

Cyclicity of the Informal Economy*

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Abstract:

This paper investigates the cyclical properties of the size of the informal economy over the business cycle. To this end, it uses a panel data set of 152 countries and finds strong evidence towards the countercyclicality of the informal sector size i.e. the size of the informal sector as a ratio of GDP is reduced in booms and becomes bigger in busts. This has serious consequences over the business cycle as it implies that the presence of the informal sector increases the amplitude of the business cycles.

Keywords: business cycles, informal sector, panel data, cyclicity.

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1 Introduction

As opposed to smoother cycles in developed countries, business cycles in emerging markets are mostly characterized increasingly by their high amplitude and large volatility. This is obvious when one compares GDP per-capita of developed and developing economies in percentage deviations from their trend. (See Kose, 2002; Aguiar and Gopinath, 2004; Kaminsky, Reinhart and Vegh, 2005; Neumeyer and Perri, 2005 among many others.)

To contribute to this literature and to further our understanding of the causes of the difference in the amplitude and volatility of business cycles across countries, this paper examines the cyclical properties of the size of the informal economy over the business cycle and by using a panel data set of 152 countries and it finds strong evidence towards the countercyclicality of the informal sector size i.e. the relative size of the informal economy expands during recessions and shrinks in booms. Considering that the informal sector is a substitute to the formal economy, this has serious consequences over the business cycle as it implies that the presence and such a volatility of the informal sector amplifies the magnitude of the business cycles.

The rest of the article is organized as follows. Section 2 reviews the theoretical framework and presents various theoretical arguments linking the evolution of the informal sector to business cycles. Next, section 3 outlines the econometric model and report the empirical results. Finally, section 4 concludes.

2 Theoretical Framework

Informal economy is generally defined as a sector which does not comply with government regulations. In that sense, it includes "unreported income from the production of legal goods and services." (See Schneider and Enste, 2000 for comparison of various definitions.) and is imperfectly (if any) included in official estimates of GDP.

To characterize, it is generally viewed as a sector which, compared to the formal economy, is highly labor intensive and less productive. However, in this regard, it serves as a substitute to the formal economy both for firms and households. Outside of government scrutiny it does not comply with government regulations (including social security requirements), standards and usually avoid most of

the (if not all) taxes. With these characteristics, the informal economy provides room for a significant amount of labor and produces a substantial value-added which, as argued above, is largely absent in official GDP statistics. Notably, among many other complications, this leads to a certain amount of underestimation of total value-added within an economy.

The empirical investigation made in this paper sheds light on the relationship between informal sector size and business cycles. The main question is whether informal sector is larger in booms and smaller in busts (procyclical) or countercyclical. Considering the characteristics of the informal economy outlined above and that it is a substitute to the formal sector, one should expect it to be countercyclical. For example, in busts when the official economy is not performing well, one should expect that the households and firms, not being able to find opportunities in the formal sector, turn to the informal economy. This would certainly increase the informal sector's size, relative to official GDP. A similar story would work in booms in the opposite direction.

A potential countercyclicality of the informal sector would have very important consequences over the business cycles. As it implies that informal households and firms would relatively move to the formal sector in booms and formal households and firms would relatively move to the informal sector in busts, this would certainly increase the measured amplitude of the business cycles in an economy. Surely, the effect would not be limited on the business cycle only. For example, as the informal sector avoids most of the taxes, a fluctuation in its size over the business cycle would certainly affect the volatility of the tax base. As argued by Cicek and Elgin (2011) this might be one of the factors behind the developing countries' inability to follow countercyclical fiscal policy, as they have a large informal sector compared to the developed economies.

3 Empirical Analysis

3.1 Methodology

To understand whether there is a correlation between the size of the informal economy and business cycles

the following equation is set up using a panel data:

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

Here for country i in year t , $Cycle_{i,t}$ represents the cyclicity measure as a proxy for business cycles, 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 explanations for different degrees of business cycle amplitudes across countries. Finally, θ_i represents the country fixed-effects and $\epsilon_{i,t}$ is the error term. Moreover, to address any potential endogeneity issues regressions are also run using the GMM estimator of Arellano and Bond (1991). In this case the following is estimated:

$$Cycle_{i,t} = \beta_0 + \beta_1 IS_{i,t} + \beta_2 Cycle_{i,t-1} + \sum_{k=3}^n \beta_k X_{k,i,t} + \theta_i + \epsilon_{i,t}$$

The coefficient of interest in the empirical analysis will be β_1 . A significant negative (positive) estimate of it will imply that the informal sector size is countercyclical (procyclical).

3.2 Data

Table 1: Complete Dataset Summary Statistics

	Mean	Std. Deviation	Minimum	Maximum
Percentage Deviation from Trend	-10.40	-17.90	-78.64	52.15
Growth Rate of GDP per-capita	3.49	6.22	-33.85	14.12
Informal Sector Size (in %)	33.14	12.98	8.10	68.30
Openness	89.55	52.53	4.83	453.44
Government exp.	15.21	5.68	2.29	42.95
Democracy Index	3.99	1.68	0.00	6.00
Law and Order Index	3.88	1.35	0.50	6.00
Corruption Control	2.78	1.22	0.00	6.00
Real Interest Rate	6.98	1.68	-82.56	86.98
Fiscal Balance	-0.70	4.51	-18.40	40.43

The regressions in this section will use informal sector size as % of GDP as the key independent variable. These I obtain from the estimates of Schneider, Buehn and Montenegro (2010). This dataset is available for 152 countries over 9 years from 1999 to 2007 in an annual basis. To measure the business cycle two different variables will be used in different sets of regressions. These are the percentage

deviation of the real GDP per-capita from its long-run trend (The trend is estimated using the long-run average growth rate over the period 1960-2007.) and its annual growth rate, respectively.

Control variables used in the regression are openness (defined as the), government spending to GDP ratio, an index for the level of democracy, law and order and corruption control, real interest rate, and fiscal balance to GDP ratio. GDP, government spending and openness data are obtained from Penn World Tables, institutional quality indices from the ICRG of the PRS Group and interest rate and fiscal balance data from World Development Indicators.

Table 2: Informal Economy and Cyclicity

Dep. Var.: % Dev.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	GMM-AB
IS	-3.41*	-3.41*	-3.32*	-3.12*	-3.11*	-3.07*	-2.60*	-1.89*
	(0.16)	(0.16)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.25)
Openness		0.003	0.005	0.02	0.02	0.03**	0.001*	0.01
		(0.009)	(0.009)	(0.01)	(0.01)	(0.02)	(0.00)	(0.02)
Gov. Sp.			-0.17**	-0.18**	-0.19**	-0.12	0.14	-0.43*
			(0.07)	(0.07)	(0.07)	(0.08)	(0.11)	(0.15)
Democracy				0.16	0.09	-0.14	0.65***	0.11
				(0.25)	(0.25)	(0.28)	(0.36)	(0.37)
Corruption					0.09	0.11	0.01	-0.47
					(0.27)	(0.28)	(0.36)	(0.38)
Law/Order					0.73**	0.37	0.15	-0.68
					(0.36)	(0.36)	(0.50)	(0.50)
Int. Rate						-0.04*	-0.05**	-0.06**
						(0.01)	(0.02)	(0.03)
Fiscal Balance							0.12**	0.16*
							(0.06)	(0.08)
L. % Dev.								0.81*
								(0.06)
<i>R</i> -squared	0.32	0.32	0.32	0.31	0.32	0.34	0.55	
Observations	1189	1189	1139	977	977	788	461	411
F-Test	479.05	239.42	154.77	96.01	65.32	49.45	32.88	

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

3.3 Results

Estimation results are presented in tables 2 and 3. Table 2 reports results with percentage deviation from trend as the cyclicity measure and Table 3 the growth rate of real GDP per-capita. In both cases, 7 equations are estimated using the fixed effects estimator with a different set of independent

variables. Finally, the last column (denoted by GMM-AB) reports results of the dynamic panel data estimation. One can observe that the estimated coefficient of the informal sector size is significantly and robustly negative in both tables. That is, using both measures of the business cycles, one obtains a similar result: A higher informal sector size is associated with a lower deviation from trend or lower growth rate of real GDP per-capita. In other word, informal sector size is countercyclical.

Table 3: Informal Economy and Cyclicity

Dep. Var.: Growth	(1)	(2)	(3)	(4)	(5)	(6)	(7)	GMM-AB
IS	-1.22*	-1.14*	-1.09*	-1.07*	-1.00*	-1.17*	-1.01*	-1.15*
	(0.13)	(0.13)	(0.14)	(0.15)	(0.16)	(0.14)	(0.20)	(0.43)
Openness		0.03*	0.04*	0.04*	0.04**	0.03**	0.01	0.09
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.06)
Gov. Sp.			-0.06	-0.06	-0.06	-0.03	0.34*	0.39
			(0.09)	(0.10)	(0.10)	(0.09)	(0.13)	(0.49)
Democracy				0.12	0.24	-0.23	-0.32	-0.37
				(0.29)	(0.30)	(0.28)	(0.34)	(0.37)
Corruption					-0.34	-0.18	0.01	0.06
					(0.34)	(0.29)	(0.37)	(0.51)
Law/Order					-0.53	-0.69***	-0.70	-0.31
					(0.43)	(0.37)	(0.49)	(1.22)
Int. Rate						-0.04***	-0.08*	-0.08
						(0.02)	(0.03)	(0.08)
Fiscal Balance							0.29*	0.12
							(0.08)	(0.15)
Growth (-1)								0.001
								(0.07)
<i>R</i> -squared	0.07	0.07	0.07	0.08	0.08	0.15	0.18	
Observations	1356	1356	1303	1121	1121	919	560	418
F-Test	90.54	48.61	29.75	20.60	14.30	19.43	12.44	

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

4 Concluding Remarks

This paper investigated the cyclical properties of the size of the informal economy over the business cycle. To this end, it made use of a panel data set of 152 countries and found strong evidence towards the countercyclicality of the informal sector size i.e. the size of the informal sector as a ratio of GDP gets bigger in busts and is reduced in booms. Since the informal economy acts as a substitute,

even though not necessarily perfect, to the formal sector, this has serious consequences for economic policy makers as it increases the amplitude of the business cycles. Future research should focus on the underlying mechanism behind this observation as well as remedial policies to smooth the business cycles.

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