THE INFORMAL SECTOR, PRODUCTIVITY SHOCKS, AND DISTORTIONS IN THE LABOR MARKET

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ABSTRACT

We use a general equilibrium model to study the effects of a positive productivity shock on the formal sector, and also to study the impact of changes of the level of distortions---measured in terms of taxes---in the labor market on the size of the informal sector in Venezuela. Our main findings are that in the long run there is a positive relationship between the level of distortions in the labor market and the size of the informal sector and that a positive productivity shock in the formal sector reduces the size of the informal sector.

[*] I thank James Alm and Diego Pablo Restuccia for their comments, helpful suggestions, and advice. I have benefitted from the comments of Anna Alberini, Charles Becker, Jennifer Thacher, Julio Videras, and seminar participants at Vicepresidencia de Estudios Económicos del BCV and Asociación Civil para la Promoción de Estudios Sociales

I. Introduction

An important feature of labor markets in many Latin American countries is the number of people employed in the informal sector. For example, 44 percent of the employed males in Argentina work in the informal sector. In the case of Venezuela, this number is 49 percent, for Mexico 62 percent, and for Peru 56 percent.[1] This structural characteristic of the Latin American economies should be taken into account in the design and implementation of economic policies. It is related not only to labor markets but also to social outcomes such as poverty levels, educational attainment, and income distribution.

In this paper, we study how the size of the informal sector responds to a positive exogenous shock to a capital-intensive sector and to a change in the level of distortions in the labor market. To do that we develop a general equilibrium model with three sectors: a private sector, an intermediate-good sector, and an informal sector. We assume that the government owns the intermediate-good sector and that it has the highest capital-labor ratio of all sectors. This theoretical framework captures some relevant and important features of the Venezuelan economy. We then use data from that country to parameterize the model. Along those lines, the shocks we analyze are motivated by two events that are taking place or could take place there. First, the Venezuelan oil industry started four years ago an expansion plan of its

[1] These numbers come from household surveys from the aforementioned countries for 1995 and 1996, as reported in a recent study coordinated by the Banco Interamericano de Desarrollo, or the Inter American Development Bank. See BID (1998).

production capacity from 3 million to 6 million barrels per day.[2] The oil sector produces approximately 23 percent of Venezuelan GDP. Second, there could be changes in policies regarding regulations of the labor market. Accordingly, the shocks we focus on are a change in productivity in the oil sector and a change in the level of distortions in the labor market.

Before explaining our theoretical framework in more detail, let us review the literature about the informal sector and place the approach that we are using in the context of that research.

One important feature of the economic literature addressing the informal sector is the lack of consensus on the definition and origin of this sector. One branch of the literature defines the informal sector as an urban sector that produces at small scale and hires non-skilled labor.[3] This literature argues that the informal sector arises because the technology used in developing countries is not appropriate for the relative factor scarcities in those countries. These capital-intensive technologies are imported in order to satisfy the demand for goods in underdeveloped societies, which try to imitate the consumption patterns of developed countries. This branch of the literature looks at the informal sector as resulting from the production structure and consumption patterns of developing countries.[4]

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[2] For an analysis of the opportunities open to the Venezuelan oil industry that motivate the plan, see Toro-Hardy (1994).

[3] In the rural-urban migration models, the traditional urban sector has these characteristics. See Todaro, (1969), Harris and Todaro (1970), and Fields (1976). In this literature, the traditional urban sector is the the labor market where newcomers to the cities, usually unskilled rural workers, find a job while they wait for the opportunity to work permanently in the urban modern sector. Tokman (1989) characterizes the informal sector as a sector that uses a very small scale of operation, uses low capital, has low productivity, and exhibits a high degree of heterogeneity in terms of the activities performed there.

[4] See Prebisch (1976).

By contrast, the more popular view concerning the origin of the informal sector comes from the Neoclassical approach. According to this school of thought, the informal sector results from the excessive burden that government regulations and taxes impose on individuals and firms in an environment of generalized controls and very inefficient bureaucracy. As Ghersi (1997) notes, "activities are informal because of the cost of legality." Regulations, such as fringe benefits, minimum wages, constraints on free dismissal, and social security, raise the cost to firms of hiring and firing workers. De Soto (1986) describes how these restrictions contributed to the rise of the informal sector in Peru, defining the informal sector as the set of economic units that do not comply with government taxes and regulations. Peattie (1987) defines the informal sector as the set of workers that receive wages below the legal minimum. The Neoclassical view emphasizes the lack of compliance as a defining characteristic of the informal sector.

Using De Soto's definition of the informal sector, Loayza (1996) estimates the size of the informal sector for 14 Latin Americans countries from the early 1990s using some proxies for the weakness of government institutions and a measure of tax burden. He then calculates the correlation between the estimated size of the informal sector and the growth rate of those countries, and finds a negative correlation between the size of the informal sector and the growth rate of the economy. Asea (1996) points out limitations and mistakes in the procedure followed by Loayza.

Chaudhuri (1989) provides a theoretical explanation for the existence of the informal sector using a static general equilibrium model with three sectors (rural, formal, and informal) to study the production linkages between the formal and the

informal sector. In his model, there are two final goods and one intermediate good. The informal sector is one of the sectors producing the intermediate good. It has a smaller labor cost than the formal sector and a greater capital cost than the formal sector.[5] The differences in labor costs are related to distortions in the labor market imposed by the government. Firms in the informal sector have a greater capital cost because they have less access to credit. The informal sector exists because of the difference between the ratio of input prices faced by both sectors.

In practice, the definition of the informal sector is related to the size of the firms where people work.[6] Note that this definition includes microenterprises, domestic employment, and own-account workers. Using a static theoretical model, Rauch (1991) incorporates this empirical characterization of the informal sector in a framework of a dual formal-informal sector labor market.[7] The essential government regulation that Rauch introduces is a minimum wage, which is enforced only for firms greater than a certain size. He provides a theoretical explanation for the gap between the size of the firms in both sectors. He concludes that the gap between the largest firm of the informal sector and the smallest firm in the formal sector increases the further the minimum wage is from the equilibrium wage.

The model we use differs from the models mentioned here in two significant ways. It is a dynamic model, and it is also designed to reflect important features of the

[5] These two assumptions imply that the informal sector has a capital-labor ratio that is smaller than the formal sector.

[6] For example, the Venezuelan Statistics Office defines the informal sector as the set of persons that work in firms with less than five employees. Rosenbluth (1994) presents statistics about the size of the informal sector for different Latin American countries, using the same threshold to define the informal sector.

[7] See Saint-Paul (1996) for a variety of theoretical models of dual labor markets.

structure of the Venezuelan economy. As discussed in Section II, the general equilibrium dynamic model has three sectors: private, public, and informal. We assume that this economy is closed and there is full employment. Two goods are produced: a final good and an intermediate good.[8] Both the private sector and the informal sector produce the final good; however, these sectors use different technologies to produce this final good. The intermediate good is exclusively produced by the public sector. In our model, there is an informal sector because there is a distortion in the labor market. The model is built in a way that if there is no distortions in the economy, then the size of the informal sector is zero. The source of the distortion in the labor market is a tax that the government imposes on labor hired in the intermediate-good sector and in the private sector, which is assumed to represent all costs imposed for all the regulations in the labor market. The informal sector arises because firms in the formal sector fire workers or do not have incentives to hire them, due to the increase in the cost of this input imposed by the distortions. Note that the model assumes that this economy is at full employment every period, so that, workers not working in the formal sector work in the informal sector. We also assume that the informal sector uses no capital and that firms there have a very small scale of operation.

Besides imposing a tax on labor in the formal sector and producing the intermediate good, the government provides a transfer to each consumer. The total amount of the transfers equals the government revenue in each period. This

[8] For intuitive purposes, think of this intermediate good as oil.

assumption is made to focus attention on the effect on the labor markets and not on the government budget.

The individuals in this economy are heterogeneous and live infinite periods. The dimension of heterogeneity in this model is that individuals work in different sectors and thus receive different amounts of training. For the agents that decide to work in the formal sector, training is mandatory. The agents working in the informal sector do not receive any training. Individuals have the same preferences, time endowment, and discount factors.

In Section III, we present the maximization problems of the agents, and the definition of competitive equilibrium for this economy. In Section IV, we find the stationary equilibrium of this economy by determining the expressions that define each variable at the steady state. In Section V, we explain the parameterization of the model and the benchmark specification.

In Section VI, we introduce two different shocks to the model. First, we change the productivity parameter of the production function for the intermediate goods so that this sector doubles its output. Second, we change the level of distortions. We perform eleven simulations, with different combinations of the two shocks and compare these results to the benchmark case. In the last section, we comment on our findings from these eleven cases and outline some policy implications.

II. Economic Environment

Agents are heterogeneous and infinite-lived. They differ in one aspect: the sector in which they work. This decision implies a choice about the level of education. To simplify, we assume that workers in the informal sector do not need any training, while workers in the formal sector must obtain training.[9] In all other dimensions, individuals are identical.

More precisely, we characterize agents in the following manner:

a) agents have the same preferences; that is, they have the same utility function, and they only derive utility from the consumption of the output good Y;

b) they have the same present discounted value of lifetime earnings;

c) in any period t, each agent is endowed with one unit of time that can be devoted to work in the formal or the informal sector;

d) each agent is endowed with some basic skills that can be expanded through training using the following technology:

$$h = \begin{cases} 1 \\ G(n) = Bn_t^{\upsilon} \end{cases}, \qquad (1)$$

where h is the level of ability that an agent has at a given point in time, n represents the time devoted to learning, B is a constant greater than zero, υ is a parameter with

[9] Education/schooling in this model can be thought of as on-the-job training. When individuals decide to work in the formal sector, they know that they must employ part of their time in training. They do not receive any payment for the fraction of their time spent in training. The only cost of education in this model is foregone wages. Tuition costs are not considered.

$0<\upsilon<1$. Note that if agents do not work in the formal sector they retain the basic level of working skills. To simplify, this basic skill level is normalized to one. If agents decide to work either in the private sector or in the public firm, then their basic level of working skills must be transformed by training into h units of productive labor services. Each period, total labor services supplied by each worker are equal to h(1-n), given that they devote a fraction, n, of their time to schooling. We assume that when agents are studying they do not receive any earnings. This implies that the present discounted value of earnings among workers is the same. This condition is important for the equilibrium of our model because, if it does not hold, then all the agents will work in the sector with the maximun earnings.

Besides the output good Y, there is an intermediate good, I. The output good is produced using two technologies, one used by the informal sector and another by the private sector.[10] The main difference between the two technologies is that they use different inputs. The informal sector employs untrained labor services, meaning agents that did not improve their working skills through schooling.[11] This technology can be represented as

$$Y_{IF} = A_{IF}N_{IF,} \tag{2}$$

where Y_{IF} is the amount of Y produced by the informal sector, A_{IF} is the technology specific parameter, and N_{IF} is the proportion of people employed in the informal

[10] The technologies used to produce the final good follow Restuccia (1998).

[11] We make the assumption that workers do not increase their working skills due to experience or tenure, but only through specific on-the-job training.

sector.[12] The price of Y is normalized to one. Furthermore, we assume that the informal sector does not use capital to produce capital. This assumption, although extreme, is reasonable since empirical evidence shows that the informal sector generally has a very low capital-labor ratio.

In producing Y, the private sector employs three different inputs: skilled labor services, H_p, physical capital services, K_p, and an intermediate good, I_p. H_p is defined as

$$H_p = N_p h_p (1-n_p). \tag{3}$$

As in the case of the informal sector, N_p represents the fraction of the population working in the private sector. The technology of the private sector can be represented as:

$$Y_p = K_p^{\alpha} I_p^{\beta} (A_p H_p)^{1-\alpha-\beta}, \tag{4}$$

where A_p is the technology-specific labor augmenting productivity parameter, $0<\alpha<1$, $0<\beta<1$, and $\alpha+\beta<1$. The parameter constraints imply that the production function exhibits constant returns to scale.

The intermediate good, I, is exclusively produced by the government using the following technology

$$I = A_I L H_I^{\gamma} K_I^{\chi}, \tag{5}$$

[12] Note that a firm that belongs to the informal sector, by definition, operates at small scale. We can think of this production function as the aggregate production function for the informal sector. Also, N_{IF} is a number between zero and one since it is the proportion of workers employed in the informal sector with respect to total labor force. Here the number of workers is equal to the labor services because the workers do not need any training and the level of basic skills is normalized to one.

where $0<\chi<1$, $0<\gamma<1$, and $\chi+\gamma<1$. A_I is the technology specific parameter, H_I is the skilled labor services,[13] K_I is the services from human capital, and L is a specific factor.[14] The presence of this specific factor allows us to explain the high productivity of the labor force and capital in this sector. We assume that this specific factor belongs to the government.[15] The production of this sector is demanded by the private sector, I_p.

The earnings of the typical agent come from three sources. First is w*ages*. The agents receive compensation for working in a firm in any of the three sectors. The wage of an agent depends on her level of human capital, h, and the sector in which she decides to work. Given that the present discounted value of lifetime earnings of agents is the same in the three sectors, agents are indifferent to working in any of them. The following relationship holds in equilibrium:

$$w_{pt}(1-n_{pt})h_{pt} = w_{It}(1-n_{It})h_{It} = w_{IFt}, \qquad (6)$$

where w_{it} is the remuneration in sector i at time t, $(1-n_{it})$ is the time spent working by the agent employed in sector i, and h_{it} is the level of human capital of the individual who works in sector i.[16]

Human capital is accumulated through the following law of motion

[13] H_I is defined in a similar way to H_p. Again N_I represents the fraction of the population working in the intermediate good sector.

[14] For example, in the case of the oil industry one can think of this specific factor as the readiness to extract oil.

[15] In reality, it is not the specific factor L that the government owns but the right to access to it. For example, the specific factor is the readiness to extract oil while the government owns the land. As a more specific example, in Venezuela the government owns the property rights to all the underground resources.

[16] Note that $i \in \{p, I\}$, the only sectors where training is important.

$$h_{i(t+1)} = (1-\gamma_i)h_{it} + B_i n_{it}^{\upsilon_i}, \quad (7)$$

where γ_i is the depreciation rate of the human capital accumulated by individuals working in sector i.

Individuals also receive income from *lump sum transfers*. The agents receive a per capita transfer from the government, τ. All the agents receive the same amount of transfer. Financing of these transfers is explained below. Finally, individuals have income from the *returns from savings*. In this economy, an individual divides her income between savings and consumption. Agents can only save in this economy through shares of capital assets. This implies that for the economy as a whole the total product is divided between consumption of Y and the investment in capital, X. Note that Y is used both for consumption and as a capital good. The law of motion for physical capital is

$$K_{t+1} = K_t(1-\delta) + X_t, \quad (8)$$

where δ is the depreciation rate of the capital stock, K_t and X_t are the capital stock and investment in period t, respectively, and K_{t+1} is the capital stock in period t+1. Physical capital is a homogenous good, and, since it is used in two sectors, the following identity holds for each period t:

$$K_t = K_{pt} + K_{It}, \quad (9)$$

where K_{pt} is the capital used by the private sector in period t, and K_{It} is the capital used in the intermediate good sector in period t.

As mentioned before, we assume that consumers derive utility only from the consumption of the final good, they have the same discount factor, ψ, and they also

have the same utility function for each period t, $u(c_t)$. We make standard assumptions about the intertemporal utility function,

$$\sum_{t=0}^{\infty} \psi^t u(c_t). \qquad (10)$$

In particular, the utility function is separable across periods, twice differentiable with continuous derivatives, monotone, and strictly concave. This last assumption is not stronger than the assumption of quasi-concavity of the utility function in a static model. It is a result of the fact that the summation of quasi-concave functions is strictly concave. In the model there is no labor-leisure choice. We assume that in every period the agents are working or receiving training.

Since our analysis is done at two steady states, the particular functional form of the utility function can be very flexible and only has to meet the assumptions described above. As we explain in section IV, none of the variables at the steady state depend on the particular form of the utility function or its derivatives. Another assumption regarding the individuals in our economy is that there is no growth of the population.

In this environment, the government performs three economic actions. First, the government produces the intermediate good. To do so, it hires qualified labor services and capital services. Note that the government has positive economic profits, Π_I because we use a production function that does not have constant returns to scale. Since it has the exclusive right to produce I, no other firm attempts to enter the market. Second, the government imposes a tax, t, per unit of labor services hired by the firms in the formal sector. This tax reduces the incentives of firms in the formal

sector to hire labor services and explains the existence of the informal sector. In a broader sense, t can be interpreted as the distortions present in the labor market that make hiring and firing a worker more expensive. Third, the government returns tax revenues back to consumers as lump-sum transfers. This guarantees that at any point in time the government budget is balanced.

These three functions are summarized in the budget constraint of the government:

$$tw_I H_I + tw_p H_p + \Pi_I = N\tau, \qquad (11)$$

where N is the total amount of persons in the economy, τ is the amount of lump sum transfers per head, and w_I and w_p are the remuneration to labor services in the intermediate-good sector and the private sector, respectively.

III. Competitive Equilibrium

III.1 Consumer Problem

The maximization problem of any consumer is a sequence problem. It can be described as follows:

$$\underset{c_t, K_{t+1}, h_{t+1}, n_t}{\text{Max}} \sum_{t=0}^{\infty} \psi^t u(c_t) \quad \text{subject to} \qquad (12)$$

$$c_t + k_{t+1} - (1-\delta)k_t = M_p w_{pt}(1-n_{pt})h_{pt} +$$

$$+ M_I w_{It}(1-n_{It})h_{It} + M_{IF} w_{IFt} + r_{pt}(k_t - k_{it}) + r_{it} k_{it} + \tau \qquad (13)$$

$$h_{p(t+1)} = (1-\gamma_1)h_{pt} + B_1 n_{pt}^{\upsilon_1} \qquad (14)$$

$$h_{i(t+1)} = (1-\gamma_2)h_{it} + B_2 n_{it}^{\upsilon_2}. \qquad (15)$$

Equation (13) is the consumer budget constraint. Its left-hand side describes the two possible uses of earnings, consumption and investment; the right-hand side accounts for all the possible sources of income, labor income and non-labor income. Non-labor income consists of government transfers and returns from savings. M_j is an indicator function that takes the value of 1 if the agent is working in sector j and 0 otherwise. Equations (14) and (15) are the laws of motion of human capital for the private sector and the intermediate sector, as explained before.

III.2 Firm Problem

In each sector, the goal of the firms is to maximize profits. The problem that they solve is not sequential, as in the case of the consumers. It is a static problem, and must be solved period by period. The maximization problems are given below for each of the three sectors.

III.2.1 Informal Sector

In order to maximize profits, firms in the informal sector choose N_{IF}, subject to the restriction that $N_{IF} > 0$. In particular, they solve the following problem:

$$\underset{\{N_{IF}\}}{\text{Max}}\ A_{IF}N_{IF} - w_{IF}N_{IF} \qquad \text{subject to} \qquad N_{IF} > 0. \qquad (16)$$

III.2.2 Private Sector

In the private sector, firms solve a similar static problem given the remuneration of labor, the rental rate of capital, and the price of the intermediate good, q, and subject to the restriction that K_p, H_p, I_p>0. Their maximization problem is:

$$\underset{\{K_p,H_p,I_p\}}{\text{Max}} K_p^{\alpha} I_p^{\beta} (A_p H_p)^{1-\alpha-\beta} - r_p K_p - (1+t) w_p H_p - q I_p \text{ subject to } K_p, H_p, I_p>0 \quad (17)$$

III.2.3 Public Sector

Taking the prices of the inputs as given and subject to the restriction that K_I>0 and H_I>0, the firms of the intermediate sector solve the following profit maximization problem:

$$\underset{\{K_I,H_I\}}{\text{Max}} qA_I L H_I^{\gamma} K_I^{\chi} - (1+t) w_I H_I - r_I K_I \qquad \text{subject to } H_I>0 \qquad (18)$$

III.3 Competitive Equilibrium

The competitive equilibrium in this economy is defined as follows:

1) Given the present value sequences for each of the prices in this economy and the present value sequence of the lump-sum transfer, a sequence of final goods maximizes the present discounted value of utility for each consumer.
2) Given a vector of prices in each period and a tax t, there is a profit-maximizing vector of inputs for each firm in each sector.
3) For all periods in all markets, price sequences are consistent with market clearing, resource constraints, and a balanced government budget.

Given all the restrictions imposed on the utility function, the technologies, and the budget constraint, the stationary equilibrium is unique.

IV. Stationary Equilibrium

The variables to be determined at the steady state are: r_p, r_I, h_p, n_p, h_I, n_I, w_p, w_I, w_{IF}, q, N_{IF}, H_p, K_p, H_I, and K_I. To solve this problem, we use the first order conditions derived from the consumer and firm problems and the restrictions faced by these two types of agents.

The first order conditions (FOCs) of the consumer problem are:

$$c_t : \psi^t u'(c_t) = \lambda_t^0 \tag{19}$$

$$K_{t+1} : \lambda_t^0 = \lambda_{t+1}^0[(1-\delta) + r_{p(t+1)}] \tag{20}$$

$$K_{I(t+1)} : \lambda_{t+1}^0(r_{I(t+1)} - r_{p(t+1)}) = 0 \tag{21}$$

$$h_{p(t+1)} : \lambda_t^1 = \lambda_{t+1}^1(1-\gamma_p) + \lambda_{t+1}^0 M_p w_{p(t+1)}(1-n_{p(t+1)}) \tag{22}$$

$$n_{pt} : \lambda_t^0 w_{pt} h_{pt} = \lambda_t^1 B_p \upsilon_p n_{pt}^{\upsilon_p - 1} \tag{23}$$

$$h_{I(t+1)} : \lambda_t^1 = \lambda_{t+1}^2(1-\gamma_I) + \lambda_{t+1}^0 M_I w_{I(t+1)}(1-n_{I(t+1)}) \tag{24}$$

$$n_{It} : \lambda_t^0 w_{It} h_{It} = \lambda_t^2 B_I \upsilon_I n_{It}^{\upsilon_I - 1} \tag{25}$$

Using equations (19) and (20), at the steady state we get

$$\frac{1}{\psi} = [(1-\delta) + r_p]. \tag{26}$$

At the steady state, equation (21) implies that:

$$r_p = r_I. \tag{27}$$

Using the human capital law of motion of the agents working in the private sector, we get

$$h_p = \frac{B_p}{\gamma_p} n_p^{\upsilon_p}. \tag{28}$$

Using equations (22), (23), and (28), the equations that determine the values of n_p and h_p at the steady state are:

$$n_p = \frac{\gamma_p \upsilon_p \psi}{[1-\psi(1-\gamma_p)][1+\gamma_p \upsilon_p \psi]} \tag{29}$$

$$h_p = \frac{B_p}{\gamma_p}\left[\frac{\gamma_p \upsilon_p \psi}{[1-\psi(1-\gamma_p)][1+\gamma_p \upsilon_p \psi]}\right]^{\upsilon_p} \tag{30}$$

Using the same procedure as before, but taking into account equations (15), (24), and (25), n_I and h_I, at the steady state are:

$$n_I = \frac{\gamma_I \upsilon_I \psi}{[1-\psi(1-\gamma_I)][1+\gamma_I \upsilon_I \psi]} \tag{31}$$

$$h_I = \frac{B_I}{\gamma_I}\left[\frac{\gamma_I \upsilon_I \psi}{[1-\psi(1-\gamma_I)][1+\gamma_I \upsilon_I \psi]}\right]^{\upsilon_I}. \tag{32}$$

The first order conditions of the maximizations problem of the firms in the private sector are:

$$K_p : \alpha K_p^{\alpha-1} I_p^{\beta} (A_p H_p)^{1-\alpha-\beta} = r_p \tag{33}$$

$$H_p : (1-\alpha-\beta) K_p^{\alpha} I_p^{\beta} A_p^{1-\alpha-\beta} H_p^{-\alpha-\beta} = w_p (1+t) \tag{34}$$

$$I_p : \beta K_p^{\alpha} I_p^{\beta-1} (A_p H_p)^{1-\alpha-\beta} = q. \tag{35}$$

The first order condition of the maximization problem of the firms in the informal sector is

$$N_{IF} : A_{IF} = w_{IF}. \tag{36}$$

The first order conditions of the maximization problem of the public sector firm are:

$$H_I : \gamma q A_I L^{\phi} H_I^{\gamma-1} K_I^{\chi} = w_I(1+t) \quad (37)$$

$$K_I : \chi q A_I L^{\phi} H_I^{\gamma} K_I^{\chi-1} = r_I \quad (38)$$

One can derive the wages for the different sectors using equations (29), (30), (31), (32), and (35), such that the equilibrium conditions for wages are:

$$w_{pt} = \frac{A_{IFt}}{(1-n_{pt})h_{pt}} \quad (39)$$

$$w_{It} = \frac{A_{IFt}}{(1-n_{It})h_{It}} \quad (40)$$

Dividing equation (38) by (39), we get the ratio of capital to labor services in the intermediate-goods sector:

$$\frac{K_I}{H_I} = \frac{\chi w_I(1+t)}{\gamma r_I}. \quad (41)$$

Dividing equation (36) by (37), we get the ratio of intermediate goods to labor services in the private sector:

$$\frac{I_p}{H_p} = \frac{\beta w_p(1+t)}{(1-\alpha-\beta)q}. \quad (42)$$

Dividing equation (35) by (33), we get the ratio of intermediate goods to capital in the private sector

$$\frac{I_p}{K_p} = \frac{\beta r_p}{\alpha q}. \quad (43)$$

Dividing equation (34) by (33), we get the ratio of capital to labor services in the private sector:

$$\frac{K_p}{H_p} = \frac{\alpha w_p(1+t)}{(1-\alpha-\beta)r_p}. \quad (44)$$

Equation (34) can be written as:

$$(1-\alpha-\beta)A_p^{1-\alpha-\beta}\left(\frac{K_p}{H_p}\right)^{\alpha}\left(\frac{I_p}{H_p}\right)^{\beta} = w_p(1+t). \quad (45)$$

Substituting equations (42) and (44) into (45), we get q as follows:

$$q = \beta\left(\frac{\alpha}{r_p}\right)^{\alpha/\beta}\left(\frac{A_p(1-\alpha-\beta)}{(1+t)w_p}\right)^{(1-\alpha-\beta)/\beta}. \quad (46)$$

Rewrite equation (37) as

$$K_I = \frac{\chi w_I(1+t)}{\gamma r_I}H_I. \quad (47)$$

Substituting equation (41) into (47) and reordering gives H_I such that

$$H_I = \left(\frac{\gamma q A_I L}{[w_I(1+t)]^{1-\chi}}\left(\frac{\chi}{r_I\gamma}\right)^{\chi}\right)^{1/(1-\gamma-\chi)}. \quad (48)$$

Substituting equation (47) into (48), one can solve for K_I. I_p can be obtained by substituting equations (47) and (48) into the technology of the intermediate-good sector and taking into account the equilibrium condition in the market for such a good, on $I=I_p$. To determine H_p and K_p at the steady state, rewrite equation (44) to get (49). Substituting equation (33) into (49), we get H_p, and substituting (50) into (49), we get K_p. N_p is obtained by dividing H_p by $h_p*(1-n_p)$. Using a smilar procedure one can get N_I:

$$K_p = \left(\frac{\alpha w_p(1+t)}{(1-\alpha-\beta)r_p}\right)H_p \quad (49)$$

$$H_p = \frac{I_p A_p^{(1-\alpha-\beta)/\beta}}{r_p^{\alpha/\beta}}\left[\frac{1-\alpha-\beta}{\alpha w_p(1+t)}\right]^{(1-\alpha)/\beta}. \quad (50)$$

V. Calibration

The expressions derived in Section IV for the unknowns of this economy, (r_p, r_I, h_p, n_p, h_I, n_I, w_p, w_I, w_{IF}, q, N_{IF}, H_p, K_p, H_I, and K_I,) are expressed in terms of the parameters of the model. In order to get specific numbers for these variables, we have to specify some values for the parameters. These values come from different sources, such as actual data from the Venezuelan economy, previous studies, and some facts of the Venezuelan economy that we want to replicate in the benchmark model. We also make several assumptions since we do not have any information about an aggregate function including sectors such as manufacture, services, and agriculture. The differences among the set of assumptions we use are the value of the labor and capital shares. As we describe below, for the benchmark case we assume that the labor share is greater than the capital share.

The discount factor, ψ, is selected by making its value consistent with an interest rate of 7 percent and a depreciation rate of physical capital, δ, equal to 6 percent. The value for the interest rate is higher than the one used in studies of the U.S. economy because the interest rate of government bonds in Venezuela is higher than that in United States. The value of δ is taken from Rebelo and Stockey (1995). In our model, the explicit relationship among δ, ψ, and r is given by equation (8).

The time that individuals devote to schooling in the private sector, n_p, is selected in order to match the average years of schooling, 5.5, of the Venezuelan population over 25 years of age.[17]

Using the n_p as calculated, rearranging equation (11), and using the assumed depreciation rate of human capital, we get the exponent of the technology to expand

[17] See Barro and Lee (1993).

basic skills, ν_p. γ_p is 4 percent, which is taken from Trostel (1993).[18] Using equation (12) and normalizing the value of B to one, we obtain h_p.

The remaining parameters A_p, A_I, and A_{IF} are set to match three key features of the Venezuelan economy. The oil sector produces 22.9 percent of total GDP in 1991, it employs 1.25 percent of the total labor force, and approximately forty-five percent of the employed people work in the informal sector.[19]

To get the specific values for these parameters, we take the following steps. First, we set N_{IF} =0.45.[20] Second, we set the value of the ratio H_p/H_I equal to 43 because the number of people employed in the private sector is forty three times greater than the number of people employed in the in the oil sector.[21] Finally, we set Iq/GDP=22.9 percent and use the wage equilibrium conditions to solve for A_p, A_I, and A_{IF}.

[18] Trostel takes this value of 4 percent from estimations by Heckman (1976), which are between 4 and 9 percent, and by Haley (1976), whose values range from less than 1 to 4 percent. In the next section we perform a sensitivity analysis of the model outcomes to this assumption, with two additional simulations for γ_p=2 percent and γ_p =6 percent.

[19] For the 1994-1998 period, the average size of the Venezuelan informal sector, as a percentage of the labor force was approximately 45 percent.

[20] Since N is normalized to one, that means that 45 percent of the labor force works in the informal sector.

[21] In our model $(H_p/H_I) = (N_p/N_I)$. Since N_{IF} =0.45, then N_p+N_I =0.55. Given that we want to replicate the fact that N_I =0.0125, then N_p/N_I=0.5375/0.0125=43.

TABLE 1

BENCHMARK CASE

SECTOR	% OF PEOPLE EMPLOYED
PRIVATE SECTOR	53.75
INTERMEDIATE GOOD SECTOR	1.25
INFORMAL SECTOR	45.00
INTERMEDIATE GOOD SECTOR GDP/ TOTAL GDP	22.90 %

Table 1 shows the outcomes from substituting the value of all parameters described in this section into the model. These are the steady states values for the benchmark model.

VI. Simulations

We analyze steady states, before and after we introduce shocks in the model. We do not study the transitional dynamics between these two equilibria. The five different shocks we simulate are shown in Table 2. The remainder of this section presents and analyzes the results for each case.

VI.1 CASE 1

As noted in Section I, the Venezuelan oil industry is currently expanding its production capacity from three million barrels per day to six million barrels per day. To simulate a shock like this, we increase the technology parameter of the production function of the intermediate good sector in such a way that the output of that sector is twice as much as before. Note that we are simulating the magnitude and direction of the shock, and not the specific manner in which the shock arises.

TABLE 2

SHOCKS

	CHANGE IN PRODUCTION				
CHANGE IN DISTORTIONS		**-50 percent**	**0**	**50 percent**	**100 percent**
	-33 percent	Case 11	Case 4	Case 8	Case 9
	0	Case 5	Baseline	Case 10	Case 1
	33 percent	Case 7	Case 6	Case 3	Case 2

The outcome of the base line case and the results from the other simulations are presented in Table 3. In Case 1 there is a reduction of 23 percentage points in the relative participation of the informal sector, in terms of employment. The increase in the relative participation of the formal sector is split in the following way: the relative weight of the private sector in the labor markets rises by 22.48 percentage points and the proportion of people employed in the intermediate sector increases by 0.52 percentage points. This is consistent with the fact that the oil sector is very capital intensive, so the increase of people employed in that sector will be very small.

TABLE 3

SIMULATIONS

SECTOR	BASELINE % OF PEOPLE EMPLOYED	CASE 1 % OF PEOPLE EMPLOYED	CASE 2 % OF PEOPLE EMPLOYED	CASE 3 % OF PEOPLE EMPLOYED	CASE 4 % OF PEOPLE EMPLOYED	CASE 5 % OF PEOPLE EMPLOYED
PRIVATE SECTOR	53.75	76.23	55.50	46.89	75.74	48.37
INTERMED GOOD SECTOR	1.25	1.77	1.26	1.07	1.80	0.96
INFORMAL SECTOR	45.00	22.00	43.24	52.04	22.46	50.67

SECTOR	CASE 6 % OF PEOPLE EMPLOYED	CASE 7 % OF PEOPLE EMPLOYED	CASE 8 % OF PEOPLE EMPLOYED	CASE 9 % OF PEOPLE EMPLOYED	CASE 10 % OF PEOPLE EMPLOYED	CASE 11 % OF PEOPLE EMPLOYED
PRIVATE SECTOR	41.66	34.84	84.26	88.31	64.22	56.24
INTERMED GOOD SECTOR	0.93	0.79	2.01	2.17	1.43	1.22
INFORMAL SECTOR	57.41	64.37	13.73	9.52	34.35	42.54

VI.2 CASE 2

In Case 2, we analyze the effects of the same positive shock explored in Case 1 combined with a 33 percent increase in the level of distortions in the labor market. Notice that an increase in distortions is an increase in the price of labor in the formal sector, keeping constant both the price of that input in the informal sector and the price of capital. The greater distortion can be thought of as an increase in the tax

differential of these two inputs and therefore as a rise in the tax wedge between these two sectors that changes the relative price between labor and capital and the relative price between the cost of labor in the formal and informal sector.

Under these assumptions, in the new steady state relative employment in the informal sector decreases by 1.76 percentage points. At the same time, the relative weight of the private sector in total employment of the economy rises by 1.75 percentage points and the proportion of people employed in the intermediate-good sector increases by 0.01 percentage points. The increase in distortions in the labor market acts in an opposite direction to the positive shock in the intermediate good-sector. It is worth highlighting that the theoretical justification for the informal sector deals with the presence of distortions in the economy, especially in the labor markets. This result is along the same lines of this explanation; that is, there is a positive correlation between the size of the informal sector and the size of the distortions.

VI.3 CASE 3

For case 3, we allow two shocks. First, we assume an increase in the productivity parameter that implies, without changing the distortions, an increase in the production of the intermediate good equal to 50 percent. Second, we assume an increase in distortions by 33 percent. As we can see, the increase in distortions outweighs the positive shock on the intermediate-good sector, and, participation in the informal sector rises by 7.04 percentage points. At the same time, the relative weight of the private sector in total employment of the economy decreases by 6.86

percentage points and the proportion of people employed in the intermediate-good sector diminished by 0.18 percentage points.

VI.4 CASE 4.

The outcomes derived from this case reinforce the results of the last two cases. After a reduction of the distortions by 33 percent with no shock in the intermediate-good sector, there is an increase in the relative weight of the private sector by 21.99 percentage points and a decline in the informal sector from 45.00 to 22.46 percent. Both changes are very similar to those in Case 1, which suggests that a reduction in distortions has similar effects as an increase in productivity. The decrease in distortions means a decrease in the price of labor in the formal sector relative to the price of that input in the informal sector. Incentives for the firms to create jobs in the formal sector increase as the distortions in the labor market become smaller.

VI.5 CASE 5.

Here we assume a reduction in the productivity parameter that implies, without changing the distortions, a decrease in production of the intermediate good equal to a 50 percent. As shown in Table 3, the percentage of people employed in the oil sector as a percentage of total employment decreases by 0.29 percentage points, and the negative shock on the oil sector reduces the proportion of people employed in the private sector by 5.38 percentage points.

VI.6 CASE 6.

In this case, we analyze the effects of an increase in distortions by 33 percent, keeping constant the productivity parameter of the production function. Under these assumptions, in the new steady state relative employment in the informal sector increases by 12.41 percentage points. At the same time, the steady state level of employment for the private sector decreases by 12.09 percentage points and employment in the intermediate-good sector decreases by 0.32 percentage points. As explained for Case 2, these results are determined by the incentive structure introduced by the distortions. The new steady state of employment in the informal sector is greater than in Cases 2 and 3 because for simulation 6 there is not a positive shock in productivity that compensates for the negative shock represented by an increase in distortions.

VI.7 CASE 7.

The outcomes derived from this case reinforce the results of Cases 5 and 11 with respect to changes in distortions, and from Cases 2, 3, and 6 respect to changes in productivity. This is an extreme negative scenario because it is based on the greatest reduction in productivity and the greatest increase in distortions. Therefore, we get the greatest increase at the steady state of employment in the informal sector, 19.37 percentage points relative to the baseline case, and the greatest decrease at the steady state of employment in the private sector (or 18.91 percentage points.)

VI.8 CASE 8.

In this simulation, we assume at the same time two shocks: a decrease in distortions equal to a 33 percent, and an increase in the production of the intermediate good equal to a 50 percent. Both shocks act in the same direction. In this case, the new steady state of relative employment decrease with respect to the baseline case by 31.27 percentage points. It is greater than the variation from Cases 4 and 11 because in Case 4 there is only one shock, and in Case 11 the shocks act in opposite directions.

VI.9 CASE 9.

As in Case 8, we analyze the effect of a reduction in distortions combined with an increase in the production of the intermediate good equal to 100 percent. Case 9 is an extreme positive simulation because we combine the greatest increase in production with the greatest reduction in distortions. Steady state employment in the informal sector registers the greatest decrease relative to the baseline case, or 35.48 percentage points. In addition, the steady state of employment in the intermediate good sector reaches its greatest value (2.17 percentage points.)

VI.10 CASE 10.

In this case, we assume an increase in production equal to 50 percent without any change in distortions. Participation in the private sector rises by 10.47 percentage points. At the same time, the relative weight of the informal sector in total

employment of the economy decreases by 10.65 percentage points, and the proportion of people employed in the intermediate-good sector rises by 0.18 percentage points.

VI.11 CASE 11.

In this simulation, we assume two shocks: a decrease in distortions equal to a 33 percent, and a decrease in the production of the intermediate good equal to a 50 percent. These two shocks act in opposite directions. The steady state of employment in the informal sector decreases by 2.46 percentage points, the percentage of people employed in the intermediate good sector falls by 0.03 percentage points.

VII. Sensitivity Analysis

We analyze the sensitivity of our results to changes in two parameters: the depreciation rate of human capital and the labor share. We decide to check the sensitivity of the outcomes of the model to changes in these two parameters because in the case of the depreciation rate of human capital, it was taken from studies that use data for the American economy, and in the case of the labor share, there are no estimates of this parameter for Venezuela.

a) *The depreciation rate of human capital*. In the baseline case, the value of γ_p is 4 percent. We perform two sets of simulations. For the first one, we use γ_p=2 percent, and for the other we assume that γ_p is 6 percent. The results are in Tables 4 and 5. They show the same trend as the outcomes in the five cases presented earlier.

b) *The labor share*. Recall that in the benchmark case the labor share was greater than the capital share. We perform two sets of simulations. For the first one, we assume that the labor share is equal to the capital share. For the second, we suppose that the labor share is smaller than the capital share. The results are in Tables 5 and 6. They have the same pattern as the outcomes of the cases studied before.

TABLE 4

SENSITIVITY ANALYSIS
CHANGE IN THE DEPRECIATION OF HUMAN CAPITAL
g_p=2%

	BASELINE	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5
SECTOR	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED
PRIVATE SECTOR	53.75	75.18	54.74	46.24	74.69	47.57
INTERMED GOOD SECTOR	1.25	2.82	2.01	1.70	2.87	1.58
INFORMAL SECTOR	45.00	22.00	43.25	52.06	22.44	50.85

	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11
SECTOR	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED
PRIVATE SECTOR	41.79	34.75	83.98	87.98	63.97	55.87
INTERMED GOOD SECTOR	1.41	0.91	3.23	2.78	1.98	2.09
INFORMAL SECTOR	57.00	64.34	12.79	9.24	34.05	42.04

TABLE 5

SENSITIVITY ANALYSIS
CHANGES IN THE DEPRECIATION OF HUMAN CAPITAL
g_p=6%

	BASELINE	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5
SECTOR	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED
PRIVATE SECTOR	53.75	76.68	55.83	47.16	76.18	49.96
INTERMED GOOD SECTOR	1.25	1.30	0.94	0.80	1.34	0.78
INFORMAL SECTOR	45.00	22.02	43.23	52.04	22.48	49.26

γ_p=6%

	CASE6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11
SECTOR	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED
PRIVATE SECTOR	41.79	34.89	85.21	88.37	64.29	56.35
INTERMED GOOD SECTOR	0.72	0.69	0.82	2.04	1.25	1.03
INFORMAL SECTOR	57.49	64.42	13.97	9.59	34.46	42.62

TABLE 6

SENSITIVITY ANALYSIS
CHANGES IN THE LABOR SHARE
a =35%

SECTOR	BASELINE % OF PEOPLE EMPLOYED	CASE 1 % OF PEOPLE EMPLOYED	CASE 2 % OF PEOPLE EMPLOYED	CASE 3 % OF PEOPLE EMPLOYED	CASE 4 % OF PEOPLE EMPLOYED	CASE 5 % OF PEOPLE EMPLOYED
PRIVATE SECTOR	53.75	75.70	56.84	45.82	72.74	46.16
INTERMED GOOD SECTOR	1.25	2.29	1.69	1.39	2.27	1.23
INFORMAL SECTOR	45.00	22.01	41.47	52.79	24.99	52.61

SECTOR	CASE 6 % OF PEOPLE EMPLOYED	CASE 7 % OF PEOPLE EMPLOYED	CASE 8 % OF PEOPLE EMPLOYED	CASE 9 % OF PEOPLE EMPLOYED	CASE 10 % OF PEOPLE EMPLOYED	CASE 11 % OF PEOPLE EMPLOYED
PRIVATE SECTOR	40.89	33.69	83.47	87.89	62.74	55.49
INTERMED GOOD SECTOR	1.13	0.89	2.13	2.38	1.59	1.37
INFORMAL SECTOR	57.98	65.42	14.40	9.73	35.67	43.14

TABLE 7

SENSITIVITY ANALYSIS
CHANGES IN THE LABOR SHARE
a =40%

	BASELINE	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5
SECTOR	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED
PRIVATE SECTOR	53.75	74.95	55.83	44.64	69.66	45.28
INTERMED GOOD SECTOR	1.25	2.60	0.94	1.87	2.90	2.01
INFORMAL SECTOR	45.00	22.45	43.23	53.49	27.44	53.71

	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11
SECTOR	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED	% OF PEOPLE EMPLOYED
PRIVATE SECTOR	40.37	33.02	83.01	87.53	61.97	54.03
INTERMED GOOD SECTOR	1.18	0.96	2.21	2.47	1.71	1.43
INFORMAL SECTOR	58.45	66.02	14.78	10.00	36.32	43.74

VIII. Final Comments

Given the data limitations, one can discuss the specific numbers we get for each case. Here we focus on the direction those exercises show. All cases taken together indicate two basic results.

First, the relationship between the level of distortions and the size of the informal sector is positive. Second, the relationship between a positive shock in the

formal sector and the number of people employed in the informal sector is negative. These results are worth highlighting because there is empirical evidence of a positive relationship between being poor and being in the informal sector. Rosenbluth (1994) shows that, excluding professionals and technicians from the informal sector, there are proportionately more people considered poor working in the informal sector than in the formal sector, in such countries as Argentina, Brazil, Mexico, Panama, Uruguay, Venezuela, Guatemala, and Paraguay. In Venezuela, Riutort (1999) documents that the growth of poverty and the growth of the size of the informal sector have been parallel processes.

In our model, we do not analyze poverty, but we study how some shocks affect the size of the informal sector. If our results were translated into the economic policy for Venezuela, a reduction in the level of distortions in the labor market would decrease the magnitude of the informal sector, and in that way the proportion of the population living in poverty would also decline. Rosenbluth divided the aforementioned countries into two groups according to the development modality: financial-modality countries and agricultural-modality countries, where all countries other than Guatemala and Paraguay belong to the first mode.[22] Rosenbluth finds that the agricultural-modality countries have a larger informal sector and a greater percentage of people working in the informal sector living in poverty than the countries in the second group. Since people from agricultural-modality countries have on average less schooling years than individuals from financial-modality countries,

[22] A financial-modality country is a country whose economy is based on the production of services. An agricultural-modality country is a nation whose economy is based on agriculture.

one policy to reduce the size of the informal sector might be subsidies to education. In the case of our model, a policy like this is implicitly taken into account because there is tuition subsidy of 100 percent. Here, the costs of education are exclusively foregone wages because individuals do not have to pay any tuition for receiving training. Our claim is that distortions in the labor market are the essential variable to explain the size of the informal sector.

Note that here we are considering only distortions in labor markets. There are no distortions in the market for physical capital. A branch of the neoclassical development theory emphasizes the role of distortions in capital markets as the main cause of differences in education, investment rates, and income among countries. In an environment of distortions to the investment in capital, Restuccia (1998) conducts a policy experiment of subsidies to education, and concludes that this policy does not compensate for negative effects that distortions impose on capital accumulation. Restuccia and Urrutia (1996) show that distortions, measured as the relative price of investment to consumption goods, explain 90 percent of the differences observed on the data in relative investment rates among countries. Chari, Kehoe, and McGrattan (1997) conclude that 80 percent of the international variability of income is due to differences in distortions on physical capital accumulation.

Bello (1999) showed the relationship between wage inequality among males and the size of the informal sector. In particular, this author showed that the size of the informal sector is important in explaining inequality in the two years in the study and that there is negative relationship between wage inequality and the size of the informal sector. The policy exercises performed in this chapter show a negative

relationship between the size of the informal sector and productivity shocks in the formal sector or the level of distortions in the labor market. Combining these results one can say that a way to reduce inequality is to reduce the level of distortions on the labor market. The liberalization of that market reduces the size of the informal sector and consequently decreases wage inequality. Further, following the neoclassical development theory, this policy has an additional effect on reducing wage inequality through the positive effects that it has on human capital accumulation. As shown in Bello (1999), education is an important variable explaining both the wage inequality in one year and the change in wage inequality over time.

REFERENCES

América Latina Frente a la Desigualdad, (1998), Progreso Económico y Social en América Latina**,** Washington, D.C.: Banco Interamericano de Desarrollo.

Barro, Robert and J. Lee, (1993), "*International Comparisons of Educational Attainment*," Journal of Monetary Economics, Vol. 32, pp. 363-394

Bello, Omar, (1999), "*Wage Inequality in Venezuela*." Mimeo. Department of Economics. University of Colorado, July.

Chari, V.V., Patrick Kehoe, and Ellen McGrattan, (1997) "*The Poverty of Nations: A Quantitative Experiment*," Staff Report, Number 204. Federal Reserve Bank of Minneapolis.

Chaudhuri, Tamal Datta, (1989), *"A Theoretical Analysis of the Informal Sector*," World Development, Vol. 17, pp. 351-355

Farmer, Roger, (1993), *The Macroeconomics of Self-Fulfilling Prophecies*. Cambridge, Massachusetts: The MIT press.

Fields, Gary (1975), "*Rural Urban Migration, Urban Unemployment and Underemployment and Job-Search Activity in LDCs*," Journal of Development Economics, Vol. 2, pp. 165-188

Ghersi, Enrique, (1997), *"The Informal Economy in Latin America*," Cato Journal, Vol. 17, pp. 99-108

Haley, William, (1976), *"Estimation of the Earnings Profile from Optimal Human Capital Accumulation*," Econometrica, Vol. 44, pp. 1223-1238

Harris, J. R. and M. Todaro, (1970), "*Migration, Unemployment, and Development: A Two-Sector Analysis*," American Economy Review, Vol. 60, pp. 126-142

Heckman, James, (1976), "*A Life-Cycle Model of Earnings, Learning, and Consumption*," Journal of Political Economy, Vol. 84, pp. S11-S44

Loayza, Norman (1996), *"The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America*," Carnegie-Rochester Conference Series on Public Policy, Vol. 45, pp. 129-162

Lucas, Robert, (1988), *"On the Mechanics of Economic Development*," Journal of Monetary Economics, Vol. 22, pp. 3-42

Mazumdar, D, (1976), *"The Urban Informal Sector*," World Development, Vol. 4, pp. 655-679

Peattie, L, (1987), *"An Idea in Good Currency and How it Grew: The Informal Sector*," World Development, Vol. 15, pp. 851-860

Prebisch, Raúl, (1976), "*A Critique to Peripheral Capitalism*," CEPAL Review, Vol. 1.

Rauch, James, (1991), "*Modelling the Informal Sector Formally*," Journal of Development Economics, Vol. 35, pp. 33-47

Restuccia, Diego, (1998), *"Technology Adoption and Schooling: Amplifier Income Effects Across Countries,"* Mimeo. Department of Economics. University of Western Ontario, December.

Restuccia, Diego, and Carlos Urrutia (1996), *"Income Disparity Across Countries: The Role of Investment Distortions,"* Mimeo. Department of Economics. University of Minnesota, July.

Rosenbluth, Guillermo, (1994), Cepal Review, *"The Informal Sector and Poverty in Latin America,"* 52, pp. 155-175

Saint-Paul, Gilles, (1996), *Dual Labor Markets*: A Macroeconomic Perspective. Cambridge, Massachusetts: The MIT Press.

Stokey, Nancy and Sergio Rebelo, (1995), *"Growth Effects of Flat-Rate Taxes*," Journal of Political Economy, Vol. 103, pp. 519-550

Todaro, M., (1969), "*A Model of Labor Migration and Urban Unemployment in Less Developed Countries*," American Economy Review, Vol. 59, pp. 138-148

Tokman, Victor, (1989), "*Policies for a Heterogenous Informal Sector in Latin America*," World Development, Vol. 17, pp. 1067-1076

Toro-Hardy, José, (1994), *Oil: Venezuela and The Persian Gulf*, Caracas, Venezuela: Editorial Panapo.

Trostel, Phillip, (1993), "*The Effect of Taxation on Human Capital*," Journal of Political Economy, Vol. 101, pp. 327-350