Institutions and Human Development in the Latin American Informal Economy

Roberto Dell'Anno
(r.dellanno@unifg.it)
University of Foggia
Department of Economics, Mathematics and Statistics
Largo Papa Giovanni Paolo II, 1
71100 – Foggia - Italy

Abstract

The aim of this study is to assess the causes of the Informal Economy (IE) in Latin American countries. By including indicators of institutional setting such as human development, marginal tax rate, public social spending and unemployment rate in panel regressions, we find empirical evidence that the institutional background is a key indicator of the size of the IE in these countries. We observe that the correlation between the size of the IE and the human development index follows an inverted U shaped curve. Policy suggestions are provided.

JEL Classification: O17, K42, O54, N16

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1. Introduction

Since North's (1989, 1990, 2003) contributions to the study of economic development, several scholars have tried to explain why some countries grow rich and others stay poor by focusing their analyses on the social, legal, political and economic framework[1]. Following this idea, this paper attempts to explain why some economies experience a sizable informal economy (IE) and others show a smaller IE. This research is intended to contribute to the institutional analysis of the IE. The term "informal economy" refers to all economic activities by workers and economic units that are – in law or in practice – not covered or insufficiently covered by formal arrangements[2] (ILO 2002a, p. 53). More specifically, given data limitations, in this paper we primarily focus on urban informal employment. This choice takes into account conclusions of a recent analysis of International Labour Organization (ILO) on Latin American IE. According to ILO (2007), in these countries IE is essentially perceived as an urban phenomenon. Owing to this urban characteristic of Latin American IE, the Economic Commission for Latin America and the Caribbean (ECLAC) measures the size of the informal sector as a ratio between the urban population employed in low productivity sectors of the labour market (micro-enterprises, domestic work and non-qualified independent workers) and the total urban employed population. This ratio is the proxy of IE used in this paper.

For Enste (2003), most studies focus on the influence of the allocation of resources and the loss of revenue for the State, but they undervalue the impact of institutions, norms and rules that may be even more important. The relevance of an institutional approach to analyse IE is supported by several International economic organizations. For instance, World Bank (2002) sustains that countries are more likely to be competitive and to develop - and hence have a smaller informal economy - if there is an open flow of information to people, adequate protection of property rights, especially of the poor, enforcement of contracts and low cost of resolving disputes and access to the judicial system by people in general. According to ILO (2002b, p. 6) "the root causes of the informal economy are multifaceted, legalization alone is not enough to promote decent work. […] Strong and effective judicial, political, economic and other market and non-market institutions and equitable access to these institutions are essential." Although a large consensus exists in the literature that the institutional variables may account for differences in levels of the size of the IE (e.g., Loayza 1996; Feige 1998; Belev 2003; Dreher et al. 2005; Bovi and Dell'Anno 2007; Torgler and Schneider 2007), it has received relatively little attention in the empirical literature. The

[1] A motivation for this approach could be that "countries with better institutions, more secure property rights, and less distortionary policies will invest more in physical and human capital, and will use these factors more efficiently to achieve a greater level of income" (Acemoglu et al. 2001, p. 1369).

[2] According to ILO "Work in the informal economy is often characterized by small or undefined workplaces, unsafe and unhealthy working conditions, low levels of skills and productivity, low or irregular incomes, long working hours and lack of access to information, markets, finance, training and technology. Workers in the informal economy may be characterized by varying degrees of dependency and vulnerability." (ILO 2002a, p. 54). However, for the ILO, "the most meaningful way of looking at the situation of those in the informal economy is in terms of decent work deficits. Poor-quality, unproductive and unremunerative jobs that are not recognized or protected by law, the absence of rights at work, inadequate social protection, and the lack of representation and voice are most pronounced in the informal economy, especially at the bottom end among women and young workers." (ILO 2002b, p 4). Unfortunately, at this time, there are not available data on the size of not-decent work in Latin America.

main difficulty for empirical analyses of this issue is the availability and reliability of data. Until a few years ago, determining the impact of economic policies on cross-country informal performance has been virtually impossible because of the inherent difficulties in measuring both the institutional performances and the size of the IE across countries. When estimates are made with unobservable variables (e.g., regulation, rule of law, IE estimates) over a short time horizon, then the trustworthiness of econometric outcomes can be gravely questionable. Fortunately, the recent availability of statistics on the scope of institutions performance and the IE now makes such a study possible. Because of these limitations, we collected data from a sufficiently homogeneous set of countries and panel data sources in order to minimize problems of measurement consistency and estimate comparability. In particular, we used releases of the Fraser Institute's *Economic Freedom of the World* annual report (Gwartney et al. 2007) including data for a large number of Latin American countries and of the ECLAC. From these sources, we extracted data on the institutional environment and estimates of the informal sector, respectively.

A poor institutional setting is assumed to reduce both the moral costs and the social stigma associated with disobeying (formal and informal) rules. It also decreases the disincentive to operate in the IE and we thus expect that institutions have tangible effects on the size of the informal sector.

This study also has the aim of investigating the relationship between the IE and human capital. Human capital is measured with the Human Development Index of United Nations Development Programme (UNDP). We hypothesize that the amount of human capital affects the size of the IE.

In this study, we find some plausible answers to the following questions: what are the main causes of the existence of IE across Latin American countries? How should the policy maker adapt his economic policy according to institutional and/or economic factors? We attempt to answer these questions by a panel data analysis for 17 Latin American countries over the period from 1994 to 2005.

The outline of the paper is as follows. Section 2 provides an overview of the literature concerning the relationship between institutions and the IE. Section 3 presents the dataset and the panel data model. Results are discussed in section 4. The paper concludes with some policy implications and general conclusions. An appendix about the datasources is provided.

2. Institutions and the Informal Economy

The relevance of the institutional approach has benefited from the influence of several topics in economics, including the analysis of the IE. In particular, the empirical research on underground production has been extensively influenced by theories of economic development where institutional variables are considered as determinants of growth. For instance, the cross-country analyses of Knack and Keefer (1995), Mauro (1995), Barro (1999), Hall and Jones (1999) and Rodrik (1999) have been influential to point out the correlation between some measures of property rights and economic growth. North and Weingast (1989) have found the formal features of the institutional environment as crucial in examining economic development and for making intertemporal comparisons within and across countries (Williamson 2000). Noteworthy are the papers of Hall and Jones (1999), Acemoglu et al. (2001) and Bertocchi and Canova

(2002). These papers exploit differences in colonial experience to evaluate the impact of institutions[3] on income per capita, and conclude that a poor institutional setting is associated with a lower level of GDP per capita. Acemoglu (2008) argues that economic institutions are relevant to determine not only the aggregate economic growth potential of the economy, but also the distribution of resources in the society. Again, for Kherallah and Kirsten (2002), the institutions of a country govern its economic performance, and it is this, according to Coase (2000), that gives the (new) institutional economics its importance for economists. Following this approach, recent studies have explored the relationship between the IE and institutions. For Dreher et al. (2005), there are at least two schools of thought on the causes of the IE. One school identifies high tax burden as the most important source of the IE, while another identifies institutional quality, regulatory discretion, and corruption as the main cause of driving economic agents underground. This second school of thought fits with the approach followed by institutional economics (Coase 1937, 1960; North 1990, 2003). The basic idea of the institutional approach to the IE came from empirical studies of economic growth literature. It has been verified that institutions are important for official economic development. As concerns the informal economy, scholars expect to find a significant relationship between the size of the IE and the institutional setting. North's (1990) classification is helpful in understanding this relationship. According to the Nobel Prize-winning economist, institutions are composed of formal rules (statute law, common law, regulations), informal constraints (conventions, norms of behaviour, and self-imposed codes of conduct), and the enforcement characteristics of both. As Schnellenbach (2007) reveals, the term informal institution has a number of different connotations in the economic literature. It can be defined as the norms internalised by individuals (Elster 1989); the self-enforcing rules that are not drafted formally (Knight 1992) or considered, according to North (1992), as an obstacle to the efficacy of formal institutions in transition processes. It makes sense to distinguish between formal and informal institutions because though it is widely accepted that both affect economic performance, it is not always obvious which institutional rules dominate. This question became a key issue for the analysis of the IE. Informal production, in fact, may be considered one of the most pervasive forms of an informal institution. To analyze how it interacts with formal rules is fundamental to understanding both official and unofficial economic development. For instance, Feige (1998) sustains that when formal and informal institutions are coherent and consistent, the incentives given by the formal rules will affect economic outcomes. As a result he believes that when formal institutions conflict with informal norms, noncompliance with the formal rules becomes pervasive, and the IE is consequential for economic outcomes. In contrast, Bejakovic (2004) argues that the informal usually complements the formal.

[3] The most commonly agreed upon definition of institutions is provided by North (1990, p. 3): *"Institutions are the rules of the game of a society, or, more formally, are the humanly devised constraints that structure human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic.*" Feige (1998) defines institutions as "*le rules that constrain human behaviors by affecting the expected payoffs for economic actors.*" Lin and Nugent (1995, p. 2037) define: *"…as a set of humanly devised behavioral rules that govern and shape the interactions of human beings, in part by helping them to form expectations of what other people will do*".

In this paper, various ideas introduced from (new) institutional economics[4] are applied to IE analysis. Rethinking IE analysis in an institutional setting means analyzing the complex interactions between formal rules that govern economic development (regulations, hiring and firing rules, taxes) and informal norms (tax morale, attitude towards the authority, etc.). Theoretical[5] and empirical literature on this issue is growing but still limited. The empirical cross-country analyses point out how the size of the IE is affected by both formal institutions (fiscal policy, labour market regulation, deterrence variables as probability to be caught, fines rates, etc.) and informal ones (perception of government's fairness, rule of law, attitude towards the State, etc.). These studies find theoretical support also from economic psychology and experimental economics. They emphasize that the perception of fairness of the economic system may play an important role in tax compliance. Thus, better institutions lead to increasing incentives to obey rules and consequently reduce the size of the IE. The first studies on this issue may go back to an analysis of tax morale on tax evasion. Schanz (1890) was probably the first to argue that the small size of a community (e.g., Swiss cantons) and direct democratic political systems establish a close exchange relationship between taxpayers and tax authorities, which lowers tax evasion. For Schmölders (1951/1952), the tax compliance will be higher the more satisfied the citizens are with the policy conducted by their government. Schwartz and Orleans (1967) found that the relative effectiveness of "appealing to conscience" and penalties depend on the socio-economic characteristics of the individual. More recently, Schnellenbach (2006) points out that taxpayers systematically adjust their compliance according to how satisfied they are with public policy, processes of collective decision-making, and the quality of their relationship to authorities. For Perry et al. (2007), individuals will be more inclined to observe the rules if they believe that the government is using public resources effectively. These studies converge on the hypothesis that to combat IE effectively, government has to improve the quality of the institutional setting. It becomes, in fact, the best policy to increase citizens' attitude towards the State and its perceived fairness.

Johnson et al. (1998; 1999), Friedman et al. (2000), Schneider (2005), Dreher et al. (2005), Guha-Khasnobis et al. (2006), Dreher and Schneider (2006), Torgler and Schneider (2007) and Bovi and Dell'Anno (2007) find empirical evidence that better institutions are correlated with lower size of the IE. World Bank (1995), Loayza (1996), Galli and Kucera (2003) and Loayza et al. (2006) focus their analyses on the impact of regulation on informality. In particular, World Bank (1995) argues that the extent of informal employment in Latin America is partly determined by "labor policies that overlooked the role of wages and working conditions as incentives and market signals, reducing the number of formal jobs and encouraging the development of the informal sector" (World Bank 1995, p. 6). Loayza (1996) finds that the size of IE depends positively on proxies for labour market restrictions and negatively on a proxy for the quality of government institutions. Galli and Kucera (2003) find robust evidence that countries with stronger "civic

[4] The (new) institutional economics is commonly considered as one of the most plausible theories of development (Preston 1996; Boliari and Topyan 2007). It aims to explain the determinants of institutions and to evaluate their impact on economic performance, efficiency, and distribution (Nabli and Nugent 1989).

[5] See for instance: Feige (1998); Belev (2003); Enste (2003).

rights" have higher shares of formal employment and lower shares of informal employment. Finally, Loayza et al. (2006) estimate that an increase of product-market and labour regulations indices lead to more informality.

In the following, we attempt to adapt the explanatory scheme for official economic development to investigate the link between institutional setting and informal sector. It is implied that we should approach the IE with a more exhaustive model of the determinants of underground economy.

To examine the relevance of the institutions on the size of IE, we evaluated the Latin American countries as the most interesting test bench for the hypotheses of this research both for the size of IE and for the features of the institutional context. About the size of the IE, according to ILO (2006), IE concerns some 75 per cent of workers in Latin America, contributes to some 40 per cent of the region's gross domestic product (GDP) and that, over the last 15 years, accounted for 70 per cent of the total number of jobs created. As regards the features of the institutional context, many Latin American countries had or still have a tradition of excessive regulations and weak government institutions. In this sense, by considering this group of countries, we aim to reduce the sources of heterogeneity among the economies under observation. It should increase the reliability of the data analysis.

3. The Dataset and Econometric approach

In this section, we discuss both the data used for the estimation and the econometric approach. The collected data set contains observations from six points of time (averages over two-years: 1994-'95, 1996-'97, 1998-'99, 2000-'01, 2002-'03, 2004-'05) from 17 Latin American countries. We limit the sample to selected Latin American and Caribbean countries because of data limitations for smaller economies and available estimates of the IE.

The panel data includes twelve variables. Following ECLAC, we consider as proxy of IE the urban population employed in low productivity sectors of the labour market as percentage of total urban employed population (IE); From ECLAC database are also extracted: Expenditure as percentage of GDP (social_exp) and the Urban unemployment rate (annual average) as percentage of labour force (Urban_unem). Eight indexes extracted by Fraser's Institute Economic Freedom Index: rule of law (RoL); labour market regulation (Lab_reg); Regulation of Credit, Labor, and Business (Reg); freedom to trade internationally (Free_Trade); index of inflation (infl); the standard deviation of annual inflation calculated over the last 5 years (St_dev_infl); the size of government based on expenditures, taxes and enterprises data (Size); top marginal tax rate that considers also the income threshold to which they apply (Top_Mar_Tax). From the UNDP is extracted the human development index (HDI). Definitions and data sources of variables are provided in the appendix.

We utilize a panel analysis approach, where alternative types of panel model specification would be suitable for this analysis. One type of panel model has constant coefficients, referring to both intercepts and slopes. In the event that there are no significant country effects, we could pool all of the data and run an

ordinary least squares regression model. This model is sometimes called the pooled regression model. In contexts like this one, the question usually arises whether the individual specific effects should be assumed to be fixed (fixed effects model) or random (random effects model). According to Baltagi (2008), the fixed effects model is the appropriate specification if the analysis is focusing on a specific set of N units and the inference is restricted to the behaviour of this set of units. The random effects model, on the other hand, is an appropriate specification if we are drawing N individuals randomly from a large population and want to draw inferences about the entire population. According to these arguments, the fixed effects specification is the most appropriate model specification for this research.

In the following, we check the robustness of the estimates by applying different estimators across the specified models. We estimate the regressions both with ordinary least squares[6] (OLS) and least squares dummy variable (LSDV). For OLS, we compute the "White diagonal" method to take into account observation specific heteroskedasticity in the disturbances. According to Redundant Fixed Effects Tests[7] the most appropriate fixed effects specifications include both cross-countries and time dummies. Hence, we estimate LSDV specification using both "White cross-section" method to correct cross-section standard errors[8] and Panel Corrected Standard Errors (PCSE) method (Beck and Katz, 1995). Although PCSE[9] approach correctly controls for unobservable fixed country and time effects as well as heteroskedasticity across cross-sections and general correlation of residuals, it may provide biased estimates as the right-hand-side variables may be endogenous. Because of too small sample size (40-47 observations) instrumental variable approach or generalized method of moments control for endogeneity are not suitable. All that means that the empirical results are surrounded by significant margins of uncertainty.

4. The Empirical Evidence

In this section, we aim to verify earlier statements about the importance of institutional failures and human development for the understanding of the IE.

The first econometric exercise (table 1) is to estimate the effects of the main causes of the IE. We may group these regressors in three clusters: institutional, taxation and spending policies, control variables. The LSDV regressions are modelled including cross-country and time fixed effects. We do not report the dummies for the sake of brevity. Standard errors estimated by LSDV are corrected by applying both "White cross-section" and the PCSE method.

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[6] Although Redundant Fixed Effects Test reveals that the cross-country and time dummies are both statistical significant, it is well-known that too many dummy variables may sap the model of sufficient number of degrees of freedom for adequately powerful statistical tests. Moreover, a model with many such variables may be plagued with multicollinearity, which increases the standard errors and thereby drains the model of statistical power to test parameters (Yaffee 2003). Because of these caveat, we report OLS estimates to check the robusteness of the outputs.

[7] See appendix for this analysis.

[8] This estimator is robust to cross-equation (contemporaneous) correlation as well as different error variances in each cross-section.

[9] The software package used in this analysis (EViews® 5.1), labels this method as: Cross-section SUR (PCSE) method of standard errors and covariance corrections.

Table 1: Informal Economy and its causes.

	OLS (I)	OLS (II)	LSDV (II)	LSDV (III)	LSDV PCSE (I)	LSDV PCSE (IV)	LSDV PCSE (V)
Institutional var.							
Rule of Law	**-6.172**[a] (-3.625)	**-7.921**[a] (-5.544)	**-1.292**[c] (-1.845)	**-0.880**[c] (-1.942)	**-2.529**[a] (-4.139)	**-0.940**[b] (-2.529)	**-0.819**[b] (-2.343)
Labour Regulation	-0.311 (-0.117)	--	--	--	1.371 (0.929)	**--**	--
Regulation	**--**	**4.070**[c] (1.892)	**3.865**[a] (3.943)	**3.352**[a] (4.160)	--	**--**	**3.544**[a] (3.197)
Size	-0.250 (-0.178)	-0.031 (-0.024)	1.100 (1.174)	--	**-2.720**[c] (-2.004)	**--**	--
St_dev_infl	**--**	0.507 (1.037)	0.288 (1.697)	--	**--**	**--**	--
Inflation index	0.647 (1.354)	--	--	--	0.257 (0.910)	0.420 (1.362)	--
Free Trade	2.617 (1.135)	1.119 (0.627)	-0.156 (-0.301)	--	-0.799 (-1.222)	--	--
Taxation and Spending var.							
Top marginal tax rate	**3.994**[a] (3.743)	**3.618**[a] (4.178)	0.137 (0.189)	**0.451**[c] (1.896)	**2.678**[a] (5.007)	**1.101**[b] (2.510)	--
Social_exp	0.046 (0.458)	0.058 (0.347)	**0.158**[c] (2.066)	**0.129**[a] (4.199)	**0.227**[c] (2.041)	**0.134**[a] (3.717)	**0.116**[a] (4.787)
Control var.							
Human Develop. Index	**42.099**[b] (-2.402)	**39.965**[b] (2.568)	**-115.56**[c] (-2.009)	**-111.00**[a] (-3.454)	**-231.640**[c] (-1.808)	**-104.937**[b] (-2.352)	**-106.35**[b] (-2.099)
Urban_unemp	-0.665 (-1.574)	**-0.940**[b] (-2.675)	-0.148 (-0.579)	-0.157 (-0.499)	-0.420 (-0.888)	-0.234 (0.486)	-0.113 (-0.389)
Observations	40	47	47	47	40	47	47
Fixed Effects	--	--	Cross & Time	Cross & Time	Cross & Time	Cross & Time	Cross & Time
Method of Covar. Correction:	White diagonal	--	--	White cross-sect.	cross-sect. SUR	cross-sect. SUR	cross-sect. SUR
R^2*-adjusted*	0.7746	0.5351	0.9733	0.9712	0.9655	0.9619	0.9717
Durbin-Wat. stat.	0.6161	0.4227	2.6239	2.2266	2.5994	1.5295	2.2223

[a]Denotes significant at 1% level; [b]Denotes significant at 5% level; [c]Denotes significant at 10% level.
For OLS (I) and LSDV PCSE (I) the cross section dimension of the panel is reduced from 17 to 16 because of missing data in Honduras.

A general evaluation of the estimated models confirms some of the results of the existing institutional approach to the SE. Finding evidence for De Soto's (1989) view, we find a reaction of the IE to the social-institutional context (e.g. rule of law, regulation). A tentative explanation would be to think of these variables as a "special" cause of the IE, eclipsing other determinants such as unemployment rate.

Table 1 provides further robust evidence in favor of the rule of law as a significant factor in explaining the magnitude of IE. Better adherence to the rule of law discourages informal sector activity. When rule of law is weak, bureaucrats make decisions on individual cases without supervision. This creates corruption, which causes workers to become informal.

The regulation indicator is significant but of the unexpected sign. According to the outcomes listed in table 1, increasing constraints on the regulation of credit, labor, and business increase the size of the IE.

With reference to statistical significance of these variables, we infer a suggestion for further research in this field. Empirical research that omits indicators of rule of law and regulation in model specification may have a questionable reliability of the estimates. There may be serious potential omitted-variables bias.

As concerns the remaining institutional variables, they are not statistically significant. In contrast with many existing studies, increasing flexibility on the labour market (lab_reg), contrasting high and/or volatile rates of inflation[10] (infl or st_dev_infl), decreasing the extent to which countries rely on the political process to allocate resources and goods and services (size)[11], limiting or encouraging international trade (free_trade) seem ineffective to influence the size of the IE in Latin American countries[12].

Two variables are used to account for the impact of fiscal policy on IE: top marginal tax rate and public social spending as percentage of official GDP. As concerns the patterns of taxation and spending in Latin America, we find evidence that higher marginal tax rates and lower public social expenditure in relation on GDP are associated with lower IE.

On the taxation side, this result fits with findings that tend to dismiss the importance of the tax burden emphasized in earlier literature. For instance, Johnson et al. (1998, 1999) estimate a negative relationship between marginal tax rate and IE. They interpret their result by stating that it is not due to higher tax rates per se but ineffective and discretionary application of the tax system and regulations by government. According to Schneider and Enste (2000, p. 85) the negative correlation between the size of the IE and the top (marginal) tax rates found by Johnson et al. (1998, 1999) "might be unexpected, but since other factors like tax deductibility, tax reliefs, tax exemptions the choice between different tax systems, and various other options for legal tax avoidance were not taken into account, it is not all that surprising". Friedman et al. (2000) found in a cross country analysis that higher tax rates are associated with less official activity as

[10] Regarding the relationship between IE and "inflation" index, anticipating the sign of this coefficient is a very puzzling question. In general, the inflation rate is considered one of the determinants of the IE (e.g., Giles 1999; Schneider 2005, 2007). It increases both lack of trust in the State and the tax burden through the fiscal drag phenomenon. By using the "inflation" index, thus we take into account not only the inflation rate but also the institutional setting. We do not consider the inflation data because both outliers and it may be highly collinear to variables such as the unemployment rate (e.g., Phillips' curve), and multicollinearity may therefore become an issue. We consider two alternative proxies of inflation as a check for robustness to alternative specifications. They are an index of inflation that accounts the tendency of inflation rate to erode the value of property held in monetary instruments and the standard deviation of inflation . Table 1 provides a check that there aren't qualitative differences between outcomes estimated by specifications that include either index of inflation. For Latin America, the role of the inflation rate in the economy has distinctive characteristics. In particular, hyperinflation characterized the region up to the first half of 1990s. Nine major Latin American countries averaged nearly 235 percent inflation per year in the first half of the nineties and averaged only 13 percent per year in 1995-99 and less than 8 percent in 2000-04 (Bernanke 2005). The rapid succession of monetary reforms needed to reach price stability makes challenging any prediction of the effect of inflation on the IE for these countries. Therefore, the not statistically significant of "inflation" indicators is considered not surprising.

[11] This variable is significant at 10% level in very few model specifications. Moreover, we find that the coefficient of the index "size" is not significantly different from zero if standard errors are not corrected for heteroskedasticity across cross-sections and/or general correlation of residuals (both PCSE and White methods).

[12] We also analyse the impact of institutions on the IE by including interaction variables (e.g. Rol*Reg; Rol*Lab_reg; Top_mar_tax*Social_exp). They are included, in turn, in panel regression with other explanatory variables. We find these coefficients, for the most part, separately neither one is statistically significant, but the joint F-test says that at least one of these coefficients must be different from zero. These conflicting results are due to multicollinearity. The interaction and institutional variables are highly correlated. This is affecting our estimates and standard errors. We consider it may be better to apply the simpler reduced model (without interaction variables).

percent of GDP. They argue that entrepreneurs go underground not to avoid official taxes but to reduce the burden of bureaucracy and corruption. Recently, Ferreira-Tiryaki (2008) found greater top marginal tax rates are associated with smaller informal sector. According to Ferreira-Tiryaki (2008) this result is only justified when higher tax rates allow for the provision of a greater amount of public goods by the government and thus generate an incentive for the workers to remain in the formal economy.

The outcome of this research does not confirm Ferreira-Tiryaki's hypothesis for Latin American countries. In particular, we found evidence that greater amount of public expenditure for health, education, social security and housing generate an incentive for the workers to remain in the IE. This result fits to Schneider and Enste (2000). They argued that a larger social welfare system should increase the size of the IE because it discourages beneficiaries from working in the official economy, since by doing so they lose eligibility for some of the benefits.

We deduce that the roots of these apparently surprising results on fiscal variables reside to three peculiarities of Latin American countries: a great extent in the high levels of income inequality, an income taxation system that remain far away from the progressiveness of the European welfare States and an absolute levels of social spending fairly flat across income quintiles and for some countries, to be even regressive (Breceda et al. 2008).

According to Breceda et al. (2008) patterns of spending and taxation in Latin America vary significantly across countries. It makes difficult to provide a conclusive answer on the relationship between these variables and IE by a panel approach. Further single-country analyses are needed to better understand if these results are valid in each of the Latin American country.

The control variables listed in table 1 take into account further potential causes of the IE and reduce potential omitted-variables bias. These are human development and urban unemployment rate.

Concerning the (urban) unemployment rate, according to Tanzi's (1999) arguments, we should expect a weak correlation between the unemployment rate and the size of the IE. Tanzi (1999) claims that the official unemployment rate could be weakly related to the IE as consequence of the very heterogeneous composition of labour force of the IE. One subgroup of the hidden workers is classified as unemployed but belong to the official labour force. The other informal workers are retirees, minors, and homemakers who are not part of the official workforce. Furthermore, there are persons who simultaneously hold an official and an unofficial job (Tanzi, 1999). In Latin American countries, this weak correlation is confirmed.

Further econometric analysis carried out in this research focus on the relationship between HDI and the IE. The HDI is an indicator combining normalized measures of life expectancy, literacy, educational attainment, and GDP per capita. It deals with a wider idea of human development and it may be considered an approximate measure of human capital. From this viewpoint, our model is able to compare different types of capital to explain the size of the IE across countries: the social capital (measured by institutional setting) and the human capital (measured by the human development index).

To analyze the role of human development on the size of the IE, we add a quadratic terms to model a

curvilinear relationship between HDI and IE.

$$IE_{i,t} = \beta_1 HDI_{i,t} + \beta_2 HDI_{i,t}^2 + \alpha_i + \lambda_t + x_{it}^{'}\gamma + \varepsilon_{it} \quad (1)$$

Where: $i = 1,2,...,17$; $t = '94/'95,'96/'97,'98/'99,'00/'01,'02/'03,'04/'05$; α_i and λ_t are cross-country and time dummies; $x_{it}^{'}$ is a vector of institutional, fiscal and control variables.

We find the relationship between the informal economy and human development to have an inverted U-curve shape. Table 2 reports the estimated coefficient of the equation (1) using LSDV estimators.

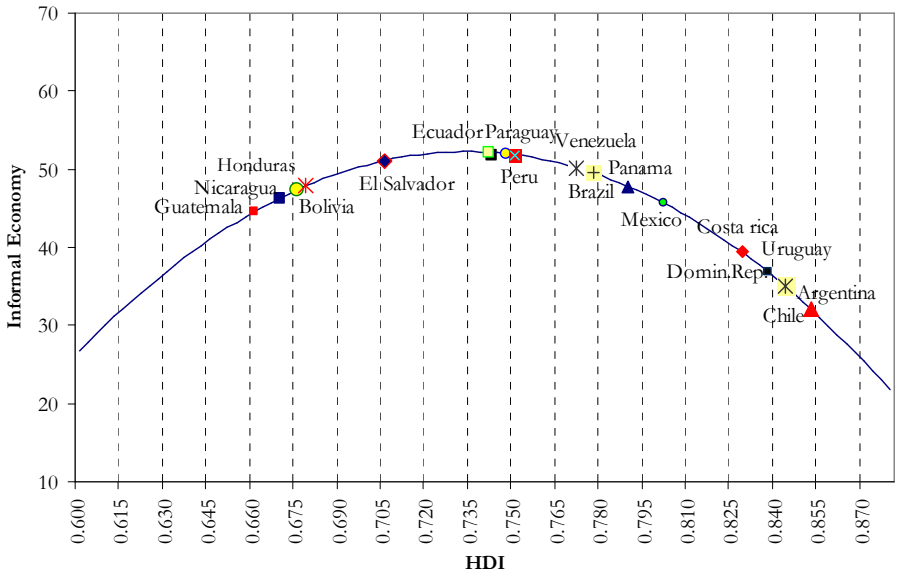
Table 2: Informal Economy and Human Development Index.

	LSDV (a)	**LSDV (b)**	**LSDV (c)**	**LSDV (d)**	**LSDV (e)**
Human Develop. Index	**676.783**[b] (2.507)	278.70 (0.889)	**2105.35**[b] (2.553)	-97.205 (-0.372)	**2074.19**[b] (2.322)
Human Develop. Index^2	**-496.68**[b] (-2.620)	-259.99 (-1.245)	**-1435.47**[b] (-2.692)	-9.762 (-0.057)	**-1420.44**[b] (-2.505)
Institutional var.					
Rule of Law	--	**-**0.177 (-0.357)	**-**0.884 (-1.237)	**-0.862**[b] (-2.365)	-0.920 (-1.382)
Labour Regulation	--	--	-0.393 (-0.397)	--	-0.171 (-0.114)
Regulation	--	--	--	**3.341**[b] (2.462)	--
Free Trade	--	--	--	--	-0.224 (-0.288)
Taxation and Spending var.					
Top marginal Tax rate	--	**0.822**[c] (1.937)	**1.430**[c] (1.923)	0.447 (0.922)	**1.446**[c] (1.897)
Public social expend. on GDP	--	**0.117**[a] (3.252)	0.073 (1.414)	**0.129**[a] (4.535)	0.082 (1.247)
Control variables					
Urban Unemployment rate	--	-0.266 (-0.734)	-0.181 (-0.628)	-0.159 (-0.540)	-0.203 (-0.766)
Observations	52	47	40	47	40
Fixed Effects	Cross & Time	Cross & Time	Cross & Time	Cross & Time	Cross & Time
Method of Covar. Correct.:	--	Cross-sect. SUR	Cross-sect. SUR	Cross-sect. SUR	Cross-sect. SUR
R^2-adjusted	0.9593	0.9554	0.9702	0.9698	0.9682
Durbin-Wat. stat.	1.1828	1.125	2.3889	2.2250	2.3844

[a]Denotes significant at 1% level; [b]Denotes significant at 5% level; [c]Denotes significant at 10% level.
For LSDV (c) and LSDV (e) the cross section dimension of the panel is reduced from 17 to 16 because of missing data in Honduras.

The results shown in table 2 for the most part confirm the outcomes reported in table 1. This analysis reveals a statistically significant negative relationship between IE and the square of HDI[13] $(\beta_2 < 0)$. This outcome implies an inverted U-curve shape between IE and human development. A graphical analysis is shown in figure 1.

Fig. 1: The quadratic relationship between HDI and the IE



The empirical outcomes show a positive correlation between the IE and the HDI for human developing countries and a negative relationship between the IE and the HDI for human developed countries.

Figure 1 helps to interpret the negative coefficient associated of variable HDI reported in table 1. The rationale is that, for the majority of Latin American countries (twelve on seventeen), the level of HDI is greater then the estimated maximum of the U-shaped curve ($HDI^{max}=-\beta_1/2\beta_2 =0.73$)[14]. This negative correlation may be considered the long-term effect of better human capital on the size of the IE. The positive correlation of the countries with lower HDI (HDI< 0.73) may represent the short-term trade off effect of human development on the IE.

People's decision to work in the informal economy might change according to better standard of living and education. We hypothesize for the economies with low level of human development the IE is fundamentally a source of subsistence for people, while for countries with higher human development the nature of IE is different. Higher accumulation of human capital makes people less willing to disobey to social norms and work in an irregular market (lower IE). The rationale is that higher human development creates an enabling environment where the community and hence the individuals get empowered and can

[13] We have no completely robust pattern that confirms our hypothesis of inverted U-curve shape among the range of indicators and specifications employed. Anyway, this hypothesis holds for the most part of estimated regressions.
[14] This is the maximum for both LSDV (c) and LSDV (e). For LSDV (a) the maximum is equal to 0.68.

exercise their rights, including the right to decent work.

Because of data limitations, we cannot solve causality issues, which are crucial when performing normative analyses with a sufficient level of reliability. Hence, due to the potential endogeneity bias, previous suppositions require more research and it may be an area for further development in this literature.

5. Conclusions

Several studies state that institutional economics and analysis of the IE are highly complementary. What we do in this paper is contribute to this strand of literature by undertaking an empirical analysis in Latin American countries. This is also one of the few panel data analyses of the role of institutional setting on the IE by using estimates of informal sector based on country's household survey. This is not trivial, since the scarce reliability of estimates of the IE is often considered the most relevant weakness of this strand of literature.

In addition, this is the first time analysis of IE that considers the HDI. Taking into account that the model specification includes also a wide prospective of institutional variables (rule of law, regulation, labour regulation, indexes of price stability, size of government, freedom to trade internationally) thus we aim to provide a reliable description of the Latin American IE .

A preliminary remark is needed before we summarize policy implications and general conclusions. Any empirical analysis of the IE must be examined very carefully, since the estimates of the IE are never very strong or absolute. That being stated, any empirical analysis that use the IE estimates in its framework is necessarily subject to the same caveats. Again, additional limitations of the reliability of the econometric exercise can be highlighted. Among these, even putting aside measurement errors and the effect of omitted variables, the most relevant is probably an issue of endogeneity. For instance, the IE can reduce government resources and this can lead to a more inefficient bureaucracy. Thus, it is far from clear that the correlation is causal. All that means is that the exercises proposed here can realistically offer only some indicative correlations.

On the positive side, what is pointed out in this paper contributes to the ongoing debate, confirming previous empirical results and offering new insights.

Inefficient, and unfair institutions live in economies with larger IE's. Greater top marginal tax rates and larger social welfare systems are associated with smaller IE.

We find that human development is negatively and significantly associated with informality, suggesting that better education system, standard of life, and economic growth help to reduce the size of the IE. This analysis is examined closely to determine if a curvilinear model better explains the variation in IE. The statistical significance of the quadratic term of HDI proves that downward concavity exists. According to the econometric and graphical analysis, this relationship is changing from positive to negative for Latin American countries. The rationale may be that an increase in human development raises the social and moral cost of breaking formal and informal rules. We conclude that higher human capital provides a

disincentive for people to work in the IE.

This paper leads to the following conclusions: Overall, three factors have been found to contribute to informality: institutional setting (rule of law and regulation) taxation and spending policies, human development. In particular, the outcomes convincingly demonstrate that: (1) institutional sources of the Latin American IE are both inadequate rule of law and lacking regulation; (2) lower top marginal income and payroll tax rate and greater public social expenditure boosts the size of the IE; (3) the relationship between the IE and HDI follows an inverted U-curve shape.

The changing relationship between HDI and IE is hypothesized due to the improved standard of living. Increasing HDI, factors such as institutional setting, tax morale, social status, become more relevant in the citizen's decision process to work informally. It means that, *ceteris paribus,* higher human development may reduce the size of the IE. Although other obstacles also play a role, we find that, controlling for these variables there is no significant evidence that a more flexible labour market or higher openness of domestic market to international competition, or lower unemployment rate may reduce the size of the IE.

An overall statement should be considered when there are suggested policy recommendations to reduce the IE. It seems clear that fighting the IE is not an easy task. Wider economic reforms are needed with a long term prospective. This process should include social and institutional transformation in order to move from a "bad equilibrium" (with a large IE and inadequate institutional context) towards a better situation.

We deduce at least two kinds of actions that could be useful to combat the IE effectively. In order to provide disincentives to informal operators: reduce the "perception" of impunity for tax evasion crimes, increase the efficiency of bureaucracy, and raise the quality of human capital. These kinds of actions have multiple effects as they reduce illegal activities, increase tax morality and social stigma as well as improve the citizens' attitude toward the State.

By interpreting the IE as an "exit option" for unsatisfied citizens, one must make governments responsible for the relevance of their economic and social role. One of the most important tasks for a modern State is to create favourable conditions for private business development and for the establishment of fair competition in the economy. In this sense, the IE can be considered one of the costs of missing, incomplete, delayed, or inadequate reforms as well as an index of its government inadequacy.

References

Acemoglu, D., Johnson, S., Robinson J. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review*, 91(5), 1369-1401.

Acemoglu, D. (2008). Growth and Institutions. The New Palgrave Dictionary of Economics. Second Edition. Eds. Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan.

Baltagi, B.H. (2008). *Econometric Analysis of Panel Data.* Chichester: John Wiley and Sons.

Barro, R.J. (1999). Notes on Growth Accounting, *Journal of Economic Growth*, 4(2), 119-37.

Beck, N. & Katz, J.N. (1995). What To Do (and Not To Do) with Time-Series Cross-Section Data, *American Political Science Review*, 89, 634-47.

Belev, B. (2003). The Informal Economy in the EU Accession Countries: Size, Scope, Trends and Challenges to the Process of EU Enlargement (Ed.). Centre for Study of Democracy, Sofia.

Bertocchi, G. & Canova, F. (2002). Did colonization matter for growth?: An empirical exploration into the historical causes of Africa's underdevelopment, *European Economic Review,* 46(10), 1851-1871.

Bejakovic, P. (2004). The Informal Economy in Croatia and Economic Development. *South East Europe Review for Labour and Social Affairs*, 3, 69-78.

Bernanke, B. (2005). *Inflation in Latin America: a New Era?*, Speech at the Stanford Institute for Economic Policy Research Economic Summit, Stanford, California. (http://www.bis.org/review/r050216g.pdf?noframes=1).

Boliari, N. & Topyan, K. (2007). Conceptualizing Institutions and Organizations: A Critical Approach. Journal of Business & Economic Research, 5(1), 1-9.

Bovi, M. & Dell'Anno, R. (2007). The Changing Nature of the OECD Shadow Economy. Working Paper n. 81, ISAE Rome, Italy.

Breceda, K., Rigolini, J. & Saavedra J. (2008). Latin America and the social contract: patterns of social spending and taxation. Policy Research Working Paper n. 4604. The World Bank.

Coase, R. (1937). The Nature of the Firm, *Economica, 4(16),* 386-405.

Coase, R. (1960). The Problem of Social Cost, *Journal of Law and Economics*, 3(1), 1-44.

Coase, R. (2000). The New Institutional Economics in: Menard C, (ed), Institutions, contracts and organizations: Perspectives from New Institutional Economics. Edward Elgar, Cheltenham, UK.

De Soto, H. (1989). *The Other Path. The Invisible revolution in the Third World.* New York: Harper and Row.

Dreher, A., Kotsogiannis, C., McCorristonz, S. (2005). How do Institutions Affect Corruption and the Shadow Economy? Discussion Papers in Economics n. 05/01. University of Exeter, UK.

Dreher, A. & Schneider F. (2006). Corruption and the Shadow Economy: An empirical Analysis. IZA Discussion Paper Series, n. 1936.

Elster, J. (1989). Social Norms and Economic Theory. *Journal of Economic Perspectives*, 3, 99-117.

Enste, D.H. (2003). Shadow Economy and Institutional Change in Transition Countries, 81-113 in Belev, B. (eds). The informal economy in the EU accession countries: size, scope, trends and challenges to the process of EU enlargement. Centre for the Study of Democracy, Sofia.

Feige, E.L. (1998). Underground Activity and Institutional Change: Productive, Protective and Predatory Behavior in Transition Economies. In Nelson, J. M., Tilley, C. &Walker, L. (eds.) *Transforming Post-communist Political Economies*. Washington, D.C.: National Academy Press.

Ferreira-Tiryaki, G. (2008). The informal economy and business cycles. Journal of Applied Economics, 11, 91-117.

Friedman, E., Johnson, S., Kaufmann, D., Zoido-Lobaton, P. (2000). Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 Countries, *Journal of Public Economics*, 76, 459-494.

Galli, R. and Kucera, D. 2003. Informal Employment in Latin America: Movements over Business Cycles and the Effects of Worker Rights. International Institute for Labour Studies Discussion Paper, No. 145. Decent Work Research Program, ILO. Geneva.

Giles, D.E.A. (1999). Modeling the hidden economy and the tax-gap in New Zealand. Empirical Economics, 24, 621-640.

Guha-Khasnobis, B., Kanbur, R., Ostrom, E. (2006). Beyond Formality and Informality', in Guha-Khasnobis, B., R. Kanbur, E. Ostrom (eds) Linking the Formal and Informal Economy: Concepts and Policies, Oxford University Press.

Gwartney, J. D. & Lawson R.A., S. Sobell, Peter T. Leeson (2007). *Economic Freedom of the World: 2007 Annual Report,* Vancouver B.C., The Fraser Institute.

Hall, R. & Jones, C. (1999). Why do some countries produce so much more per worker than others?, Quarterly Journal of Economics, 114, 83-116.

ILO (2002a). Resolution and conclusions concerning decent work and the informal economy, International Labour Conference, 90th Session, Geneva, (available at http://www.ilo.org/public/english/standards/relm/ilc/ilc90/pdf/pr-25.pdf).

ILO (2002b). Decent Work and the Informal Economy; Report of the Director-General; International Labour Conference, 90th Session; Report VI; Geneva.

ILO (2006). Decent work in the Americas: An agenda for the Hemisphere, 2006–15, Report of the Director-General, 16th American Regional Meeting, Brasilia, May, Geneva.

ILO (2007). The informal economy. International Labour Office Governing Body, GB.298/ESP/4. (available at http://www.ilo.org/public/english/standards/relm/gb/docs/gb298/pdf/esp-4.pdf).

Johnson, S., Kaufmann, D., Zoido-Lobaton, P. (1998). Regulatory Discretion and the Unofficial Economy*, American Economic Review*, 88, 387-392.

Johnson, S., Kaufmann, D., Zoido-Lobaton, P. (1999). Corruption, Public Finances and the Unofficial Economy, W*orld Bank Working Paper*. N. 2169.

Kherallah M. & Kirsten J.F. (2002). The new institutional economics: applications for agricultural policy research in developing countries, *Agrekon, 41(2)*, 110-133.

Knack, S. & Keefer, P. (1995). Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures. *Economics and Politics*, 7, 207-27.

Knight, J. (1992). Institutions and Social Conflict, Cambridge: Cambridge University Press.

Lin, J.Y. & Nugent, J.B., (1995). Institutions and economic development, in Behrman and T.N. Srinivasan (eds), Handbook of Development Economics, Volume 3A, North Holland, Amsterdam, 2301–2370.

Loayza, N.V. (1996). The economics of the informal sector: a simple model and some empirical evidence from Latin America, Carnegie-Rochester Conference Series on Public Policy, 45, 129-162.

Loayza, N.V., Oviedo, A. M. & Serven, L. (2006) The impact of regulation on growth and informality: cross-country evidence. In Guha-Khasnobis, B., Kanbur, R. and Ostrom E. (eds). Linking the Formal Economy: Concepts and Policies.

Mauro, P. (1995). Corruption and Growth. *Quarterly Journal of Economics*, 110, 681-712.

Nabli, M.K., & Nugent, J.B. (1989). New Institutional Economics and Development: Theory and Applications to Tunisiawith. In Contributions to Economic Analysis Series, Nabli, M. K. &Nugent, J.B. (eds.). Amsterdam: North-Holland, Elsevier.

North, D. (1981). Structure and Change in Economic History. New York: W.W. Norton & Co.

North, D. (1989). Institutions and economic growth: An historical introduction, World Development, 17(9), 1319-1332.

North, D. (1990). Institutions, Institutional change, and Economic Performance. New York: Cambridge University Press.

North, D. (1992). Privatization, Incentives and Economic Performance, in: Horst S.t (ed.), Privatization. Symposion in Honour of Herbert Giersch, Tubingen: Mohr.

North, D. (2003). The Role of Institutions in Economic Development, ECE Discussion Papers Series 2003_2, UNECE.

North, D. & Weingast, B. (1989). Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth Century England, *Journal of Economic History 49(4),* 803-32.

OECD (2002). *Measuring the Non-Observed Economy: A Handbook*, Paris, OECD

Perry, G.E., Arias, O., Fajnzylber, P., Maloney, W.F., Mason, A., Saavedra-Chanduvi, J. (2007). Informality: Exit and Exclusion in Latin American. Washington, DC: World Bank.

Preston, P.W. (1996). Development Theory: An Introduction. Blackwell Publishers Ltd: Cambridge: Massachusetts.

Rodrik D., (1999). Making openness work, John Hopkins University Press.

Schanz, G. von (1890). Die Steuern der Schweiz in ihrer Entwicklung seit Beginn des 19. Jahrhunderts, Vol I to V, Stuttgart.

Schmölders, G. (1951/1952). Finanzpsychologie. *FinanzArchiv,* 13, 1-36.

Schneider, F. (2005). Shadow economies around the world: what do we really know? *European Journal of Political Economy*, 21, 598-642.

Schneider, F. & Enste, D.H. (2000). Shadow Economies: Size, Causes, and Consequences. *Journal of Economic Literature,* 38, 77-114.

Schnellenbach, J. (2007). Tax Morale and the Legitimacy of Economic Policy. Homo Oeconomicus, 24, 1-25.

Schnellenbach J. (2006). Tax morale and the taming of Leviathan. Constitutional Political Economy, 17, 117–132.

Schwartz, R.D., & Orleans, S. (1967). On Legal Sanctions, *University of Chicago Law Review* 34, 282-300.

Tanzi, V. (1999). Uses and Abuses of Estimates of the Underground Economy. *The Economic Journal*, 109, 338-347.

Torgler, B. & Schneider, F. (2007). Shadow Economy, Tax Morale, Governance and Institutional Quality: A Panel Analysis. CESifo Working Paper Series. No 1923, IZA discussion Paper No. 2541.

Williamson, O.E. (2000). The New Institutional Economics: Taking Stock, Looking Ahead, *Journal of Economic Literature*, 38(3), 595-613.

World Bank (2002). World Development Report 2002: Building institutions for markets Washington, DC. The World Bank.

World Bank (1995). Labor and economic reforms in Latin American and the Caribbean. Washington, D.C., The World Bank.

Yaffee, R. (2003). A Primer on Panel Data Analysis. New York University. (Available at http://www.nyu.edu/its/pubs/connect/fall03/pdfs/yaffee_primer.pdf)

Appendix 1: Source of Data and Definitions

The (unbalanced) panel used for estimating panel regressions consisted of a cross-section of seventeen countries over six time periods. The sources of the data are ECLAC for Informal Economy, Public social expenditure as a percentage of GDP; United Nation Development Programme - Human Development Report (various years)[15] for HDI; the source for urban unemployment rate is the Economic Survey of Latin America and the Caribbean Santiago, Chile (Various years); Gwartney et al. (2007)[16] for the remaining institutional variables.

The size of the **Informal Economy** is, for data limitations, estimated as urban informal employment (informal sector). It is defined as the ratio between the urban population employed in low productivity sectors of the labour market (micro-enterprises, domestic work and non-qualified independent workers) and the total urban employed population. This proxy of informal economy is based on special tabulations of the respective country's household survey data and it ranges from 1994 to 2005. These series are published by ECLAC: Statistics and Economic Projections Division, Social Statistics Unit. These series are freely available to http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp.

Data on **Rule of law** are available from the Fraser Institute, which creates an index running from 0 to 10 (lower numbers mean worse legal environment). In particular, we use as proxy of Rol the Area 2 of the index of economic freedom, so called "*Legal Structure and Security of Property Rights*" published by Gwartney et al. (2007). The key ingredients accounted by this index are rule of law, security of property rights, independent judiciary, and impartial court system.

The **Labour market regulation index** measures the extent to which restraints upon economic freedom such as minimum wages, dismissal regulations, centralized wage setting, extension of union contracts to no participating parties, and conscription are present across countries. In order to get a high rating in this index, a country must allow "*the market forces to determine wages and establish the conditions of hiring and firing, and refrain from the use of conscription*" (Gwartney et al. 2007, p. 12).

Data on **Regulation** contains an index that runs from 0 to 10 (lower numbers mean worse regulation). This index considers several kinds of restrictions of entry into markets and interference with the freedom to engage in voluntary exchange. It is built as average of three main factors. The first component reflects conditions in the domestic credit market. The second one considers labour market regulations infringe upon the economic freedom of employees and employers. In order "*to earn high marks in the component rating regulation of the labour market, a country must allow market forces to determine wages and establish the conditions of dismissal, avoid excessive unemployment benefits that undermine work incentives, and refrain from the use of conscription. The third sub-component is designed to identify the extent to which regulatory restraints and bureaucratic procedures limit competition and the operation of markets"* (Gwartney et al.. 2007, p. 12).

[15] Data retrieved from: http://hdr.undp.org/en/statistics/data/

[16] Gwartney, James, and Robert Lawson, with Russell S. Sobel and Peter T. Leeson (2007). Economic Freedom of the World: 2007 Annual Report. Vancouver, BC: The Fraser Institute. Data retrieved from www.freetheworld.com.

The index called "**Size**" is one of the five major areas of the Economic Freedom Index (namely *Size of Government: Expenditures, Taxes and Enterprises*). It indicates the extent to which countries rely on the political process to allocate resources and goods and services. "*It allocates higher ratings to countries with low levels of government spending as a share of the total, a smaller government enterprise sector, and lower marginal tax rates earn"* (Gwartney et al. 2007, p. 9).

The index of **Inflation** is a proxy of the tendency of inflation rate to erode the value of property held in monetary instruments. It is extracted by Economic Freedom of the World (2007). It is calculated by the following formula: (Vmax−Vi)/(Vmax−Vmin). Where the Vi represents the rate of inflation during the most recent year. The values for Vmax and Vmin and are set at zero and 50%, respectively - the lower the rate of inflation, the higher the rating. "*Countries that achieve perfect price stability earn a rating of 10. A zero rating is assigned to all countries with an inflation rate of 50% or more*" (Gwartney et al. 2007, p. 187).

The "**standard deviation of the inflation rate**" is a variable that take into account the monetary policy. Inflation erodes the value of property held in monetary instruments. When governments (or central banks) create money to finance their expenditures they are, in effect, expropriating the property and violating the economic freedom of their citizens. In this sense, it is an institutional form to protect property rights and, thus, economic freedom. In order to earn a high rating in this area, a country must follow policies and adopt institutions that lead to stable rates of inflation (Gwartney et al. 2007). This component is a sub-component of Area 3 of Economic Freedom index defined as "Access to Sound Money". The following formula was used to determine the zero-to-10 scale rating for each country: (Vmax−Vi)/(Vmax−Vmin) multiplied by 10. Where Vi represents the country's standard deviation of the annual rate of inflation during the last five years. The values for Vmin and Vmax were set at zero and 25%, respectively. "*This procedure will allocate the highest ratings to the countries with least variation in the annual rate of inflation. A perfect 10 results when there is no variation in the rate of inflation over the five-year period. Ratings will decline toward zero as the standard deviation of the inflation rate approaches 25% annually*" (Gwartney et al. 2007, p. 185).

The index of **Freedom to trade internationally** is the index of Area 4 published by the Fraser Institute. The components in this area are designed to measure a wide variety of restraints that affect international exchange: tariffs, quotas, hidden administrative restraints, and exchange rate and capital controls. It runs from 0 to 10. In order to get a high rating in this area, "*a country must have low tariffs, a trade sector larger than expected, easy clearance and efficient administration of customs, a freely convertible currency, and few controls on the movement of capital*" (Gwartney et al. 2007, p. 11)[17].

In the literature, the most popular determinant of the IE is taxation. The common hypothesis is that an increase in the tax rate is a strong incentive to work in the unofficial economy. In the econometric framework, this variable is measured by the indicator of **Top marginal tax rate** (1D in Economic freedom index classification). It is one of the four components of area 1 (Size of Government: Expenditures, Taxes and Enterprises). The variable 1D is based on the top marginal income tax rate and (Dii) the top marginal

[17] For the sources of each sub-index, see Gwartney et al. 2007, pp. 187-189.

income and payroll tax rate and the income threshold at which the top marginal income-tax rate applies. These two sub-components are averaged to calculate 1D. High marginal tax rates that apply at relatively low income levels are also indicative of reliance upon government. Such rates deny individuals the fruits of their labor. Countries with high marginal tax rates and low-income thresholds are rated lower (Gwartney et al. 2007 p. 9).

Data on **Public social expenditure** as percentage of the Gross Domestic Product includes public expenditure for education, health, social security and housing. This data was extracted from Social Expenditure Database published by ECLAC: Social Development Division. These series are freely available to http://websie.eclac.cl/sisgen/ConsultaIntegrada.asp.

The **Human Development Index** combines three dimensions: Life expectancy at birth; the adult literacy rate (with two-thirds weighting) and the combined primary, secondary, and tertiary gross enrolment ratio (with one-third weighting); the natural logarithm of gross domestic product (GDP) per capita at purchasing power parity (PPP). Data are extracted from the annual report of Human Development Report of UNDP.

The **Urban Unemployment** is defined as the share of the urban labour force that is without work but available for and seeking employment. Definitions of labour force and unemployment may vary by country. Sources are Economic Survey of Latin America and the Caribbean Santiago, Chile (Various years). These series are freely available to http://qesdb.usaid.gov/lac/index.html.

Table 3: Datasets – Countries averages over the entire period 1994-2005

	inform	rol	lab reg	reg	size	stand dev infl	infl	free trade	top mar tax	social exp	HDI	urban unem
Argentina	42.23	4.36	5.23	5.73	7.43	4.79	8.42	6.45	7.00	20.63	0.85	15.25
Bolivia	65.58	4.12	4.23	5.98	7.12	7.61	8.38	6.55	9.81	10.51	0.67	6.21
Brazil	45.77	5.22	4.13	4.95	6.24	6.50	6.24	4.79	5.50	21.98	0.78	7.88
Chile	33.52	6.53	5.14	6.87	6.61	8.55	9.11	8.03	5.25	13.83	0.84	8.54
CostaRica	39.65	6.41	5.89	6.25	7.14	8.54	7.26	7.68	7.69	17.30	0.83	6.03
Dom.Rep.	46.85	4.33	5.92	6.29	8.57	5.35	6.79	6.32	8.63	13.83	0.75	15.93
Ecuador	57.18	3.34	3.88	4.92	8.43	4.51	5.99	6.73	8.13	5.63	0.75	10.24
El Salvador	53.20	3.86	3.93	6.04	8.40	8.81	8.40	5.91	6.50	6.73	0.72	6.93
Guatemala	61.00	3.70	4.18	5.56	8.71	8.68	8.49	6.65	7.19	5.52	0.66	4.43
Honduras	54.34	3.72	5.25	5.82	7.42	8.35	7.36	7.05	8.44	9.06	0.67	6.03
Mexico	44.38	4.59	5.29	5.76	7.63	7.71	7.25	7.39	6.75	9.41	0.81	4.56
Nicaragua	60.25	3.71	6.53	6.21	5.95	6.65	8.36	7.01	6.31	7.90	0.67	12.22
Panama	35.62	5.05	5.69	6.48	7.90	9.37	9.78	7.38	7.94	17.36	0.79	15.42
Peru	62.90	4.34	4.78	6.14	7.83	6.85	9.05	7.13	6.69	7.32	0.76	8.96
Paraguay	61.63	3.19	3.41	5.04	7.93	7.70	8.05	7.49	9.88	8.43	0.75	8.78
Uruguay	42.85	5.84	5.95	5.97	7.02	5.53	6.49	6.94	8.63	21.34	0.84	12.70
Venezuela	52.16	2.69	3.89	4.59	5.59	4.66	4.50	5.59	7.06	10.01	0.78	13.10
Mean	49.64	4.41	4.87	5.80	7.41	7.07	7.64	6.77	7.49	12.23	0.76	9.65
Maximum	70.90	6.78	6.66	7.28	9.22	9.67	9.91	8.31	10.00	49.90	0.87	18.50
Minimum	31.80	1.52	0.00	4.01	4.84	0.00	0.00	0.00	2.00	4.10	0.63	3.35
Observ.	83	68	58	68	68	68	68	68	68	93	68	101

Informal has the following missing values: Brazil '94/95; Chile '04/'05; Dom. Rep. '94/'95, '98/'99; Guatemala '94/'95. '96/'97, '00/'01; '04/'05; Honduras '00/'01, '02/'03; Mexico '94/'95; Nicaragua '94/'95, '96/'97, '02/'03, '04/'05; Panama '00/'01; Peru '94/'95, '04/'05; Paraguay '02/'03.
Rol, Lab_reg, Reg, Size, Stand_dev_infl, Infl, Free_trade, Top_mar_tax and ***HDI*** have two missing values for each countries ('96/'97 and '98/'99). ***Lab_reg*** has an additional missing value in the period '94/'95 for the following countries: Bolivia, Costa rica, Dom. Rep., Ecuador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Uruguay.
Social_exp has the following missing values: Argentina '04/'05; Bolivia '04/'05; Chile '04/'05; El Salvador '94/'95, '96/'97, '98/'99; Honduras '02/'03; Peru '04/'05; Uruguay '04/'05.
Urban_unem has a missing value in Guatemala '00/'01.

Table 4: Test cross-section and period fixed effects (table 1 - model I, II, III)

Redundant Fixed Effects Tests	**Model I**			**Model II**			**Model III**		
	Statistic	d.f.	Prob.	Statistic	d.f.	Prob.	Statistic	d.f.	Prob.
Cross-section F	11.877	(15,12)	0.000	19.915	(16,18)	0.000	18.670	(16,21)	0.000
Cross-section Chi-square	110.518	15	0.000	137.64	16	0.000	127.97	16	0.000
Period F	1.472	(3,12)	0.272	3.664	(3,18)	0.032	4.716	(3,21)	0.011
Period Chi-square	12.533	3	0.006	22.404	3	0.000	24.207	3	0.000
Cross-Section/Period F	10.216	(18,12)	0.000	18.395	(19,18)	0.000	17.202	(19,21)	0.000
Cross-Section/Period Chi-sq.	111.705	18	0.000	141.76	19	0.000	131.93	19	0.000

Redundant fixed effects tests for Models IV and V get the same qualitative results of models I, II and III. We do not report the outputs for the sake of brevity.