Education and Informal Labour: What Welfare Effects Are at Stake? Methodological Notes

Andrea Doneschi y Rossana Patron

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Abstract

Although the wage distribution is central to analysing inequality issues, the provision of public services destined for the poor can make an essential difference in evaluating inequality in welfare rather than in income. Whereas raising taxes to fund public services would lead to a distributional conflict along with an efficiency loss, lower informality levels as a source of government revenue would make everyone better off. The simulation results suggest that, given the important size of the informal sector in developing countries, government intervention to reduce informality has great potential as an efficient redistributional tool.

Key words: informality, education, inequality

Resumen

El análisis de la dispersión salarial es central para el estudio de temas de desigualdad pero también el consumo de servicios públicos en los hogares pobres hace una contribución importante al bienestar, lo que aporta a la reducción de las desigualdades medidas en términos de bienestar. Mientras que la recaudación impositiva para financiar los servicios públicos puede llevar a un conflicto distributivo, además de la pérdida global de bienestar ocasionada por la pérdida de eficiencia, la reducción de los niveles de informalidad como fuente de ingresos de gobierno puede beneficiar a todos. Los resultados de la simulación sugieren que, en función de la fuerte participación de los mercados informales en los países en desarrollo, la intervención del gobierno para la reducción de la informalidad tiene un gran potencial como una eficiente herramienta distributiva.

Palabras clave: informalidad, educación, desigualdad.

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1 INTRODUCTION

The size of the informal sector in developing countries accounts for a significant share of GDP; there is no single definition of informal labour, but following ILO's (2002) general guidelines, it can be considered as consisting of unregulated activities where the quality of the jobs is poor. Informality is an issue closely linked to the analysis of poverty, income distribution, and economy development, as highlighted by the relevant empirical and theoretical literature. Indeed, the size of the informal economy is inverse to the GDP per capita, as shown, for instance, by Schneider et al. (2010). Moreover, a positive relationship between informality and income inequality has been found by, for instance, Perry et al. (2007); also, at the theoretical level, Chong and Grandstein (2007) have developed a model in which informality is positively related to income inequality.

The immediate consequences of informal status, such as poor-quality jobs, are the focus of much attention in the labour market research literature; however, farther-reaching effects are far less discussed. Some exceptions are those related to trade effects (for instance, Paz, 2012; Goldberg and Pavcnik, 2003; Kar and Marjit, 2001), but welfare analysis focused on informality and welfare inequality is scarce in the literature. Although the wage distribution is central to analysing inequality issues, the provision of public services destined for the poor can make an essential difference in evaluating inequality rather than only in income. However, the financing of these services is also relevant both for inequality and income growth. These notes discuss a general equilibrium approach that allows assessing the economy-wide impact of informality and the provision of public services; some simulations are used to shed further insight to this approach.

The notes are organized as follows: Section 2 describes relevant empirical facts relating education and informality; Section 3 describes the extended general equilibrium model, including informal activity; Section 4 provides numerical examples; and Section 5 concludes. An Annex presents additional modelling details.

2 THE CURRENT SITUATION

There are interesting observed facts that relate education levels to informality. Bassi et al. (2012) stress the association of lower-educated workers to a higher propensity to work

informally, as shown in Graphic 1 for Latin American and Caribbean countries. The explanation of these facts given by Perry et al. (2007) is that "Informality falls considerably with education, partially because it raises the opportunity cost of working by their own," which highlights the importance of educational attainment in the population as a relevant restriction to informality reduction policies.

Graphic 1 Education and informality. Selected Latin American countries (aggregate average), 1980-2010, in percentages.
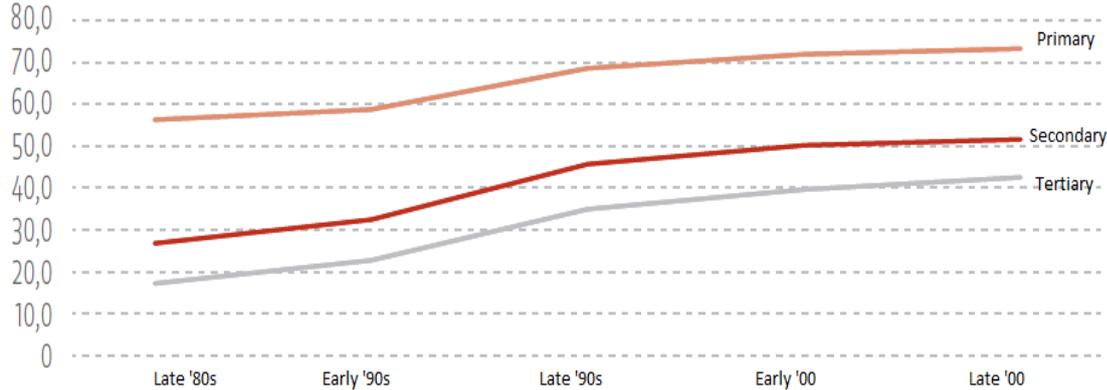
Source: Bassi et al. (2012)

Also, in developing countries informality is high: in countries such as those in Latin America, informal labour represents, on average, half of the total employment, with extremely high levels above 90% in Honduras, for instance, as shown in Graphic 2. This is a second relevant fact: with sizeable informal sectors, the government capacity to raise revenue is significantly undermined, and so is its capacity to provide public services.

Graphic 2 Informality levels in selected Latin American countries - Late '00
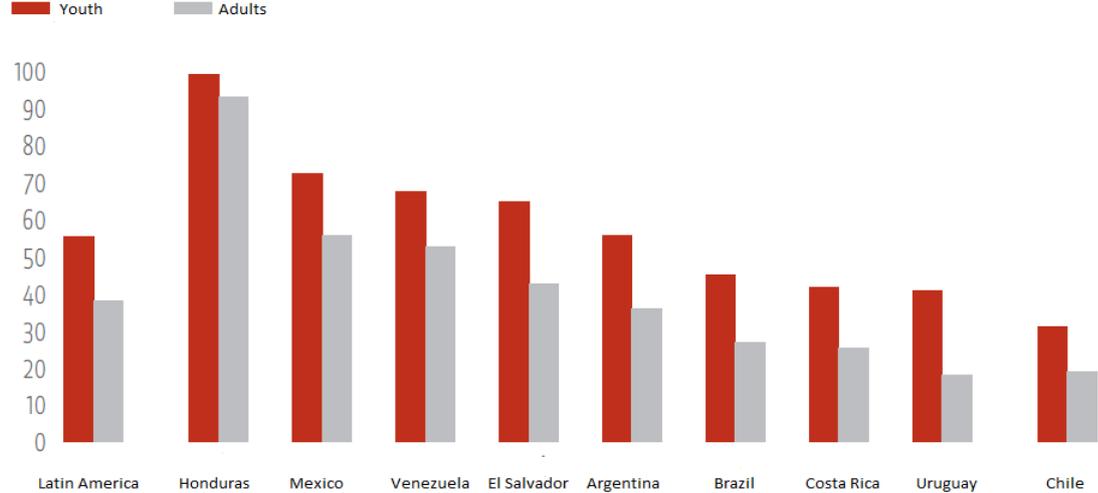

Source: Bassi et al. (2012)

Besides this, in practice formal and informal goods are usually substitutes, and this is the central topic in the Böhme and Thiele (2011) study. In an application to South African countries these authors find that the channels for consumption differ, and that the estimated elasticities show that higher income households display a lower propensity to consume informal goods. So, changes in the production mix of formal-informal goods affect differently each household type.

Finally, it is also important to note that, according to the World Development Report (World Bank, 2004), at the global level, there is a lack of public services, in quantity and quality, destined for the poor. For instance, the World Bank reports that the poor are less likely to start school and more likely to drop out early and that child mortality is substantially higher in poor households: in these cases, public intervention, as a prominent service provider, fails to adequately reach the poor.

Graphic 3 More public spending for the rich than for the poor

Share of public spending that accrues to the richest and poorest fifths
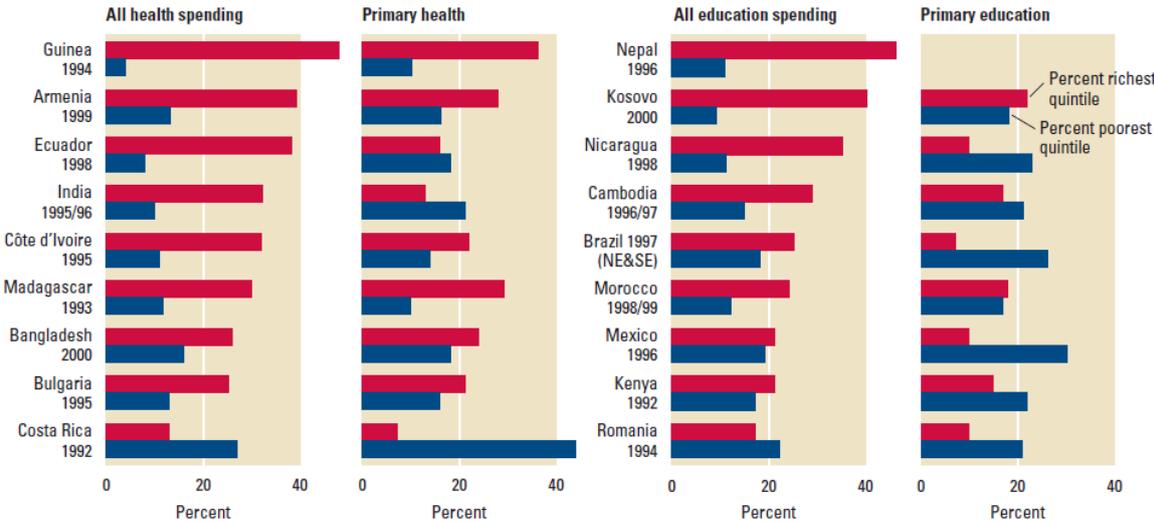
Source: World Bank (2004). World Development Report (2004).

These facts lead to some conjectures. First, a reduction in informality levels may improve welfare disparity across income/skill groups as it would allow improving government provision of services to the poor. A second conjecture that seems relevant is that the source of financing for the expansion of public services matters, and the difference between

raising taxes and reducing informality as a source of government revenue seems crucial. The discussion in these notes will try to support these conjectures.

3 MODEL DESCRIPTION

There are two representative households: each one owns only one type of labour, skilled or unskilled. Households make a consumption-leisure choice so that labour supply is endogenous. Let L_z be the total amount of labour units of type z available, H_z the units that the household chooses to work, and C_z a composite of privately provided consumption goods; for simplicity, the same subscript associates households and factors. Households spend all their (after-tax) income on consumption goods; the budget constraint is given by $w_z H_z = P_{C_z} C_z$, where P_{C_z} is the price index of the composite good for household z computed at consumers' prices, and w_z is the wage received by workers. Households' utility depends on consumption goods, including public services and leisure; utility as a CES function is given by $U_z = \left(\alpha_{C_Z} . C_z^{T^{\mu_z}} + \alpha_{R_Z} . \left(\overline{L}_z - H_z \right)^{\mu_z} \right)^{\frac{1}{\mu_z}}$, where

$C_z^T = . \left(\sum_{\forall h \neq n} \delta_{hz} D_{iz}^{\phi_z} + \delta_{nz} D_{nz}^{\phi_z} \right)^{\frac{1}{\phi_z}}$. The consumption good C_z^T is composed of h goods, including private goods (D_i) and public services (D_n). Public services supply is determined by the government, and the households consume all supply; $Q_{PG} = D_{nz}$. The price of public services (P_{PS}) is equal to the unit cost of providing it, and $\sum_z \delta_{nz} = P_{PS}$ to satisfy Samuelson's rule, $\sum_z \delta_z Q_{PS} = P_{PS} Q_{PS}$. Consumers' utility is a direct function of δ_{hz}, the participation of privately provided goods and public services in the consumption set; variations in household utility can be measured by the Equivalent Variation.

Property: *A change in taxes would cause a rise in government revenue only if*

$$\frac{\tau_z i\hat{t} + \phi_z \hat{t}_z}{\widehat{w_z/P_{C_z}}} > \tau_z \eta_{C_z,P_{C_z}} - \phi_z \eta_{H_z w_z} \quad \forall \; z$$

where $\eta_{C_z,P_{C_z}}$ is the elasticity of consumption to prices, $\eta_{H_z w_z}$ is the elasticity of labour supply to wage rate (see computation details in the Appendix), and τ_z and ϕ_z are the proportions of revenue from indirect and income taxes (from households z) out of total government revenues.

Demonstration: Government revenue is given by $GR = \sum_z P_{C_z} C_z + \sum_z w_z H_z$; after differentiation it gives $dGR = \sum_z P_{C_z} C_z \left(\hat{P}_{C_z} + \hat{C}_z \right) + \sum_z w_z H_z \left(\hat{w}_z + \hat{H}_z \right)$. The government revenue can also be expressed as $GR = it \sum_z P'_{C_z} C_z + \sum_z t_z w'_z H_z$. Total differentiation, and after rearranging, it gives $\widehat{GR} = \sum_z \tau_z \left(i\hat{t} + \hat{C}_z \right) + \sum_z \phi_z \left(\hat{t}_z + \hat{H}_z \right)$, where τ_z and ϕ_z are the proportions of revenue from indirect taxes and income taxes raised from type z households out of total government revenues, respectively, and $\sum_z (\tau_z + \phi_z) = 1$. After some manipulation, this results in

$$\widehat{GR} = \sum_z \left[\tau_z i\hat{t} + \phi_z \hat{t}_z + \left(\phi_z \eta_{H_z w_z} - \tau_z \eta_{C_z,P_{C_z}} \right) \left(\frac{\hat{w}_z}{P_{C_z}} \right) \right]$$

Thus, if taxes are unchanged, $\widehat{GR} = 0$; otherwise, $\widehat{GR}$ may be positive or negative. A sufficient condition for $\widehat{GR} > 0$ is

$$\frac{\tau_z i\hat{t} + \phi_z \hat{t}_z}{\widehat{w_z/P_{C_z}}} > \tau_z \eta_{C_z,P_{C_z}} - \phi_z \eta_{H_z w_z} \quad \forall \; z$$

This result implies that the impact on government revenue of a change in taxes is a function of the tax structure and the elasticities for labour and consumption.

Extension. Informality:

The private sector comprises tradable and non-tradable activities, which use skilled and unskilled labour. Informal activities are non-tradable; the sector is modelled as not subject to taxes (direct and indirect). Both types of labour are employed to produce an informal good that is an imperfect substitute for the tradable goods. It follows that wages and prices differ between the informal and formal activities. In the formal sector, the determination of wages is tied to international prices; wages are determined in a purely domestic market in the non-traded informal sector.

The standard leisure-work option is modified so that people also make a choice between earning income in the informal or the formal sector, the choice being based on the untaxed wage in the former and the taxed wage in the latter. The propensity to work informally is assumed to be higher for unskilled workers. Assuming a Constant Elasticity Transformation (CET) function for a composite labour H_z, it can be expressed as

$$H_z = B_z \left(\beta_{Fz}.L_{Fz}^{\theta_z} + \beta_{Iz}.L_{Iz}^{\theta_z} \right)^{\frac{1}{\theta_z}} \qquad\qquad \beta_{Fz} > 0, \beta_{Iz} > 0, \beta_{Fz} + \beta_{Iz} = 1$$

where L_{Fz} and L_{Iz} are the inputs of formal and informal labour of H_z, and the elasticity of transformation is $\eta_z = 1/(\theta_z - 1)$, $\theta_z > 1$. The two types of labour are allocated so as to maximize the total wage income from one unit of H_z. The maximization problem is

Maximize $w_{Fz}.l_{Fz} + w_{Iz}.l_{Iz}$

subject to $B_z \left(\beta_{Fz}.l_{Fz}^{\theta_z} + \beta_I.l_{Iz}^{\theta_z} \right)^{\frac{1}{\theta_z}} = 1$

where w_{Fz} and w_{Iz} are the wages of each type of labour (post-tax for formal labour), and l_{Fz} and l_{Iz} are the inputs of formal and informal labour to one unit of H_z. Using the optimal values for l_F, l_I, the wage of H_z is $w_z = w_{Fz}.l_{Fz} + w_{Iz}.l_{Iz}$, and the total

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household income is $w_z H_z = w_{Fz} L_{Fz} + w_{Iz} L_{Iz}$, where $w_{Fz} = w_{zF}^P (1 - t_z)$, t_Z is the rate of income tax, and w_{Iz} is the wage received by workers in the informal sector. As modelled, changes in direct taxation will affect the relative supply to formal and informal markets, and the government's potential to collect direct tax revenue will depend on the propensities to work informally.

4 EXAMPLES

There are two formal tradable sectors (Sector A and Sector B), an informal sector and public services. Sector A produces an unskilled intensive good that is exported, whereas sector B is skilled intensive and produces an import-competing good. There are two representative households (H_S and H_U) that consume private and public goods and services. Two different assumptions are used: i) both households have the same consumption basket (1 SET), and ii) the consumption basket for the lower-wage earners (unskilled workers H_U) has a higher share of informal and unskilled intensive formal goods and a higher weight of public services (2 SETS). Table 1 displays the composition of each consumption basket in both scenarios.

A probable scenario as income levels rise with economic development is a change in key parameters. One of these is the propensity to work informally: such scenario is simulated assuming changes in the propensity to work informally; Table 2 displays the results for alternative assumptions (1 SET or 2 SETS).

Table 1 Consumption basket composition ($H_U - H_S$), in percentages.

	1 SET	2 SETS
Sector A	(32-32)	(37-24)
Sector B	(49-49)	(35-72)
Informal sector	(19-19)	(28-4)
Total basket	(100-100)	(100-100)
Public services	(50-50)	(60-40)

Table 2 shows that while the propensity to work informally among the unskilled declines, the welfare of both income groups, measured by the Equivalent Variation (EV), is likely to rise, mainly because of a higher provision of public services. Also, it is apparent that there is a favourable effect on utility inequality; however, the effects depend on the consumption basket. The example also shows, as a likely result (in both scenarios), that the negative effects of a higher price of the informal good (due to lower supply) on the unskilled's utility could be outweighed by the positive effects of the rise in the provision of public services.

Table 2 EV for changes in propensity to work informally—Simulation results

Household	1 SET	2 SETS
H_U	0.6	1.3
H_S	0.1	0.6

The sensitivity of utility to variations in the consumption basket is also relevant at the moment to assess the welfare effects of policy measures, such as a tax reform. Table 3 shows the effects on welfare of changes in direct and indirect taxes (flat rise of 4%). Increases in taxes would cause an efficiency loss caused by tax distortions, but the effect on inequality is favourable. As shown in Table 3, the utility for the low-income group rises and that for the higher-wage earners is reduced, causing a distributive conflict. In this case, the levying of taxes to finance public services favours better provision of public services; also, informal activity is likely to rise (depending on price elasticities), favouring the poor's consumption. Therefore, the poor are better off at the expense of the richer, also with overall welfare loss due to tax distortions.

Table 3 EV changes in taxes—Simulation results

Household	1 SET	2 SETS
H_U	0.6	0.8
H_S	0.4	-0.1

Summing up, the exercises highlight the trade-offs that relate informality and households' welfare with the government's capacity to provide public services. This is not a straightforward relation as the government's revenue capacity depends on the propensity to work informally, and households' utility depends on the weight of informal and public

goods in the consumption set. The observed fact that the lower skilled have a higher propensity to work informally implies that the government potential to collect direct tax revenue is constrained by the average level of education of workers; also, the government can influence the size of the informal sector by its tax policy. So, government policy can influence inequality as there is much room to improve the public provision of public services to the poor.

5 CONCLUSIONS

The provision of public services could make an essential difference in evaluating inequality; however, the financing of these services is also relevant. If taxes are levied to finance public services, the consequences are vast: informal labour is likely to rise, favouring the poor's consumption of these goods which price falls; and government revenue would rise (given suitable elasticities of labour supply, consumption, and working informally), favouring better provision of public services. Therefore, the poor would be better off at the expense of the richer and damaging overall economic efficiency. By contrast, if government revenue rises because of a reduction in informality, the provision of public services may improve, thus reducing welfare disparity without distributional conflict or efficiency loss. Thus, considering the important size of the informal sector in developing countries, the reduction of informality seems to have great potential as an efficient redistributional tool; the role of education policies in reducing informality is significant as informality is lower for higher educational levels. However, the relative efficiency of alternative government interventions (e.g., public assistance programs) in reducing welfare inequality is beyond the scope of these notes.

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ANNEX

The main features of the whole economy are as follows. There are competitive markets for goods and factors. All production functions are subject to constant returns to scale. In long-run equilibrium, profits are zero so prices are equal to unit costs. The government raises revenue from taxes to provide public services and runs a balanced budget. There are income and indirect taxes in formal markets.

The CES utility for household z is $U_z = \left(\alpha_{C_z} . C_z^{\mu_z} + \alpha_{R_z} . \left(\overline{L}_z - H_z \right)^{\mu_z} \right)^{\frac{1}{\mu_z}}$, $\alpha_{C_z} > 0$,

$\alpha_{R_z} > 0$, $\alpha_{C_z} + \alpha_{R_z} = 1$, $\sigma_z = \dfrac{1}{1 - \mu_z}$, with $\mu_z < 1$. Consumers maximize utility subject

to the budget constraint $P_{C_z} C_z = w_z H_z$, post-tax wage w_z, and price index P_{C_z} of the composite good z at consumers' prices. The optimal values for H_z and C_z are given by

$$C_z = \frac{w_z}{P_{C_z}} \frac{\alpha_{C_z}^{\sigma_z} . P_{C_z}^{1-\sigma_z}}{\alpha_{C_z}^{\sigma_z} . P_{C_z}^{1-\sigma_z} + \alpha_{R_z}^{\sigma_z} . w_z^{1-\sigma_z}} L_z, \qquad H_z = \frac{\alpha_{C_z}^{\sigma_z} . P_{C_z}^{1-\sigma_z}}{\alpha_{C_z}^{\sigma_z} . P_{C_z}^{1-\sigma_z} + \alpha_{R_z}^{\sigma_z} . w_z^{1-\sigma_z}} L_z .$$

The elasticity of time worked with respect to the wage rate for household z is

$\eta_{H_z, w_z} = \dfrac{w_z}{H_z} \dfrac{\partial H_z}{\partial w_z} = (\sigma_z - 1) \dfrac{L_z - H_z}{L_z}$, which is positive provided $\sigma_z > 1$. The elasticity of

demand for C_z with respect to prices is $\eta_{C_z, P_{C_z}} = \dfrac{P_{C_z}}{C_z} \dfrac{\partial C_z}{\partial P_{C_z}} = - \left(\sigma_z \dfrac{L_z - H_z}{L_z} + \dfrac{H_z}{L_z} \right)$,

which is negative.