Working Papers 2012/05, Bogazici University, Department of Economics.

11. Farber, H. S. and Western, B. (2001). "Accounting for the Decline of Unions in the Private Sector", 19731998, *Journal of Labor Research*, 22 (3), 459-485.

12. Hart, K., 2008. "Informal Economy", *The New Palgrave Dictionary of Economics*. Second Edition, Eds.Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan.

13. Ihrig, J., Moe, K., 2004." Lurking in the shadows: The informal sector and government policy". *Journal of Development Economics*, 73, 541-77.

14. Kleiner, M. M. (2001). "Intensity of Management Resistance: Understanding the Decline of Unionization in the Private Sector". *Journal of Labor Research*, 22 (3), 519-540.

15. Lee, D. S. and Mas, A. (2009)." Long-run impacts of unions on firms New evidence from financial markets, 1961-1999" NBER Working Paper, 13709.

16. Magnani, E. and Prentice, D. (2003). "Did globalization reduce unionization? Evidence from US manufacturing", *Labour Economics*, 10 (6), 705-726.

17. Pencavel, J. H. (1971). "The Demand for Union Services: An Exercise". *Industrial and Labor Relations Review*, 24 (2) 180-190.

18. Schneider F., Enste, D. H., (2000) "Shadow Economies: Sizes, Causes and Consequences". *Journal of Economic Perspectives*, 38: 77-114.

19. Schneider, F., (2005). "Shadow Economies Around the World: What do We Really Know?", *European Journal of Political Economy*, 21, 598-642.

20. Schneider, F., (2007). "Shadow Economies and Corruption All Over the World: New Estimates for 145 Countries", *Economics- The Open-Access, Open-Assessment E-Journal*, 19, 1-66.

21. Zenou, Y. (2008) "Jobsearch and mobility in developing countries. Theory and policy implications", *Journal of Development Economics*, 86 (2), 336-355.