



BANCO CENTRAL DE RESERVA DEL PERÚ

The causes and consequences of informality in Peru

Norman Loayza*

* The World Bank

DT. N° 2007-018
Serie de Documentos de Trabajo
Working Paper series
Noviembre 2007

Los puntos de vista expresados en este documento de trabajo corresponden a los del autor y no reflejan necesariamente la posición del Banco Central de Reserva del Perú.

The views expressed in this paper are those of the author and do not reflect necessarily the position of the Central Reserve Bank of Peru.

THE CAUSES AND CONSEQUENCES OF INFORMALITY IN PERU

Norman Loayza*
The World Bank

November 2007

Abstract: *Adopting a legal definition of informality, this article studies the causes of informality in general and with a particular application to Peru. It starts with a discussion on the definition and measures of informality, as well as on the reasons why widespread informality should be of great concern. Then, the article analyzes informality's main determinants, arguing that informality is not single-caused but results from the combination of poor public services, a burdensome regulatory regime, and weak monitoring and enforcement capacity by the state. This combination is especially explosive when the country suffers from low educational achievement and features demographic pressures and primary production structures. Finally, using cross-country regression analysis, the article evaluates the empirical relevance of each determinant of informality. It then applies the estimated relationships to the case of Peru in order to assess the country-specific relevance of each proposed mechanism.*

JEL classification: K20, K30, H11, O40, O17.

Keywords: Regulation, government performance, economic growth, informal economy.

* Naotaka Sugawara provided excellent research assistance. I have benefited from discussions with Marco Camacho, Claudia Canales, Mauricio Carrizosa, Juan Chacaltana, Agnes Franco, Vicente Fretes-Cibils, Javier Illescas, Miguel Jaramillo, Teresa Lamas, Julio Luque, Miguel Morales, Ana María Oviedo, Rossana Polastri, Renán Quispe, Jamele Rigolini, Jaime Saavedra, Pablo Secada, Luis Servén, Magaly Silva, José Valderrama, Moisés Ventocilla, and Gustavo Yamada.

Definition

The informal sector is the collection of firms, workers, and activities that operate outside the legal and regulatory frameworks. Therefore, participating in the informal sector entails escaping the burden of taxation and regulation but, at the same time, not enjoying the protection and services that the state can provide. This definition was introduced by De Soto (1989), the classic study of informality. It has gained remarkable popularity due to its conceptual strength, which allows it to focus on the root causes of informality rather than merely its symptoms.¹

Measures

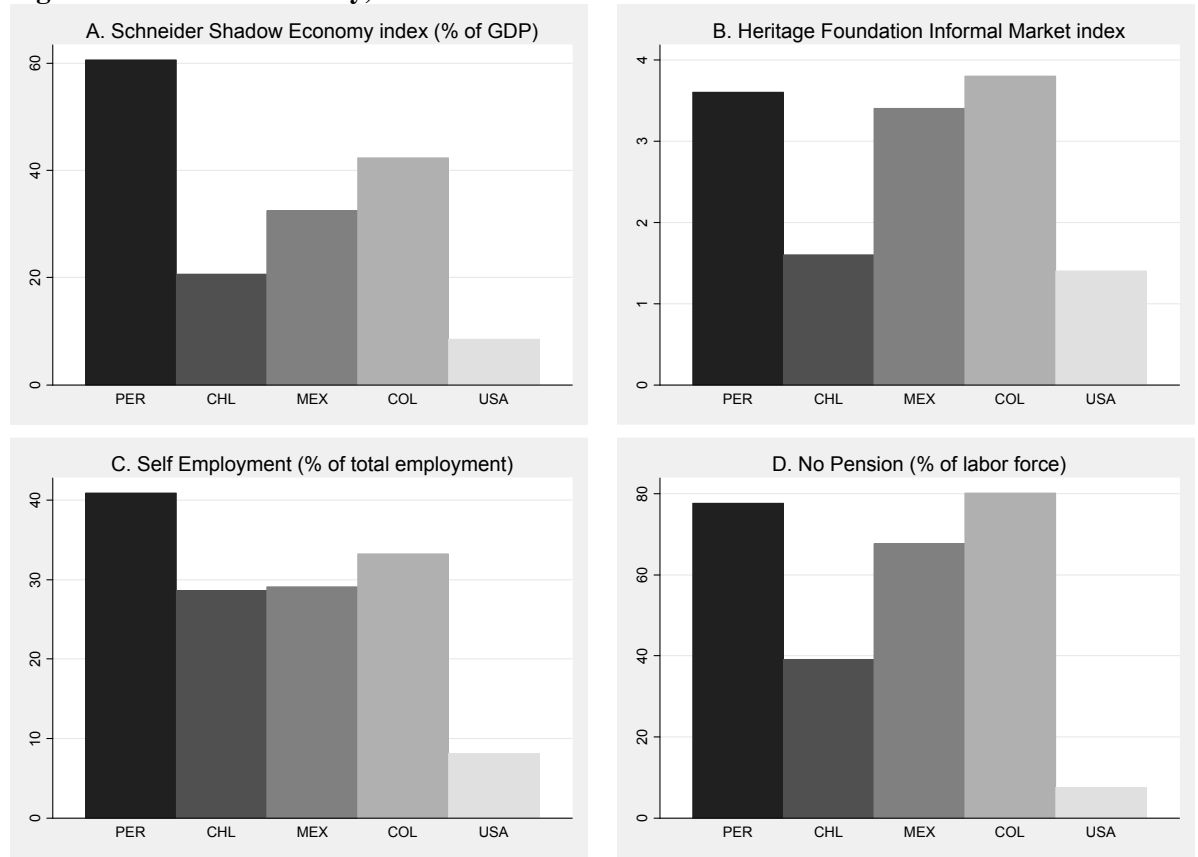
Although the definition of informality can be simple and precise, its measurement is not. Given that it is identified with working outside the legal and regulatory frameworks, informality is best described as a latent, unobserved variable. That is, a variable for which an accurate and complete measurement is not feasible but for which an approximation is possible through indicators reflecting its various aspects. Here we consider four of these indicators, for which data are available for Peru and a relatively large collection of countries. Two of them refer to overall informal activity in the country, and the other two relate in particular to informal employment. Each indicator on its own has conceptual and statistical shortcomings as a proxy of informality; taken together, however, they may provide a robust approximation to the subject.

The indicators related to overall informal activity are the Schneider index of the shadow economy and the Heritage Foundation index of informal markets. Details on definitions, sources, and samples for these and other variables used in this article are provided in the Appendix 1. The Schneider index combines the DYMIMIC (dynamic multiple-indicator-multiple-cause) method, the physical input (electricity) method, and the excess currency-demand approach for the estimation of the share of production that is not declared to tax and regulatory authorities. The Heritage Foundation index is based on

¹ For an excellent review of the causes and consequences of the informal sector, see Schneider and Enste (2000). Drawing from a public-choice approach, Gerxhani (2004) provides an interesting discussion of the differences of the informal sector in developed and developing countries. The World Bank Latin American and Caribbean 2007 flagship report *Informality: Exit and Exclusion*, Perry et al. (2007), is the most comprehensive and in-depth study on informality in the region.

subjective perceptions of general compliance to the law, with particular emphasis on the role played by official corruption. The indicators that focus on the labor facet of informality are the prevalence of self employment and the lack of pension coverage. The former is given by the ratio of self to total employment, as reported by the International Labor Organization. The latter is given by the fraction of the labor force that does not contribute to a retirement pension scheme, as given in the World Development Indicators. Appendix 2 presents some descriptive statistics on the four informality indicators. In particular, it shows that, as expected, they are significantly positively correlated, with correlation coefficients ranging from 0.60 to 0.85 –high enough to represent the same phenomenon but not too high to make them mutually redundant.

Figure 1. Size of Informality, Various Measures



Note:

1. Four measures of informality – A. Schneider (2004); B. Index of Economic Freedom by The Heritage Foundation (range 1-5: higher, more informality); C. ILO, collected by Loayza and Rigolini (2006); and D. Share of labor force not contributing to a pension scheme (World Development Indicators)

Using data on these four indicators, we can assess the prevalence of informality in Peru and compare it to that in other countries. Figure 1 presents data on the four informality indicators for Peru, for Colombia and Mexico (two countries with similar average income levels), for Chile (the Latin American country with the highest sustained growth rate), and for the USA (the developed country to which Peru and the whole region are most closely related). All in all, the degree of informality in Peru is alarmingly high, much worse than in Chile and the USA according to all indicators and worse than in Mexico and Colombia according to the share of informal production (Schneider) and self employment. Taking the indicators at face value, in Peru 60% of production is done informally, 40% of the labor force work is self-employed in informal micro-enterprises, and even counting those that work for larger firms only 20% of the labor force contribute to a formal pension plan.

Why should we worry about informality?

Informality is a distorted response of an excessively regulated economy to the shocks it faces and its potential for growth. It is a distorted, second-best response because it implies misallocation of resources and entails losing, at least partially, the advantages of legality, such as police and judicial protection, access to formal credit institutions, and participation in international markets. Trying to escape the control of the state induces many informal firms to remain sub-optimally small, use irregular procurement and distribution channels, and constantly divert resources to mask their activities or bribe officials. Conversely, formal firms are induced to use more intensively the resources that are less burdened by the regulatory regime; in particular for developing countries, this means that formal firms are less labor intensive than they should be according to the countries' endowments. In addition, the informal sector generates a negative externality that compounds its adverse effect on efficiency: informal activities use and congest public infrastructure without contributing the tax revenue to replenish it. Since public infrastructure complements private capital in the process of production, a larger informal sector implies smaller productivity growth.²

² See Loayza (1996) for an endogenous-growth model highlighting the negative effect of informality through the congestion of public services.

Compared with a first-best response, the expansion of the informal sector often represents distorted and insufficient economic growth.³ This statement merits further clarification: Informality is sub-optimal with respect to the first-best scenario that occurs in an economy without excessive regulations and adequate provision of public services. Nevertheless, informality is indeed preferable to a fully formal but sclerotic economy that is unable to circumvent its regulation-induced rigidities. This brings to bear an important policy implication: the mechanism of formalization matters enormously for its consequences on employment, efficiency, and growth. If formalization is purely based on enforcement, it will likely lead to unemployment and low growth. If, on the other hand, it is based on improvements in both the regulatory framework and the quality/availability public services, it will bring about more efficient use of resources and high growth.

From an empirical perspective, the ambiguous impact of formalization highlights an important difficulty in assessing the impact of informality on economic growth: two countries can have the same level of informality, but if this depends on different underlying causes, the countries' growth rates may also be markedly different. Countries where informality is kept at bay by drastic enforcement will fare worse than countries where informality is low because of light regulations and appropriate public services.

We now present a simple regression analysis of the effect of informality on growth. As suggested above, this analysis must control for enforcement; and a straightforward, albeit debatable, way to do so is by including a proxy for overall state's capacity as a control variable in the regression. For this purpose, we try two proxies: the level of GDP per capita and the ratio of government expenditures to GDP. The former has the advantage of also accounting for conditional convergence, and the latter has the advantage of more closely reflecting the size of the state.⁴ Table 1 presents the results of the regressions having the average growth of per capita GDP over 1985-2004 as

³ This does not necessarily mean that informal firms are not dynamic or lagging behind their formal counterparts. In fact, in equilibrium the risk-adjusted returns in both sectors should be similar at the margin. See Maloney 2004 for evidence on the dynamism of Latin American informal firms. The arguments presented in the text apply to the comparison between an excessively regulated economy and one that is not.

⁴ We also considered as proxy the ratio of tax revenues to GDP. Despite the fact that the number of observations drops considerably, the results were the same on the negative effect of informality.

dependent variable, initial (1985) GDP per capita as control variable, and, in turn, the four informality indicators as explanatory variables.

Table 1. The Effect of Informality on Economic Growth

Method of estimation: Ordinary Least Squares with Robust Standard Errors

Dependent variable: Per capita GDP Growth, 1985-2004, country average

	Per capita GDP Growth, 1985-2004							
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Initial GDP per capita (1985, in logs)	-0.23 -1.45	-0.54*** -2.89	-0.77*** -3.00	-0.90*** -3.52				
Initial Government Expenditure (% of GDP, 1985)					-0.03* -1.80	-0.05*** -2.62	-0.05 -1.42	-0.05*** -2.52
Schneider Shadow Economy index (% of GDP, in logs)	-2.18*** -3.87				-1.68*** -4.44			
Heritage Foundation Informal Market index (ranging 1-5: higher, more informality)		-1.15*** -5.07				-0.68*** -5.70		
Self Employment (% of total employment)			-0.10*** -3.43				-0.04** -2.24	
No Pension (% of labor force)				-0.05*** -5.01				-0.02*** -3.87
Constant	10.41*** 3.53	9.16*** 4.36	11.02*** 3.96	11.36*** 4.40	7.54*** 5.39	4.38*** 8.03	3.74*** 4.34	3.27*** 6.03
No. of observations	120	127	47	92	113	120	45	89
R-squared	0.19	0.22	0.15	0.20	0.17	0.19	0.07	0.12

Notes:

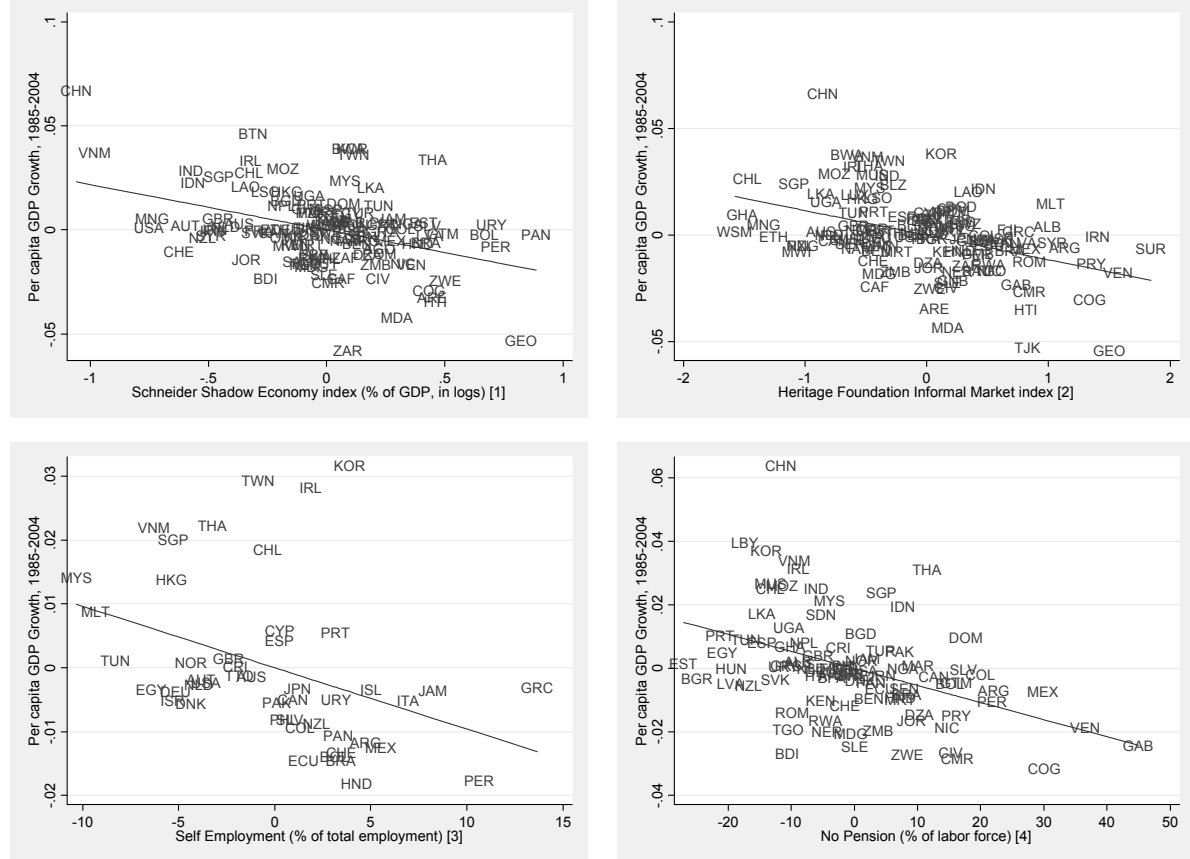
1. t-statistics are presented below the corresponding coefficients.
2. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.
3. Four types of informality measure used – [1] and [5] Schneider (2004); [2] and [6] Index of Economic Freedom by The Heritage Foundation; [3] and [7] ILO, collected by Loayza and Rigolini (2006); and [4] and [8] Share of labor force not contributing to a pension scheme (World Development Indicators).
4. All four informality indicators are in country averages while periods vary by indicator.

Source: Author's estimation

We choose a period of 20 years for the computation of the average growth rate in order to achieve a compromise between merely cyclical, short-run growth (which would be unaffected by informality) and very long-run growth (which may actually *cause* informality, rather than the other way around). The maintained hypothesis for identification of the causal relationship between informality and growth is that the level of informality is related to institutional and structural factors that change little over time and influence but are not influenced by *medium-term* growth rates (in our case, covering the 20-year period leading to 2004).

Figure 2. Informality and Economic Growth

Partial regression plots, controlling for initial GDP per capita (1985)



Note:

1. Four measures of informality – [1] Schneider (2004); [2] Index of Economic Freedom by The Heritage Foundation (range 1-5: higher, more informality); [3] ILO, collected by Loayza and Rigolini (2006); and [4] Share of labor force not contributing to a pension scheme (World Development Indicators)

The regression results indicate that an increase in informality leads to a decrease in economic growth. All four informality indicators carry negative and highly significant regression coefficients. Figure 2 shows the partial regression plots between growth and each of the informality measures (that is, partial in the sense that the initial level of per capita GDP is controlled for). They confirm that the negative connection between informality and growth represents a general tendency and not the influence of isolated observations. The harmful effect of informality on growth is not only robust and significant, but its magnitude makes it also economically meaningful --An increase of

one standard deviation in any of the informality indicators leads to a decline of 1-2 percentage points in the rate of per capita GDP growth.⁵

The Causes of Informality: conceptual discussion

Informality is a fundamental characteristic of underdevelopment, shaped both by the modes of socio-economic organization inherent to economies in the transition to modernity and by the relationship that the state establishes with private agents through regulation, monitoring, and the provision of public services. As such, informality is best understood as a complex, multi-faceted phenomenon.

Informality arises when the costs of belonging to the country's legal and regulatory framework exceed its benefits. Formality entails costs of entry --in the form of lengthy, expensive, and complicated registration procedures-- and costs of permanence --including payment of taxes, compliance with mandated labor benefits and remunerations, and observance of environmental, health, and other regulations. The benefits of formality potentially consist of police protection against crime and abuse, recourse to the judicial system for conflict resolution and contract enforcement, access to legal financial institutions for credit provision and risk diversification, and, more generally, the possibility of expanding markets both domestically and internationally. At least in principle, formality also voids the need to pay bribes and prevents penalties and fees, to which informal firms are continuously subject to. Therefore, informality is more prevalent when the regulatory framework is burdensome, the quality of government services to formal firms is low, and the state's monitoring and enforcement power is weak.

These benefits and costs considerations are affected by the structural characteristics of underdevelopment, dealing in particular with educational achievement, production structure, and demographic trends. A higher level of education reduces informality by increasing labor productivity and, therefore, making labor regulations less binding and formal returns potentially larger. Likewise, a production structure tilted

⁵ To be precise, a one-standard-deviation increase of, in turn, the Schneider index, the Heritage Foundation index, the share of self-employment, and the labor force lacking pension coverage leads to a decline of, respectively, 1.0, 1.4, 1.0, and 1.8 percentage points of per capita GDP growth.

towards primary sectors like agriculture, rather than to the more complex processes of industry, induces informality by making legal protection and contract enforcement less relevant and valuable. Finally, a demographic composition with larger shares of youth or rural populations is likely to increase informality by making monitoring more difficult and expensive, by complicating the training and acquisition of abilities, and by making more problematic the expansion of formal public services.

Often times in popular and even academic discussions, people do not follow this comprehensive approach, emphasizing instead particular sources of informality. Thus, some people focus on insufficient enforcement and related government weaknesses such as corruption; others prefer to emphasize the burden of taxes and regulations; yet others concentrate on explanations dealing with social and demographic characteristics.

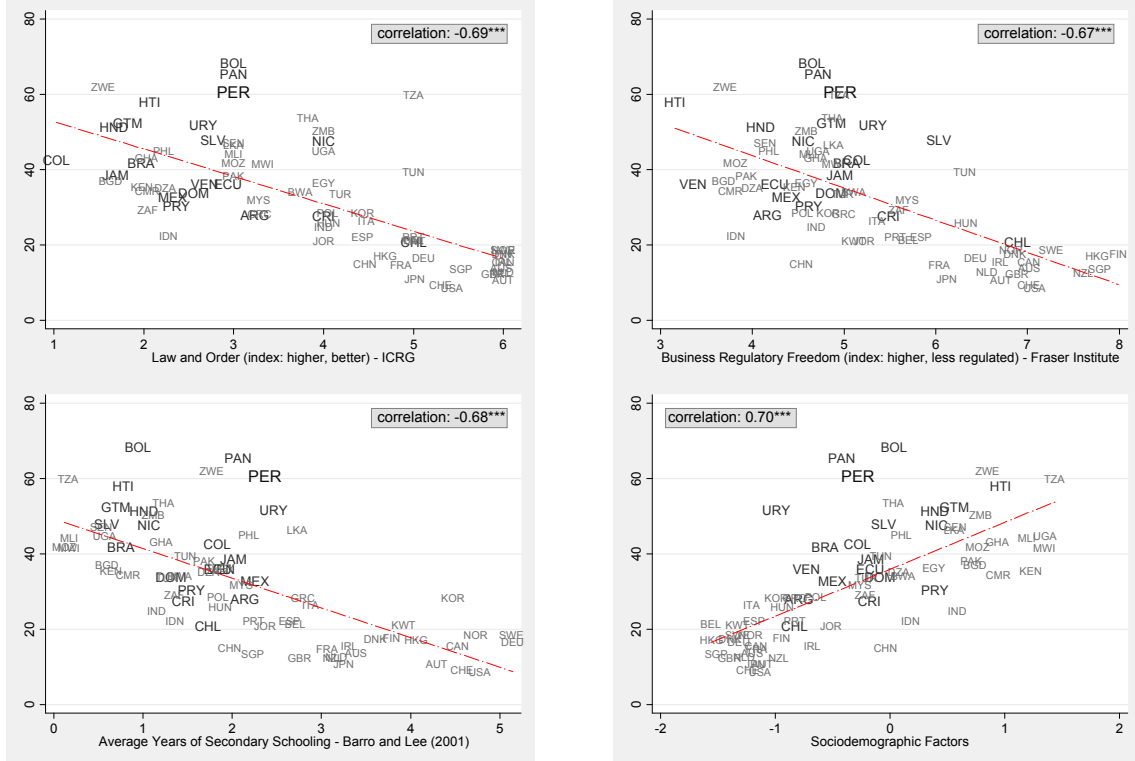
As suggested above, all these possibilities make sense, and there is some evidence to support them. Take, for instance, Figure 3. It presents scatter plots of each of the four measures of informality versus proxies for the major proposed determinants of informality. These are as follows.⁶ An index on the prevalence of law and order -- obtained from *The International Country Risk Guide*-- to proxy for both the quality of formal public services and government's enforcement strength. An index of business regulatory freedom --taken from Fraser Foundation's *Economic Freedom of the World Report*-- to represent the ease of restrictions imposed by the legal and regulatory frameworks. The average years of secondary schooling of the adult population --taken from Barro and Lee (2001)-- to represent educational and skill achievement of the working force. And an index of socio-demographic factors --constructed from the World Bank's *World Development Indicators*-- which includes the share of youth in the population, the share of rural population, and the share of agriculture in GDP.⁷

⁶ Again, details on definitions and sources of all variables are presented in Appendix 1.

⁷ This is constructed by first standardizing each component (to a mean of zero and a standard deviation of 1) and then taking a simple arithmetic average. We use a composite index, rather than the components separately, given the very high correlation among them.

Figure 3. Informality and Basic Determinants

A. Schneider Shadow Economy index (% of GDP)



B. Heritage Foundation Informal Market index (range 1-5: higher, more informality)

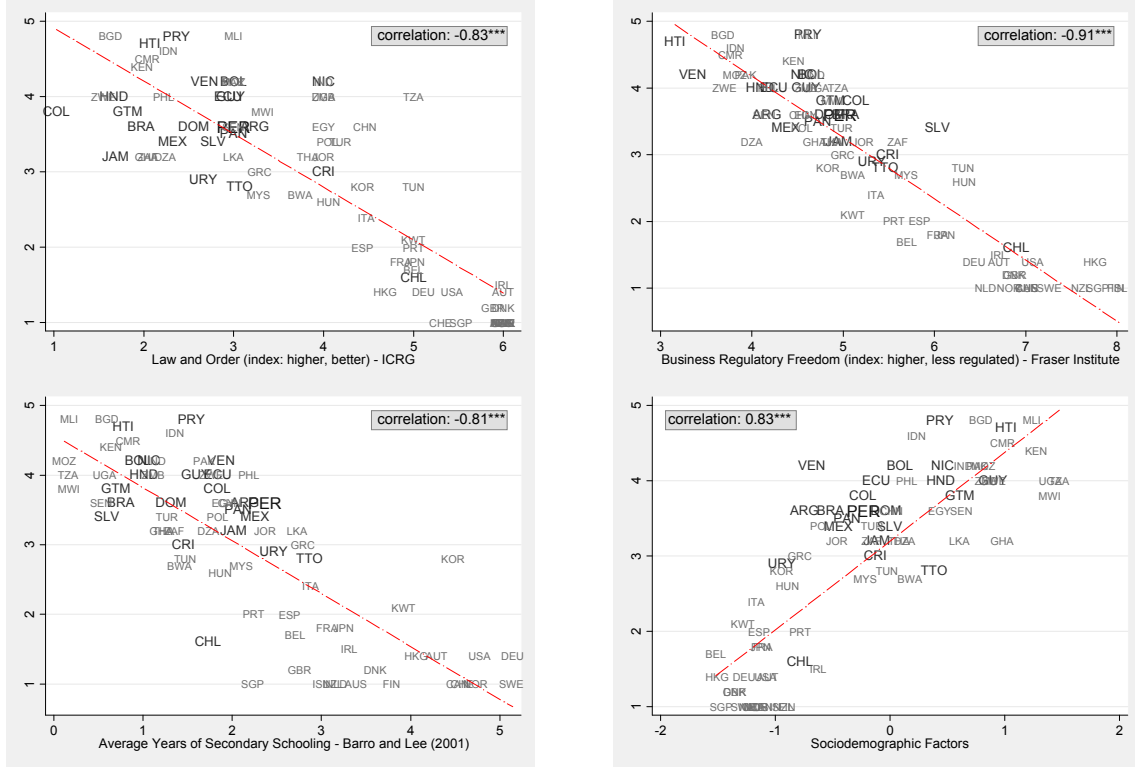
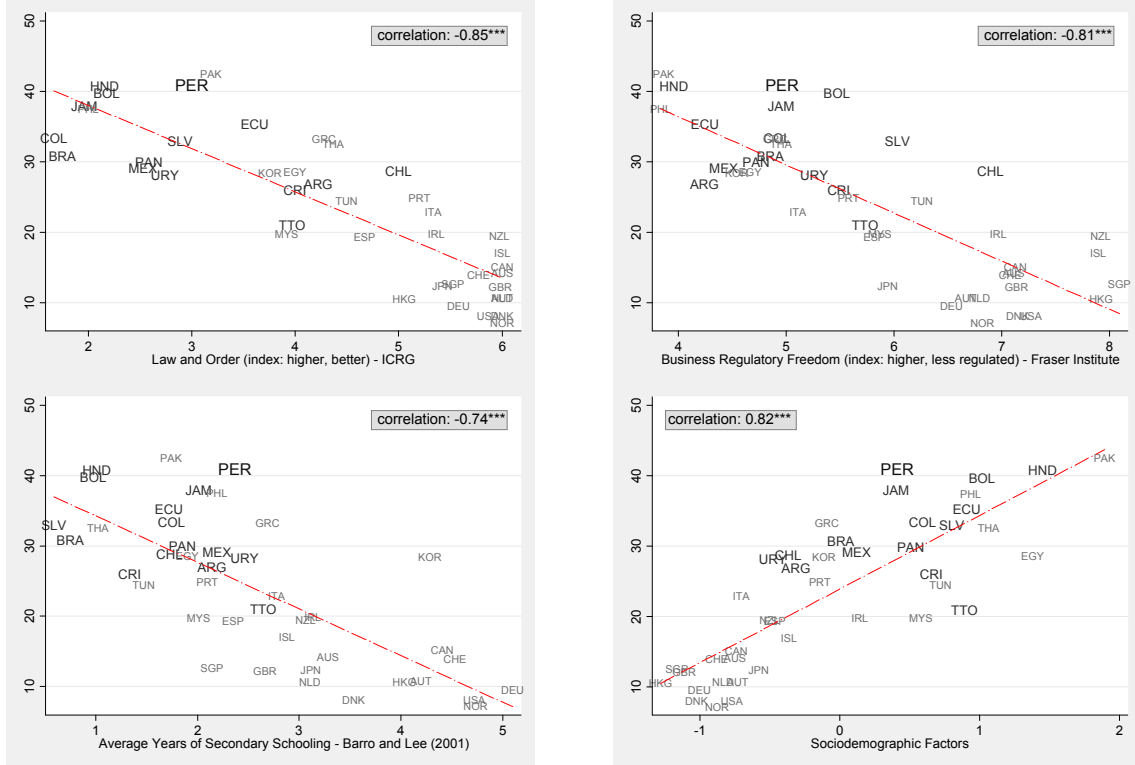
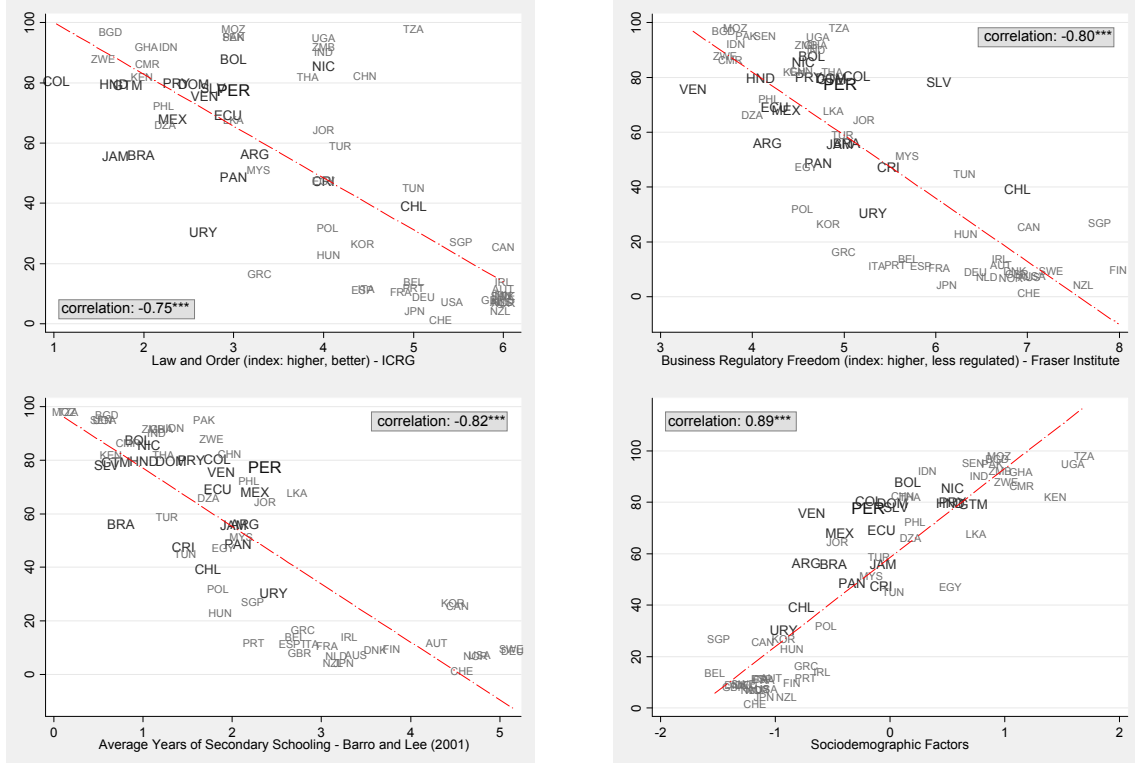


Figure 3. Informality and Basic Determinants (continued)

C. Self Employment (% of total employment) – ILO



D. No Pension (% of labor force) – World Development Indicators



Notes: 1. Sociodemographic Factors: Simple average of share of youth (aged 10-24) population, share of rural population and share of agriculture in GDP (all three variables are standardized) – World Development Indicators, ILO and UN.
 2. *** denotes significance at the 1 percent level.

Remarkably, all 16 correlation coefficients (4 informality measures times 4 determinants) are highly statistically significant, with p-values below 1%, and of large magnitude, ranging approximately between 0.7 and 0.9. All informality measures present the same pattern of correlations: informality is negatively related to law and order, regulatory freedom, and schooling achievement; and it is positively related to factors that denote incipient socio-demographic transformation.

Therefore, all these explanations may hold some truth in them. What we need to determine now is whether each of them has *independent* explanatory power with respect to informality. Or, more specifically, we need to assess to what extent each of them is relevant both in general for the cross-section of countries and in particular for a given country. To this purpose we turn next.

The Causes of Informality: econometric analysis

In what follows, we use cross-country regression analysis to evaluate the *general* significance of each explanation on the origins of informality. Then, we apply these estimated relationships to the case of Peru in order to evaluate the *country-specific* relevance of each proposed mechanism.

Each of the four informality measures presented earlier serves as the dependent variable of its respective regression model. The set of explanatory variables is the same for each informality measure and represents the major determinants of informality. They are the same variables used in the simple correlation analysis, introduced above.

The regression results are presented in Table 2. They are remarkably robust across informality measures. Moreover, all regression coefficients have the expected sign and are highly significant. Informality decreases when law and order, business regulatory freedom, or schooling achievement rise. Similarly, informality decreases when the production structure shifts away from agriculture and demographic pressures from youth and rural populations decline. The fact that each explanatory variable retains its sign and significance after controlling for the rest indicates that no single determinant is sufficient to explain informality. All of them should be taken into account for a complete understanding of informality.

Table 2. Determinants of Informality*Method of estimation: Ordinary Least Squares with Robust Standard Errors***Dependent variable: Four types of informality measure, country average**

	Informality measures			
	Schneider Shadow Economy index (% of GDP, in logs) [1]	Heritage Foundation Informal Market index [2]	Self Employment (% of total employment) [3]	No Pension (% of labor force) [4]
Law and Order (index from ICRG, range 0-6: higher, better; country average)	-0.1069*** -3.23	-0.1530*** -3.30	-2.3941*** -3.52	-3.4748* -1.88
Business Regulatory Freedom (index from Economic Freedom of the World by The Fraser Institute, range 0-10: higher, less regulated; country average)	-0.1020*** -2.72	-0.4884*** -9.21	-2.1587*** -2.62	-5.8250** -2.16
Average Years of Secondary Schooling (from Barro and Lee (2001); country average)	-0.0858** -1.92	-0.1761*** -3.87	-1.7743** -2.26	-5.1117*** -2.96
Sociodemographic Factors (simple average of share of youth (aged 10-24) population, share of rural population, and share of agriculture in GDP; country average)	0.1459** 2.27	0.3127*** 4.38	3.3082** 2.44	19.1452*** 6.69
Constant	4.5612*** 25.03	6.5817*** 32.20	51.3973*** 11.16	111.2550*** 11.35
No. of observations	74	77	42	67
R-squared	0.74	0.93	0.85	0.89

Notes:

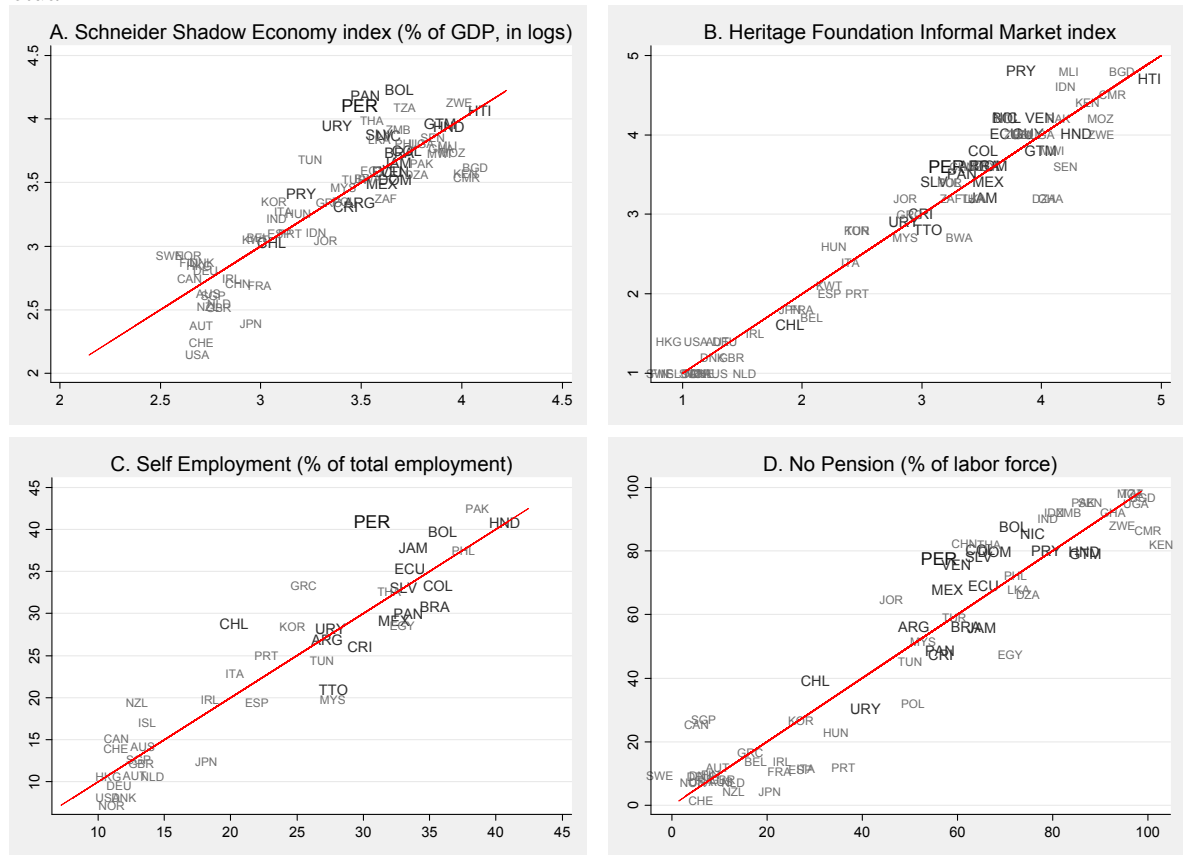
1. t-statistics are presented below the corresponding coefficients.
2. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.
3. Four types of informality measure – [1] Schneider (2004); [2] Index of Economic Freedom by The Heritage Foundation (range 1-5: higher, more informality); [3] ILO, collected by Loayza and Rigolini (2006); and [4] Share of labor force not contributing to a pension scheme (World Development Indicators).
4. Variables used to compute sociodemographic factors are all standardized. Sources are World Development Indicators, ILO and UN.
5. Periods used to compute country averages vary by informality measure.
6. A dummy variable is also included in regression [1] for Indonesia, China, India or Paraguay and in regression [4] for Greece. The dummy variable controls for anomalous cases.

Source: Author's estimation

The four explanatory variables account jointly for a large share of the cross-country variation in informality: the R-squared coefficients are 0.74 for the Schneider shadow economy index, 0.93 for the Heritage Foundation informal market index, 0.85 for the share of self employment, and 0.89 for the share of the labor force not contributing to a pension program. Figure 4 presents a scatter plot of the actual vs. predicted informality measures. The majority of countries have small residuals (i.e., the unpredicted portion of informality), a fact which is consistent with the large R-squared coefficients obtained in the regressions. Is this also the case of Peru?

Figure 4. Predicted and Actual Levels of Informality

Actual



Predicted

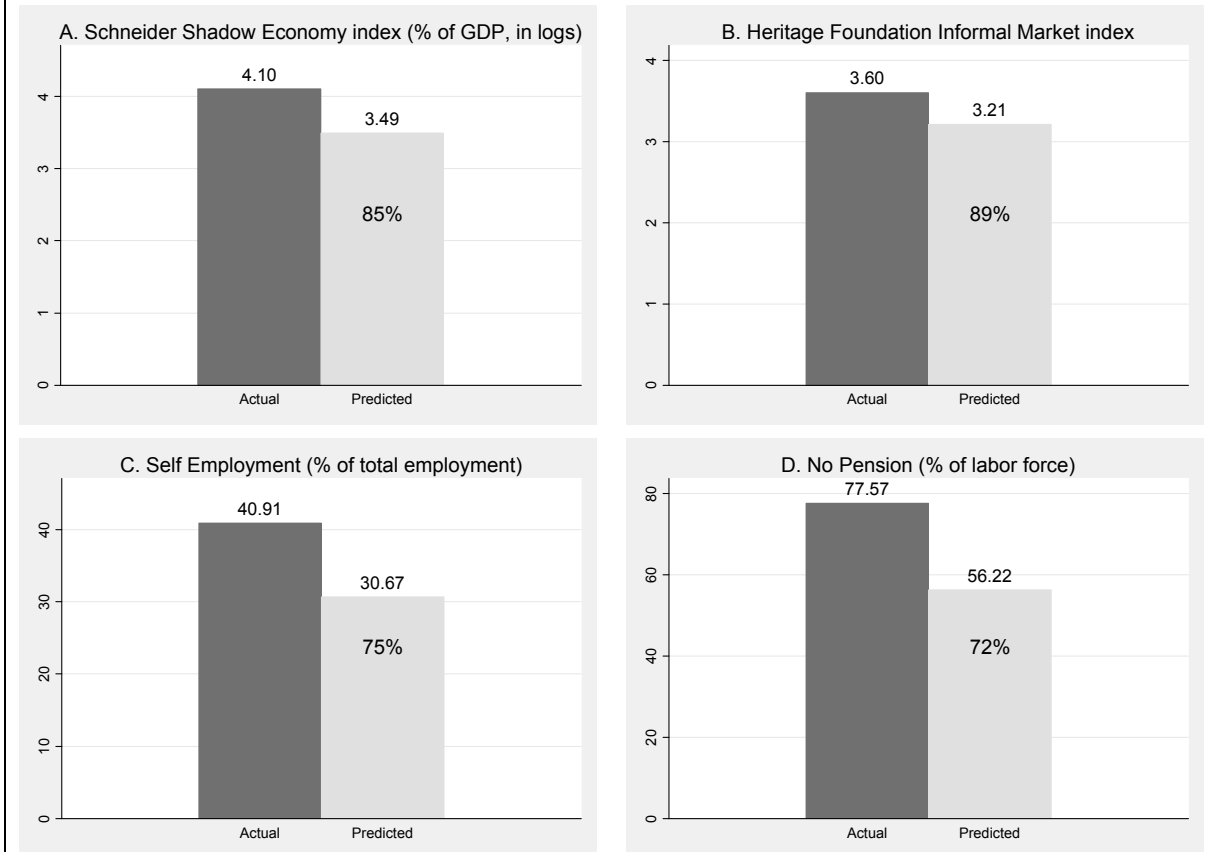
Notes:

1. Four measures of informality – A. Schneider (2004); B. Index of Economic Freedom by The Heritage Foundation (range 1-5: higher, more informality); C. ILO, collected by Loayza and Rigolini (2006); and D. Share of labor force not contributing to a pension scheme (World Development Indicators)
2. In each graph, a 45-degree line is drawn to show a distance between predicted and actual levels for each case.

Peru is in the minority of countries for which the residual is relatively large. (For illustrative purposes, the Peru observation is highlighted in Figure 4). In fact, statistical tests show that Peru’s unexplained informality is significantly different from zero. Figure 5 compares actual with predicted informality for the case of Peru. For all four measures, predicted informality falls short of actual informality, with explained fractions of 85% for the Schneider shadow economy index, 89% for the Heritage Foundation informal market index, 75% for the share of self employment, and 72% for the share of the labor force not contributing to a pension program. In summary, the cross-country regression model

explains to an important degree the high level of informality in Peru, but it does not account for it fully. To complete the story, an in-depth study that focuses on the specificities of the Peruvian case is needed.

Figure 5. Difference between Predicted and Actual Levels of Informality

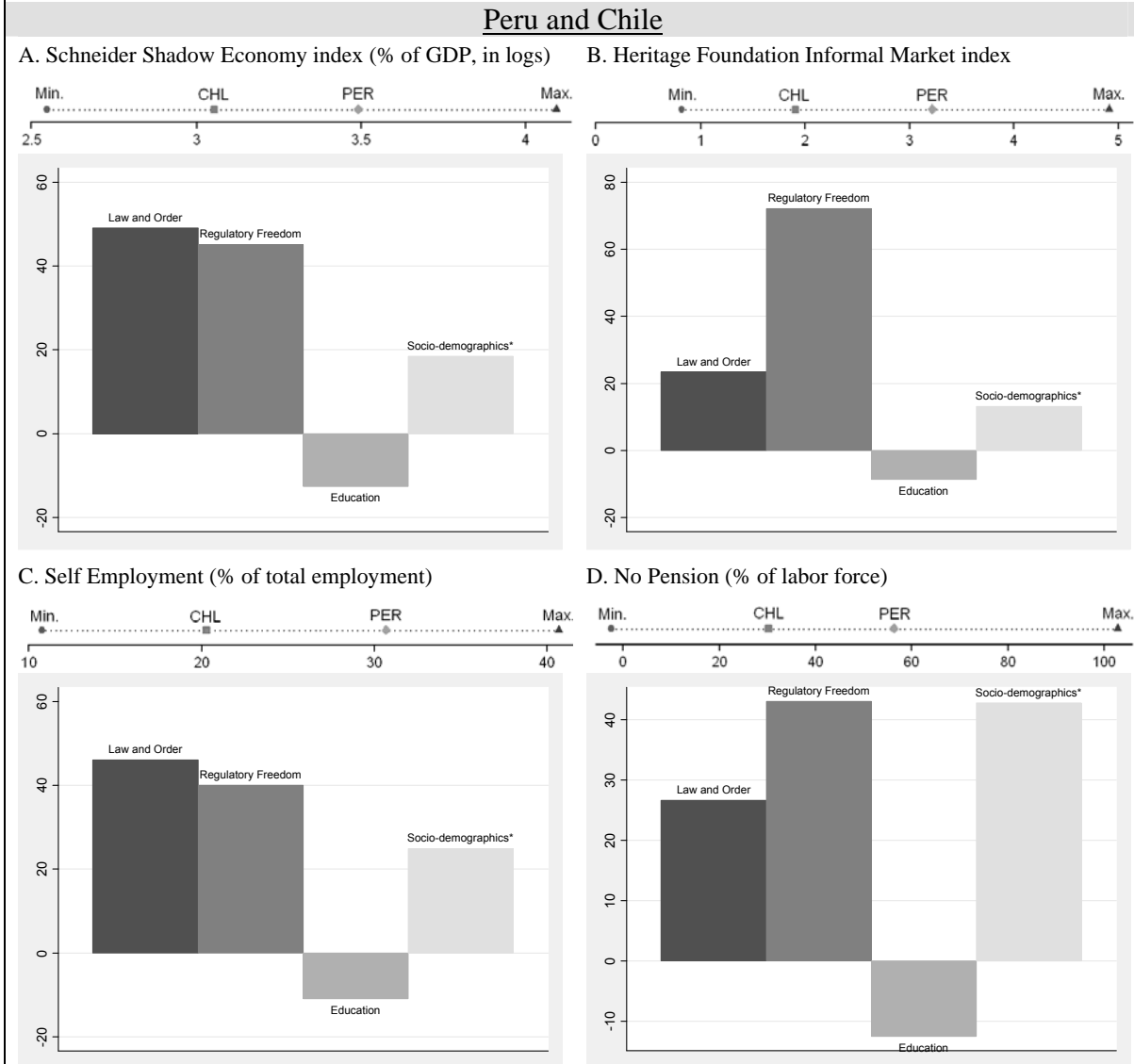


Note: Four measures of informality – A. Schneider (2004); B. Index of Economic Freedom by The Heritage Foundation (range 1-5: higher, more informality); C. ILO, collected by Loayza and Rigolini (2006); and D. Share of labor force not contributing to a pension scheme (World Development Indicators)

Focusing now on the portion of informality explained by the cross-country regression model, we can evaluate the importance of each explanatory variable for the case of Peru. In particular, we can assess how each of them contributes to the difference in informality between Peru and comparator countries, for which we choose Chile (the highest growing country in the region) and the USA (Peru’s main trading partner). The contribution of each explanatory variable is obtained by multiplying the corresponding regression coefficient (from Table 2) times the difference in the value of this explanatory variable between Peru and the comparator country. (Naturally, the sum of the

contributions equals the total difference in predicted informality between the two countries). The importance of a particular explanatory variable would, therefore, depend on the size of its effect on informality in the cross-section of countries *and* how far apart the two countries are with respect to the explanatory variable in question.

Figure 6. Explanation of Differences in Informality, Peru and Chile



Notes:

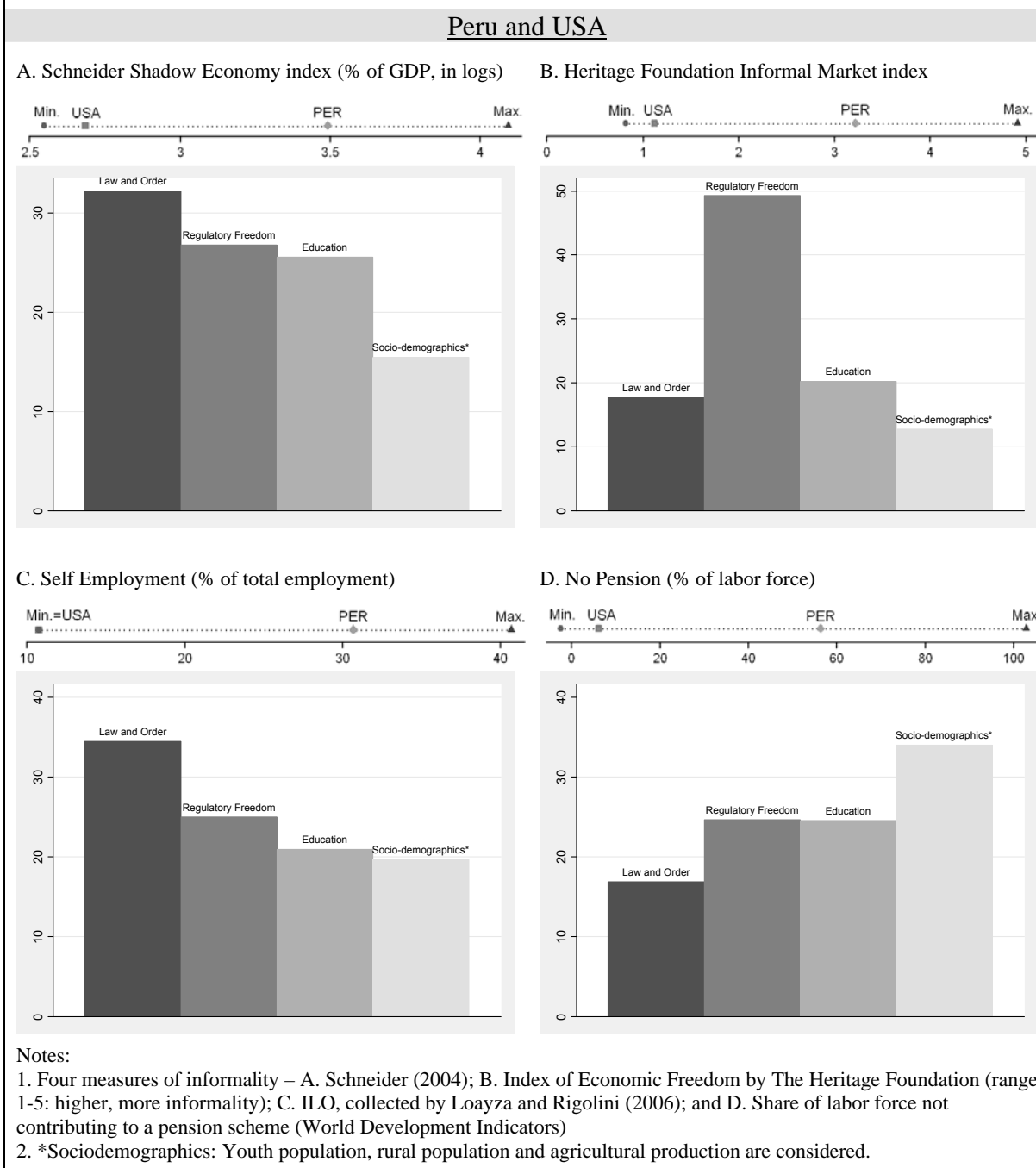
1. Four measures of informality – A. Schneider (2004); B. Index of Economic Freedom by The Heritage Foundation (range 1-5: higher, more informality); C. ILO, collected by Loayza and Rigolini (2006); and D. Share of labor force not contributing to a pension scheme (World Development Indicators)
2. *Sociodemographics: Youth population, rural population and agricultural production are considered.

Figure 6 presents the decomposition of the difference of (predicted) informality between Peru and Chile. Law and order, regulatory freedom, and socio-demographic conditions are more advanced in Chile and, thus, contribute positively to explain the higher level of informality in Peru. Education, at least as measured by years of secondary schooling, is better in Peru; therefore, by itself the difference in education would predict lower informality in Peru. Except for the informality measure based on the lack of pension coverage, the role of education and socio-demographic factors is small in explaining the informality differences between Peru and Chile. We can combine law and order and regulatory freedom in a group called “institutional factors” and then combine education and socio-demographics in another group called “structural factors.” Then, it is clear that the higher level of informality in Peru is mostly due to Chile’s higher progress in institutional factors.

Figure 7 presents the decomposition of the difference of (predicted) informality between Peru and the USA. The first thing to notice is that these differences are substantially larger than those between Peru and Chile. The second point to realize is that the relative importance of institutional and structural factors is different in the Peru-USA comparison than in the Peru-Chile case. Although for the majority of informality measures institutional factors still play the larger role, structural factors become quantitatively relevant in the Peru-USA comparison.⁸

⁸ The exception is the lack of pension coverage. It seems that lack of pension coverage differs from the other informality measures in the much larger role that structural factors play in explaining its cross-country differences. This was already glimpsed in the Peru-Chile case and is quite evident in the Peru-USA comparison.

Figure 7. Explanation of Differences in Informality, Peru and USA



Conclusion

Informality is alarmingly widespread in Peru. In fact, available measures indicate that the level of informality in the country is among the highest in the world. This is

worrisome because it denotes sharp misallocation of resources (labor in particular) and grossly inefficient utilization of government services, which can jeopardize the country's growth prospects. Cross-country evidence suggests that informality in Peru is the outcome of a combination of poor public services and a burdensome regulatory framework for formal firms. This combination is particularly dangerous when, as in the Peruvian case, education and skills are deficient, modes of production are still primary, and demographic pressures are strong. Although cross-country evidence explains most of the high informality in Peru, it is not sufficient to fully account for it. Country-specific evidence is essential to fill in the gap.

References

- [1] Barro, Robert and Jong-Wha Lee, "International data on educational attainment: updates and implications," *Oxford Economic Papers*, 3, 541-63 (2001).
- [2] De Soto, Hernando, *The Other Path: The Invisible Revolution in the Third World*, HarperCollins (1989).
- [3] Gerxhani, Klarita, "The Informal Sector in Developed and Less Developed Countries: A Literature Survey," *Public Choice*, 120, 267-300 (2004).
- [4] Gwartney, James and Robert Lawson, *Economic Freedom of the World: 2006 Annual Report*, The Fraser Institute (2006). www.freetheworld.com.
- [5] International Labour Organization (ILO), Bureau of Statistics, *LABORSTA Internet*. laborsta.ilo.org.
- [6] Loayza, Norman, "The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America," *Carnegie-Rochester Conference Series on Public Policy*, 45, 129-62 (1996).
- [7] Loayza, Norman and Jamele Rigolini, "Informality Trends and Cycles," World Bank Policy Research Working Paper No. 4078 (2006).
- [8] Maloney, William, "Informality Revisited," *World Development*, 32(7), 1159-78 (2004).
- [9] Miles, Marc, Edwin Feulner and Mary O'Grady, *2005 Index of Economic Freedom*, The Heritage Foundation and The Wall Street Journal (2005).
- [10] Perry, Guillermo, William Maloney, Omar Arias, Pablo Fajnzylber, Andrew Mason and Jaime Saavedra-Chanduvi, *Informality: Exit and Exclusion*, The World Bank (2007).
- [11] The PRS Group, *International Country Risk Guide (ICRG)*. www.icrgonline.com.
- [12] Schneider, Friedrich, "The Size of the Shadow Economies of 145 Countries all over the World: First Results over the Period 1999 to 2003," IZA DP No. 1431 (2004).
- [13] Schneider, Friedrich and Dominik Enste, "Shadow Economies: Size, Causes, and Consequences," *Journal of Economic Literature*, 38, 77-114 (2000).
- [14] United Nations (UN), Population Division, *World Population Prospects: The 2004 Revision*, UN (2005)
- [15] The World Bank, *World Development Indicators*, The World Bank, various years.

Appendix 1. Definitions and Sources of Variables Used in Regression Analysis

Variable	Definition and Construction	Source
Schneider Shadow Economy index	Estimated shadow economy as the percentage of official GDP. Average of 2001-2002 by country.	Schneider (2004).
Heritage Foundation Informal Market index	An index ranging 1 to 5 with higher values indicating more informal market activity. The scores and criteria are: (i) Very Low: Country has a free-market economy with informal market in such things as drugs and weapons (score is 1); (ii) Low: Country may have some informal market involvement in labor or pirating of intellectual property (score is 2); (iii) Moderate: Country may have some informal market activities in labor, agriculture, and transportation, and moderate levels of intellectual property piracy (score is 3); (iv) High: Country may have substantial levels of informal market activity in such areas as labor, pirated intellectual property, and smuggled consumer goods, and in such services as transportation, electricity, and telecommunications (score is 4); and (v) Very High: Country's informal market is larger than its formal economy (score is 5). Average of 2000-2005 by country.	Miles, Feulner and O'Grady (2005).
Self Employment	Self employed workers as the percentage of total employment. Country averages but periods to compute the averages vary by country. Only 47 countries that have at least two consecutive pairs of observations are used. For more details, refer to Loayza and Rigolini (2006).	ILO, collected by Loayza and Rigolini (2006).
No Pension	Labor force not contributing to a pension scheme as the percentage of total labor force. Average of 1992-2004 by country.	World Development Indicators, various years.
Law and Order	An index ranging 0 to 6 with higher values indicating better governance. Law and Order are assessed separately, with each sub-component comprising 0 to 3 points. Assessment of Law focuses on the legal system, while Order is rated by popular observance of the law. Average of 2000-2005 by country for Schneider Shadow Economy index, Heritage Foundation Informal Market index and No Pension, while periods to compute country averages are different by country for Self Employment.	ICRG. Data retrieved from www.icrgonline.com .
Business Regulatory Freedom	An index ranging 0 to 10 with higher values indicating less regulated. It is composed of following indicators: (i) Price controls: extent to which businesses are free to set their own prices; (ii) Burden of regulation / Administrative Conditions/Entry of New Business; (iii) Time with government bureaucracy: senior management spends a substantial amount of time dealing with government bureaucracy; (iv) Starting a new business: starting a new business is generally easy; and (v) Irregular payments: irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare. Average of 2000-2005 by country for Schneider Shadow Economy index, Heritage Foundation Informal Market index and No Pension, while periods to compute country averages are different by country for Self Employment.	Gwartney and Lawson (2006), The Fraser Institute. Data retrieved from www.freetheworld.com .
Average Years of Secondary Schooling	Average years of secondary schooling in the population aged 15 and over. Average of 2000-2005 by country for Schneider Shadow Economy index, Heritage Foundation Informal Market index and No Pension, while periods to compute country averages are different by country for Self Employment.	Barro and Lee (2001).
Sociodemographic Factors	Simple average of following three variables: (i) Youth (aged 10-24) population as the percentage of total population; (ii) Rural population as the percentage of total population; and (iii) Agriculture as the percentage of GDP. All three variables are standardized before the average is taken. Average of 2000-2005 by country for Schneider Shadow Economy index, Heritage Foundation Informal Market index and No Pension, while periods to compute country averages are different by country for Self Employment.	Author's calculations with data from World Development Indicators, ILO and UN.

Appendix 2. Descriptive Statistics

Data in country averages; periods vary by informality measure

(a) Univariate (regression sample)

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
Schneider Shadow Economy index (% of GDP)	74	32.430	15.172	8.550	68.200
Heritage Foundation Informal Market index (range 1-5)	77	2.936	1.206	1.000	4.800
Self Employment (% of total employment)	42	23.730	10.494	7.206	42.482
No Pension (% of labor force)	67	51.178	33.394	1.450	98.000

(b) Univariate (full sample)

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
Schneider Shadow Economy index (% of GDP)	145	34.838	13.214	8.550	68.200
Heritage Foundation Informal Market index (range 1-5)	157	3.390	1.197	1.000	5.000
Self Employment (% of total employment)	47	23.518	10.504	7.206	42.482
No Pension (% of labor force)	112	56.073	32.602	1.450	98.700

(c) Bivariate Correlations between Informality Measures

(upper triangle for regression sample (in italics) and lower triangle for full sample)

Variable	Schneider Shadow Economy	Heritage Fndn. Informal Market	Self Employment	No Pension
Schneider Shadow Economy index (% of GDP)	1.00 145 74	<i>0.74***</i> 74	<i>0.83***</i> 40	<i>0.73***</i> 67
Heritage Foundation Informal Market index (range 1-5)	0.65*** 132	1.00 157 77	<i>0.90***</i> 42	<i>0.90***</i> 67
Self Employment (% of total employment)	0.76*** 43	0.85*** 47	1.00 47 42	<i>0.85***</i> 39
No Pension (% of labor force)	0.60*** 106	0.78*** 108	0.86*** 41	1.00 112 67

Notes:

1. Sample sizes are presented below the corresponding coefficients.
2. *** denotes significance at the 1 percent level.

Documentos de Trabajo publicados Working Papers published

La serie de Documentos de Trabajo puede obtenerse de manera gratuita en formato pdf en la siguiente dirección electrónica:

<http://www.bcrp.gob.pe/bcr/Documentos-de-Trabajo/Documentos-de-Trabajo.html>

The Working Paper series can be downloaded free of charge in pdf format from:

<http://www.bcrp.gob.pe/bcr/ingles/working-papers/working-papers.html>

2007

Noviembre \ November

DT N° 2007-017

El mecanismo de transmisión de la política monetaria en un entorno de dolarización financiera: El caso del Perú entre 1996 y 2006

Renzo Rossini y Marco Vega

Setiembre \ September

DT N° 2007-016

Efectos no lineales de la volatilidad sobre el crecimiento en economías emergentes
Nelson Ramírez-Rondán

DT N° 2007-015

Proyecciones desagregadas de inflación con modelos Sparse VAR robustos
Carlos Barrera

Agosto \ August

DT N° 2007-014

Aprendiendo sobre Reglas de Política Monetaria cuando el Canal del Costo Importa
Gonzalo Llosa y Vicente Tuesta

DT N° 2007-013

Determinantes del crecimiento económico: Una revisión de la literatura existente y estimaciones para el período 1960-2000

Raymundo Chirinos

DT N° 2007-012

Independencia Legal y Efectiva del Banco Central de Reserva del Perú
Vicente Tuesta Reátegui

DT N° 2007-011

Regla Fiscal Estructural y el Ciclo del Producto
Carlos Montoro y Eduardo Moreno

DT N° 2007-010

Oil Shocks and Optimal Monetary Policy
Carlos Montoro

Mayo \ May

DT N° 2007-009

Estimación de la Frontera Eficiente para las AFP en el Perú y el Impacto de los Límites de Inversión: 1995 - 2004

Javier Pereda

DT N° 2007-008

Efficiency of the Monetary Policy and Stability of Central Bank Preferences. Empirical Evidence for Peru

Gabriel Rodríguez

DT N° 2007-007

Application of Three Alternative Approaches to Identify Business Cycles in Peru

Gabriel Rodríguez

Abril \ April

DT N° 2007-006

Monetary Policy in a Dual Currency Environment

Guillermo Felices, Vicente Tuesta

Marzo \ March

DT N° 2007-005

Monetary Policy, Regime Shift and Inflation Uncertainty in Peru (1949-2006)

Paul Castillo, Alberto Humala, Vicente Tuesta

DT N° 2007-004

Dollarization Persistence and Individual Heterogeneity

Paul Castillo y Diego Winkelried

DT N° 2007-003

Why Central Banks Smooth Interest Rates? A Political Economy Explanation

Carlos Montoro

Febrero \ February

DT N° 2007-002

Comercio y crecimiento: Una revisión de la hipótesis "Aprendizaje por las Exportaciones"

Raymundo Chirinos Cabrejos

Enero \ January

DT N° 2007-001

Perú: Grado de inversión, un reto de corto plazo

Gladys Choy Chong

2006

Octubre \ October

DT N° 2006-010

Dolarización financiera, el enfoque de portafolio y expectativas:

Evidencia para América Latina (1995-2005)

Alan Sánchez

DT N° 2006-009

Pass-through del tipo de cambio y política monetaria:

Evidencia empírica de los países de la OECD

César Carrera, Mahir Binici

Agosto \ August

DT N° 2006-008

Efectos no lineales de choques de política monetaria y de tipo de cambio real en economías parcialmente dolarizadas: un análisis empírico para el Perú

Saki Bigio, Jorge Salas

Junio \ June

DT N° 2006-007

Corrupción e Indicadores de Desarrollo: Una Revisión Empírica

Saki Bigio, Nelson Ramírez-Rondán

DT N° 2006-006

Tipo de Cambio Real de Equilibrio en el Perú: modelos BEER y construcción de bandas de confianza

Jesús Ferreyra y Jorge Salas

DT N° 2006-005

Hechos Estilizados de la Economía Peruana

Paul Castillo, Carlos Montoro y Vicente Tuesta

DT N° 2006-004

El costo del crédito en el Perú, revisión de la evolución reciente

Gerencia de Estabilidad Financiera

DT N° 2006-003

Estimación de la tasa natural de interés para la economía peruana

Paul Castillo, Carlos Montoro y Vicente Tuesta

Mayo \ May

DT N° 2006-02

El Efecto Traspaso de la tasa de interés y la política monetaria en el Perú: 1995-2004

Alberto Humala

Marzo \ March

DT N° 2006-01

¿Cambia la Inflación Cuando los Países Adoptan Metas Explícitas de Inflación?

Marco Vega y Diego Winkelreid

2005

Diciembre \ December

DT N° 2005-008

El efecto traspaso de la tasa de interés y la política monetaria en el Perú 1995-2004

Erick Lahura

Noviembre \ November

DT N° 2005-007

Un Modelo de Proyección BVAR Para la Inflación Peruana

Gonzalo Llosa, Vicente Tuesta y Marco Vega

DT N° 2005-006

Proyecciones desagregadas de la variación del Índice de Precios al Consumidor (IPC), del Índice de Precios al Por Mayor (IPM) y del Crecimiento del Producto Real (PBI)

Carlos R. Barrera Chaupis

Marzo \ March

DT N° 2005-005

Crisis de Inflación y Productividad Total de los Factores en Latinoamérica

Nelson Ramírez Rondán y Juan Carlos Aquino.

DT N° 2005-004

Usando información adicional en la estimación de la brecha producto en el Perú: una aproximación multivariada de componentes no observados

Gonzalo Llosa y Shirley Miller.

DT N° 2005-003

Efectos del Salario Mínimo en el Mercado Laboral Peruano

Nikita R. Céspedes Reynaga

Enero \ January

DT N° 2005-002

Can Fluctuations in the Consumption-Wealth Ratio Help to Predict Exchange Rates?

Jorge Selaive y Vicente Tuesta

DT N° 2005-001

How does a Global disinflation drag inflation in small open economies?

Marco Vega y Diego Winkelreid