

The Effects of Inequality on the Dynamics of the Informal Economy

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Abstract

Recent data gathered by the World Bank show that informal markets are present all over the world, but particularly in (developing and developed) countries with high levels of inequality. The aim of this paper is to analyse whether this apparent empirical link between inequality and the size of the informal markets has any theoretical foundation. For this, the paper develops a model for the occupational choice of individuals in the presence of informal markets, which are defined as markets in which economic activities evade taxation and governmental regulation. The model shows the higher the initial level of inequality is the higher the size of the underground economy will be. With high levels of inequality, there are few people that are able to afford to set up business in the formal sector and instead they prefer to set up business at a small scale in the informal sector with lower costs and avoid taxation. For this reason, at early stages of development, informal and formal markets can coexist, but the model shows that in the long run the size of the informal economy can decline to a negligible size, depending on the initial distribution of wealth and the parameters of the economy (taxes and entry costs to the formal economy). The lower the initial wealth inequality and the better the business conditions, the more incentives informal entrepreneurs have to formalize their business given that this would imply gaining access to formal credit markets that would allow them expand further their business at lower interest rates than the ones found in the informal market. The results of the model are calibrated using numerical simulations. Evidence on the impact of inequality on the size of the informal market is also presented for 99 countries.

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1 Introduction

Informal markets are present all over the world, particularly in developing countries. The 2003 “Doing Business” database of the World Bank¹ show that Latin America and Sub-Saharan, the two most unequal regions in the world, have the largest informal economies. On average there is a correlation of 0.25 between the size of the informal economy and inequality in developing countries, while this correlation is -0.14 in developed countries. This fact has not been investigated in the economic literature.

The current economic literature has so far identified public policy and corruption as likely causes of the existence of the informal economy (Loayza, 1996; Johnson et al, 1997 and Johnson et al, 1998). However, there has not yet been an exhaustive theoretical analysis either of the dynamics of the informal economy, or of whether its size is related to inequality and the dynamics of development. This article develops a mathematical model that addresses these issues.

In the model each individual lives for two periods. At the beginning of the first period each individual faces an occupational choice problem. Individuals decide whether to become entrepreneurs, or workers, either in the formal or in the informal economy. The entrepreneurs maximize the size of their firm according to their initial wealth and the credit they can get. Credit can be acquired in the formal credit market, if entrepreneurs are registered with the tax authorities. To register with the tax authorities, entrepreneurs need to pay a registration fee and taxes on profits and labour. Otherwise, credit can be obtained in the informal credit market, but at higher interest rates.

Despite the simplicity of this model, it shows that although an economy at early stages of development might simultaneously have formal and informal economies, in the long run it can reduce the size of the informal economy and even eradicate it. This depends on the initial wealth distribution. If there are enough entrepreneurs with wealth such that they set up businesses in the informal sector at medium scale, in the long run, the expansion of their scales of production will lead to higher demand for labour, higher salaries and eventually the formalisation of their businesses. Given the higher costs of credit in the informal market, the incentive to set up business in the formal sector increases with the size of the firm.

¹The 2003 “Doing Business” database of the World Bank, in addition to providing data on the size of the underground market also provides indicators of the regulation for starting a small/medium-sized firm, credit market information, employment regulations, court efficiency and regulation for closing a business (bankruptcy).

The model also explains why at early stages of development, the higher the inequality is the larger the informal economy will be. At high levels of inequality there is a smaller number of entrepreneurs in the formal sector and therefore little competition in the labour market, which is reflected in low salaries. Potential workers prefer to set up business in the informal sector than earn the low salaries offered. It is only when entrepreneurs (in the formal and informal sector) start expanding their scales of production that salaries will rise, reducing the gap between the earning of a worker and an entrepreneur. This will be reflected in a decrease in inequality. If the expansion in scales of production is such that it becomes more profitable for entrepreneurs to formalize business then eventually the informal markets will shrink. This model is calibrated with three numerical examples which give some insight into the number of initial entrepreneurs required to accelerate the formalisation of the economy.

The issues introduced are analysed in six sections. Specifically, section 2 discusses the definition of the informal economy and the current economic literature on this subject. Section 3 presents the model. Section 4 presents numerical examples. Section 5 summarizes the conclusions of the article.

2 Literature Review

The United Nations in 1993 suggested an international definition of the informal economy², with the view to incorporate it into the national account statistics. This market was described as consisting of units that provide goods or services with the aim of creating jobs and income for the individuals implicated. These units are characterised by very low levels of organization, with little or no division between labour and capital, working at small scale. The labour relationships, if present, are based generally on an occasional job basis, and a family, personal or social relationship, rather than on labour contracts with any sort of formal warranties.

Although this definition is a useful attempt to describe the activities included in the informal economy, these activities have many faces that vary across countries and over time. For this reason these activities have been described in many ways, such as parallel, residual, illegal, informal, unofficial, black, curb, shadowed, subterranean and informal activities³. As a result, there is yet no international consensus on whether activities such as street vending,

²UNDP (1993), National Accounts Systems, Brussels.

³For a survey on the topic see Schneider and Enste (2000).

common in developing countries, should be conceived as part of the informal economy or as illegal activities such as drug dealing, trading with stolen goods and the piracy of products. In addition to the difficulty of grasping the range of activities of the informal economy, further problems arise; current surveys show that the informal economy has managed to organise its operations under different kinds of labour and credit contracts and that for some people the informal economy no longer represents merely a temporary job⁴, but a secure and permanent source of income.

In this article the informal economy is defined as including economic activities that do not comply with the government-imposed taxes and regulations. This definition has been used in other work by De Soto (1989), Portes et al (1989) and Loayza (1996).

The current economic literature has focused on explaining the causes for the existence of the informal economy. Currently there are two main views on the subject. The first one suggests that the most important factors that make more likely the existence of the informal economy are rigid labour legislation, inefficient tax systems, corruption and high registration fees (Loayza, 1996; Johnson et al, 1997; Johnson et al, 1998).The second view argues that individuals who choose to work in the informal economy are constrained from public goods and services provided by the government (Loayza, 1996 and Johnson et al, 1998).

These two main theories do have empirical support. For instance, with respect to how informal markets can be constrained from services, table (1) presents some of the results on the 2003 Global Survey of Public Credit Registries in 64 countries⁵ carried out by the World Bank. The data show that banks do require information from firms that would be very difficult for entrepreneurs working in the informal market to present. For example, in 60.9% of the countries analysed banks collect the taxpayer ID from the firm and 46% of the countries analysed the banks may distribute to individuals, firms or governmental institutions the taxpayer ID.

Given that entrepreneurs in the informal sector are constrained from formal sources of credit, what would it cost them to formalise their business? The 2003 “Doing Business” database of the World Bank includes information on the bureaucratic and legal procedures involved in incorporating and registering an average small, or medium-sized company into

⁴Heikki and Jose A. Pegan (2001) using the National Mexican Survey of Microenterprises conducted by INEGI, found that 66% of microenterprise owners entered the sector to stay permanently and 21.2% plan to expand their current size of operations. About 54% of these microenterprises can be considered as part of the underground economy, by not complying with tax regulations.

⁵This survey is also part of the 2003 “Doing Business” database.

the formal economy across 133 countries.

The data show that the economies surveyed differ significantly in the way they regulate the entry of new businesses. For instance, in Latin America and the Caribbean entrepreneurs can expect to go on average through 12 steps to launch a business over 74 days, and the amount that entrepreneurs must deposited in a bank before registration starts is equal to 68% of gross national income (GNI) per capita. These regions happen to have the largest informal economies, and highest levels of inequality⁶.

Economy	Underground Economy (%GNI)	Gini	Number of Procedures	Duration (days)	Min. Capital (% of GNI)	Employment Laws Index	Private Bureau Coverage (borrowers per 1000 capita)
East Asia & Pacific	24.3	41.7	8	66	68.0	45	107.8
Europe & Central Asia	37.7	32.5	10	48	123.9	57	38.6
Latin America & Caribbean	41.5	50.9	12	74	85.6	61	196.6
Middle East & North Africa	27.5	36.1	11	50	410.2	48	14.9
OECD: High income	16.8	31.1	6	30	61.2	45	443.5
South Asia	35.7	34.7	8	44	86.1	49	1.8
Sub-Saharan Africa	42.3	45.9	11	73	237.6	52	36.3

Source: 2003 Doing Business Database, World Bank (2003).

Table 2: Regional Statistics for the Underground Economy, Inequality and Business Environment

Although the theoretical literature has found empirical support, there is still more to be done particularly in three issues. Firstly, it is necessary to assess what are the real costs and penalties that individuals face working informal. Secondly, it is important to understand why despite these costs, the informal economy represents an alternative source of income for a large proportion of the population in developing countries. Thirdly, it is essential to study the dynamics of the informal economy and specifically whether its dynamics are related to the dynamics of development and inequality.

⁶The size of the informal economies in Africa, Asia, Transition countries and Latin America were estimated according to the physical input (electricity) method, the currency demand and the DYMIMIC (dynamic multiple-indicators multiple-causes) approach. In the OECD countries the size of the informal economies was estimated using the currency approach. The physical input estimates the size of the informal economy by subtracting the estimates of official GDP from the overall electricity consumption. The DYMIMIC model measures the informal economy as an unobserved variable. The currency demand method estimates econometrically the demand for currency, the excess increase in currency is attributed to an increase in the size of the informal economy.

The next section presents a model that aims to capturing the main constraints that entrepreneurs face in the informal and the formal markets, the main objective of the model is to study the dynamics of the informal economy and specifically whether its dynamics are related to the dynamics of development and inequality.

3 The Model

There is a constant population, N , of two-period lived individuals belonging to generations of altruistic families. Individuals in each generation receive a bequest from their parents, b , and choose an occupation during the first period of life. During the second period of life individuals consume, x . The proportion consumed from their wealth, $(1 - \beta)$, is assumed to lie between 0 and 1. The utility preferences over consumption and bequest, $U(x, b)$, are expressed in eq.(1).

$$U(x, b) = (1 - \beta) \log x + \beta \log b \quad (1)$$

Individuals choose the occupation that maximises their utility subject to their wealth constraint. The occupational choices are to become either an entrepreneur, or a worker, or unemployed. It is assumed that except for the entrepreneurial activity, the rest of the occupations do not require any starting up investment to enrol in economic activity.

The economy is a one good world that can be produced either in the formal sector, A , or in the informal sector, B . In sector A , the government requires entrepreneurs to register with the tax office, which implies paying a fixed registration fee⁷ F . It also implies paying a tax rate τ^p proportional to the returns of the firm and a tax rate τ^s proportional to the salary of workers.

A worker earns a net salary $s^A(1 - \tau^s)$ if hired in sector A . In sector B , a worker earns a salary s^B and evades taxes. Nevertheless, entrepreneurs in sector B offer salaries that equal the net salary in sector A . Therefore, the net salary in both sectors is the same, $s^B = s^A(1 - \tau^s)$. An unemployed person does not receive an unemployment benefit. However, it is assumed that unemployed people using their labour are able produce some fixed amount γ , to remain in subsistence. This amount is not liable to taxes.

⁷This registration fee could be interpreted as a bureaucratic administrative registration fee, or the fee charged by notaries.

Entrepreneurs at time t use all their initial wealth w_i , to cover the costs associated with acquiring the machinery for setting up business. It is assumed that the only technology available in the economy is a Leontief production function in the sense that it uses two input factors, capital and labour which are not substitutable. The rigidity of this production function is given by the fact that although in the aggregate the economy might choose to specialise in labour or capital, for an entrepreneur there is a limit to this specialisation in one of these inputs.

In sector A , machinery must be acquired at time t , at a fixed cost σ plus a variable cost $\alpha_i^A \sigma$ that depends on the scale of production, α_i^A . The machinery depreciates, such that the net value of the machinery at time $t + 1$ is $c(\sigma + \alpha_i^A \sigma)(1 + r)$, where c is the proportion left after depreciation, and $(1 + r)$ is the discount factor. The project at time $t + 1$ yields a return ρ times the scale of the firm α_i^A . Given the initial wealth, the maximum scale of production an entrepreneur can set up is $\widehat{\alpha}_i^A$ in eq.(2). An entrepreneur does not have incentives to invest in machinery an amount smaller than his initial wealth, given that there is no risk in this economy and it is assumed that the returns of running the project ρ are higher than the returns to saving $(1 + r)$.

$$w_i = F + \sigma + \widehat{\alpha}_i^A \sigma \quad (2)$$

On the other hand, entrepreneurs in sector B need to acquire machinery at a fixed cost σ , plus a variable cost $\alpha_i^B \sigma$ that depends on the scale of production, α_i^B . The machinery depreciates at the same rate as in sector A . The project at time $t + 1$ yields a return ρ times the scale of the firm α_i^B . The maximum scale of production when the entrepreneur invests all his wealth is $\widehat{\alpha}_i^B$.

$$w_i = \sigma + \widehat{\alpha}_i^B \sigma \quad (3)$$

In both sectors, the scale of production can be increased if the entrepreneur gets a loan.

3.1 Credit Markets

Banks in the formal credit sector require borrowers to be registered with the tax office. Banks offer a loan contract conditional on borrowers providing a collateral, which can only be machinery. Wealth is not collateralisable, given that it is a liquid asset and that entrepreneurs

can easily run away with it. Then an entrepreneur will offer as a collateral the property rights of his machinery, $\sigma + \widehat{\alpha}_i^A \sigma$, which is in fact the value of his initial wealth less the cost of the registration fee F . It is assumed that the interest rate, r is fixed over time. The underlying assumption is that the economy analysed is a small economy subject to international interest rates that remains fixed over time.

$$w_i - F = \sigma + \widehat{\alpha}_i^A \sigma \quad (4)$$

At time t the maximum value of the loan L_i^A is equal to or smaller than the value of the collateral, eq.(5).

$$L_i^A \leq \sigma + \widehat{\alpha}_i^A \sigma \quad (5)$$

Once the project is set up and makes profits the entrepreneur could try to default on the repayment of the loan $(1+r)L_i^A$, given that the collateral has depreciated and at $t+1$ is just worth $c(\sigma + \widehat{\alpha}_i^A \sigma)(1+r)$.

To prevent this, banks impose an ex post liability constraint to increase the expected cost of default. It is assumed that banks will seize the total value of the depreciated collateral. An entrepreneur will honour the loan if the cost of the loan is less than or equal to the net value of the collateral at time $t+1$.

$$(1+r)L_i^A \leq c(\sigma + \widehat{\alpha}_i^A \sigma)(1+r) \quad (6)$$

From eq.(4) $\sigma + \widehat{\alpha}_i^A \sigma$ is equal to $w_i - F$, hence the loan L_i^A is equal to,

$$L_i^A = c(w_i - F) \quad (7)$$

An entrepreneur with an initial wealth, w_i and the loan L_i^A will run the project at a scale α_i^A , which is greater than $\widehat{\alpha}_i^A$, the scale of the project the entrepreneur would have run without the loan.

$$w_i - F + L_i^A = \sigma + \alpha_i^A \sigma \quad (8)$$

Solving for the scale α_i^A , the optimum scale of the project is given by,

$$\alpha_i^A = \frac{w_i - F + L_i^A - \sigma}{\sigma} \quad (9)$$

Substituting L_i^A , the optimal scale is,

$$\alpha_i^A = \frac{(w_i - F)(1 + c) - \sigma}{\sigma} \quad (10)$$

Banks will advance loans to individuals whose collateral is positive, regardless of the size of the scale of production. This is because it is assumed that even if the entrepreneur makes losses banks will always get hold of the collateral provided.

The net returns η_i^A of entrepreneurs with loan L_i^A in sector A are determined by the net returns of the scale of production $\alpha_i^A \rho(1 - \tau^\rho)$ plus the value of the depreciated machinery $c(\sigma + \alpha_i^A \sigma)(1 + r)$, minus the salary bill $\alpha_i^A s^A$ and minus the repayment of credit $(1 + r)L_i^A$.

$$\eta_i^A = \alpha_i^A \rho(1 - \tau^\rho) + c(\sigma + \alpha_i^A \sigma)(1 + r) - \alpha_i^A s^A - (1 + r)L_i^A \quad (11)$$

Entrepreneurs in sector A , will require loans only if the project yields higher returns than the net return of other possible occupation. For instance the returns η_i^A need to be equal to or higher than the earnings of a worker, given by his disposable salary $s^A(1 - \tau^s)$ plus savings $w_i(1 + r)$,

$$\eta_i^A \geq w_i(1 + r) + s^A(1 - \tau^s) \quad (12)$$

Substituting η_i^A eq.(11), α_i^A eq.(10) and L_i^A eq.(5) into eq.(12), the initial wealth w_i , has to be equal to or greater than a wealth threshold w^A (see eq.(13)) to obtain returns η_i^A higher than workers' return,

$$w_i \geq \frac{S - F\left(\frac{1+c}{\sigma}\right)s^A - s^A\tau^s}{Q - \left(\frac{1+c}{\sigma}\right)s^A} = w^A \quad (13)$$

where $Q = \frac{1+c}{\sigma}\rho(1-\tau^\rho) + (1+r)c^2 - (1+r)$, and $S = F\{c^2(1+r) + \rho(1-\tau^\rho)\left(\frac{1+c}{\sigma}\right)\} + \rho(1-\tau^\rho)$.

Another way to interpret eq.(12) is by solving for the maximum salary \bar{s}_i^A that the entrepreneur i can afford to pay in sector A and still have a higher return than workers.

$$s^A \leq \frac{w_i Q - S}{w_i \left(\frac{1+c}{\sigma}\right) - F\left(\frac{1+c}{\sigma}\right) - \tau^s} = \bar{s}_i^A \quad (14)$$

Entrepreneurs can evade the registration fee and taxes by not registering with the tax authorities, which will constrain them from access to formal credit markets. Nevertheless, entrepreneurs can borrow from the informal credit market.

The distinction between the formal and the informal credit markets is that the former has a competitive interest rate equal to r , whilst a lender in the informal credit market faces a positive extra cost, z , in keeping track of each borrower⁸. This “tracking” cost depends on the amount borrowed L_i^B . The lender will charge an interest rate r^B , where $r^B = r + z$.

$$r^B L_i^B = r L_i^B + z L_i^B \quad (15)$$

The lender will also ask for an illiquid collateral, such as machinery. The reason for not accepting wealth as a collateral is the same as that for banks in the formal credit sector; wealth is liquid and hence the entrepreneur could easily default paying back the loan. Therefore, at time t the informal lender will accept as a collateral the value of the machinery $\sigma + \hat{\alpha}_i^B \sigma$, where $\hat{\alpha}_i^B$ is the scale of the project the entrepreneur would have run without the loan.

$$L_i^B \leq \sigma + \hat{\alpha}_i^B \sigma \quad (16)$$

At time $t+1$ the cost of the loan is $(1+r+z)L_i^B$ and the discounted value of the collateral, taking into account depreciation, is $c(\sigma + \hat{\alpha}_i^B \sigma)(1+r)$. To prevent defaults the informal lender will collateralise a fraction e , from the starting up cost $\sigma + \hat{\alpha}_i^B \sigma$, where $e < c$. The fraction e is less than c reflecting the fact that given the illegality of the market, if the entrepreneur defaults, to seize the collateral the lender might incur an additional cost compared to banks, such as that of hiring bodyguards to ensure borrowers give up the collateral.

$$(1+r+z)L_i^B \leq e(\sigma + \hat{\alpha}_i^B \sigma)(1+r) \quad (17)$$

To simplify notation in eq.(17), define the ratio $\frac{1+r}{1+r+z}$ as κ . Then substituting $\sigma + \hat{\alpha}_i^B \sigma$ equal to w_i from eq.(3) and solving for L_i^B ,

⁸Another explanation for this additional cost z could be that lending aside regulations implies a risk of being caught and therefore the extra cost reflects a risk premium.

$$L_i^B = ew_i\kappa \quad (18)$$

With the loan L_i^B , the entrepreneur will run the project at a scale α_i^B , which is greater than $\widehat{\alpha}_i^B$, the scale of the project the entrepreneur would have run in sector B without a loan.

$$w_i + L_i^B = \sigma + \alpha_i^B\sigma \quad (19)$$

Substituting L_i^B , then the optimal scale α_i^B is expressed as follows,

$$\alpha_i^B = \frac{w_i(1 + e\kappa) - \sigma}{\sigma} \quad (20)$$

The lender in the informal sector will advance loans to entrepreneurs who provide a positive collateral, regardless of the scale α_i^B .

The net returns η_i^B of entrepreneurs with loan L_i^B in sector B are determined by the net returns of the scale of production $\alpha_i^B\rho$ plus the value of the depreciated machinery $c(\sigma + \alpha_i^B\sigma)(1 + r)$, minus the salary bill $\alpha_i^B s^B$ and the repayment of credit $(1 + r + z)L_i^B$.

$$\eta_i^B = \alpha_i^B\rho + c(\sigma + \alpha_i^B\sigma)(1 + r) - \alpha_i^B s^B - (1 + r + z)L_i^B \quad (21)$$

The individual will prefer to become an entrepreneur in sector B than a worker, if the project yields returns higher than the returns earned by a worker.

$$\eta_i^B \geq w_i(1 + r) + s^B \quad (22)$$

where the net salary of a worker s^B , is equal to $s^A(1 - \tau^s)$, the net salary in sector A .

Substituting η_i^B eq.(21), α_i^B eq.(20) and L_i^B eq.(18) into eq.(22), to obtain returns η_i^B higher than workers' return, the initial wealth w_i has to be equal to or greater than a wealth threshold denoted by w^B in eq.(23).

$$w_i \geq \frac{\rho}{V - \frac{(1+e\kappa)(1-\tau^s)s^A}{\sigma}} = w^B \quad (23)$$

where $V = \left(\frac{1+e\kappa}{\sigma}\right)\rho + (1 + r)[c - e + ce\kappa - 1]$.

Another way to interpret eq.(22) is by solving for the maximum salary \bar{s}_i^B that the entrepreneur i can afford to pay in sector B to get higher returns as an entrepreneur than as a

worker.

$$s_i^B \leq \frac{(w_i V - \rho)\sigma}{(1 + e\kappa)w_i} = \bar{s}_i^B \quad (24)$$

An additional consideration for potential entrepreneurs is the comparison of entrepreneurial returns in sector A and in sector B . Entrepreneurs will prefer to set up business in sector A only if they get equal or higher returns, hence only if $\eta_i^A \geq \eta_i^B$.

Substituting α_i^A , eq.(2) and L_i^A , eq.(5) into η_i^A in eq.(11) then substituting α_i^B , eq.(3) and L_i^B , eq.(18) into η_i^B in eq.(21) and solving for the initial wealth w_i , the entrepreneur will get higher profits in sector A , if the initial wealth is greater than or equal to a wealth threshold denoted by w^{AB} in eq.(25) ,

$$w_i \geq \frac{H - s^A \left[\frac{F(1+c)}{\sigma} + \tau^s \right]}{M + s^A \left(\frac{e\kappa - c - \tau^s - \tau^s e\kappa}{\sigma} \right)} = w^{AB} \quad (25)$$

where $H = F \left\{ \frac{(1+c)}{\sigma} [\rho(1 - \tau^\rho) + c^2(1 + r)] \right\} - \rho\tau^\rho$ and $M = \left(\frac{1+c}{\sigma} \right) \rho(1 - \tau^\rho) + (1 + r)c^2 - \left(\frac{1+e\kappa}{\sigma} \right) (\rho + c\sigma(1 + r)) + e(1 + r)$.

The threshold of wealth w^{AB} in eq.(25) shows that if the registration fee F and the tax rates τ^ρ and τ^s are equal to zero, entrepreneurs will always get higher profits in sector A . Depending on the parameters of the economy, w^{AB} could be such that for no individual in the economy is it profitable to become an entrepreneur in sector A , for instance if taxes on entrepreneurial returns are such that entrepreneurs get no profits or lower profits than if they were in another sector or occupation.

The order of the different wealth thresholds in this occupational choice, w^A , w^B and w^{AB} , will depend upon the different parameters of the economy. It is more likely that in an economy the highest wealth threshold will be w^{AB} , since it would require that only the wealthiest entrepreneurs make more profits in sector A . The second highest wealth threshold is likely to be w^B , since individuals that were not as wealthy as to set up business in sector A still have enough wealth to set up a small or medium size business in sector B and still earn more returns than workers. Then, the lowest wealth threshold is likely to be w^A , since people with wealth below w^A do not have enough wealth to set up business in either sector.

If the order of wealth thresholds is the above mentioned, then to become an entrepreneur in sector B the initial wealth must lie in the range $w^B \leq w_i < w^{AB}$ and to become an entrepreneur in sector A , initial wealth must lie in the range $w_i \geq w^{AB}$.

3.2 Labour Market

It is assumed that workers supply inelastically one unit of labour and they can work for as many firms as they want as long as the total supply of labour does not exceed their labour unit endowment. The total demand for labour in sector A is denoted by D^A and is given by n^A number of firms. Equally, the total demand for labour in sector B is denoted by D^B and given by n^B number of firms.

The demand for labour D_i^A of entrepreneur i , will be equal to zero if the salary s^A is greater than \bar{s}_i^A , the maximum salary an entrepreneur can afford to pay in sector A . If the salary s^A is less than or equal to \bar{s}_i^A the demand for labour will be equal to the scale of production α_i^A . The total demand for labour in sector A , D^A will be equal to the sum of the individual demands of those entrepreneurs whose initial wealth is greater than w^{AB} .

$$D^A = \left\{ \begin{array}{ll} 0 & \text{if } s^A > \bar{s}_i^A \\ \int_{w^{AB}}^{\bar{w}} \alpha_i^A(w) W_t'(w) dw & \text{if } s^A \leq \bar{s}_i^A \end{array} \right\} \quad (26)$$

where $W_t'(w)$ is the density function of the wealth distribution at time t and \bar{w} is the maximum level of wealth in the economy.

The demand D_i^B of entrepreneur i is zero if the salary s^B , is higher than the maximum salary an entrepreneur can afford to pay in sector B , \bar{s}_i^B . It is assumed that in sector B the maximum net salary offered s^B is equal to the exit option of workers which is the net salary in sector A . If the salary s^B is less than or equal to $s^A(1 - \tau^s)$ the total demand D^B for labour will be the sum of the individual demands for labour of the entrepreneurs with wealth greater than w^B but lower than w^{AB} . Entrepreneurs with initial wealth higher than w^{AB} obtain more profits in sector A , and individuals with initial wealth lower than w^B will obtain higher profits if they become workers.

$$D^B = \left\{ \begin{array}{ll} 0 & \text{if } s^B > \bar{s}_i^B \\ \int_{w^B}^{w^{AB}} \alpha_i^B W_t'(w) dw & \text{if } s^B \leq \bar{s}_i^B \end{array} \right\} \quad (27)$$

The total supply of labour denoted by Z , will take the value of zero if the current net salary is less than γ , the return to being unemployed. The supply will be positive as long as the net salary in either sector is equal to or higher than γ , and everyone in the economy will be willing to supply labour if the salaries are above \bar{s}_j , which is the highest salary that the wealthiest entrepreneur in the economy is willing to pay.

$$Z = \begin{cases} 0 & \text{if } s^A(1 - \tau^s) < \gamma \\ \int_{\underline{w}}^{w^B} W'_t(w)dw & \text{if } s^A(1 - \tau^s) \geq \gamma \end{cases} \quad (28)$$

where $W'_t(w)$ is the density function of the wealth distribution and N is the population in the economy.

As the following figure shows, in equilibrium $s^B = s^A(1 - \tau^s)$. As long as there are entrepreneurs in sector A , the salary paid in sector B will be equal to the net salary paid in sector A . If there are no entrepreneurs in sector A , the prevailing salary in sector B will be determined purely by the demand D^B and labour supply Z . In order to guarantee that there will be individuals willing to become workers in either of the sectors the following assumptions are introduced

Assumption 1 *The returns of unemployed individuals γ are strictly smaller than the maximum equilibrium salary entrepreneurs are willing to offer, \bar{s}_i^A or \bar{s}_i^B .*

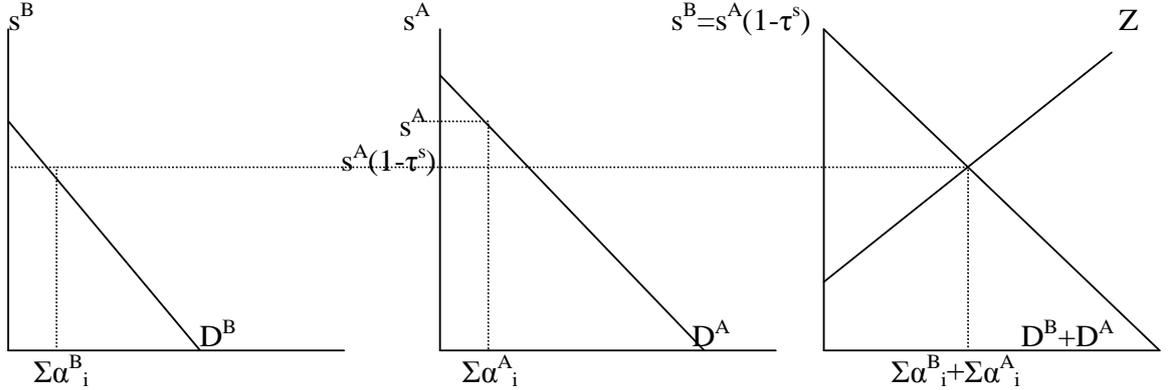


Figure 1: The Labour Market

Assumption 2 *If the demand for and supply of labour are equal the equilibrium salary will make individuals indifferent between becoming workers and entrepreneurs.*

If it is the case that the supply of labour is greater than the demand for labour, $Z \geq D^A + D^B$ there is an excess supply at the current salary. Given that the salary s_t^A and hence s_t^B are endogenously determined in the model, the salaries will adjust to reduce or clear if possible, the excess supply or demand for labour.

3.3 Dynamics of Distribution of Wealth

The idea of the dynamics of wealth distribution in this model is that if we were to measure the change in the number of individuals in each occupation and the evolution of their earnings, we could analyse how these two look given an initial distribution of wealth $W_t(w)$ and then follow the dynasties of each individual.

One can analyse the distribution of wealth of dynasties by looking at the distribution of bequests. The bequest or the future starting wealth of the offspring of unemployed individuals is a proportion β of the sum of savings $w_{u,t}(1+r)$ and the subsistence earning γ .

$$w_{u,t+1} = \beta\{w_{u,t}(1+r) + \gamma\} \quad (29)$$

The future starting wealth of the offspring of workers in either sector A or B is denoted by $w_{w,t+1}$ which is the proportion β of the sum of savings $w_{w,t}(1+r)$ and the net salaries obtained in either of the sectors $s_t^A(1-\tau^s) = s^B$, and provided that provided that $w_t \leq w^B$.

$$w_{w,t+1} = \beta\{w_{w,t}(1+r) + s_t^A(1-\tau^s)\} \quad (30)$$

The future starting wealth of the offspring of entrepreneurs in sector A is the proportion β of the returns of being an entrepreneur in sector A , η^A .

$$w_{e,t+1}^A = \beta\{\alpha_t^A(\rho(1-\tau^\rho) - s_t^A) + c(\sigma + \alpha_t^A\sigma)(1+r) - (1+r)L_t^A\} \quad (31)$$

The future starting wealth of the offspring of an entrepreneur in sector B is the proportion β of the returns of being an entrepreneur in sector B , η^B .

$$w_{e,t+1}^B = \beta\{\alpha_t^B(\rho - s_t^B) + c(\sigma + \alpha_t^B\sigma)(1+r) - (1+r+z)L_t^B\} \quad (32)$$

Substituting the values of α_t^A , L_t^A , α_t^B and L_t^B in eq.(31) and eq.(32) respectively, the future starting wealth of the offspring of entrepreneurs in sector A is,

$$w_{e,t+1}^A = \beta\{w_t\mu_t - \delta_t\} \quad (33)$$

$$\mu_t = \left(\frac{1+c}{\sigma}\right)(\rho(1-\tau^\rho) - s_t^A) + (1+r)c^2$$

$$\delta_t = F[(1+r)c^2 + \frac{(1+c)}{\sigma}(\rho(1-\tau^\rho) - s_t^A)] + (\rho(1-\tau^\rho) - s_t^A).$$

The term $\mu_t > 0$ and $\delta_t > 0$, since $s_t^A < \rho(1-\tau^\rho)$ given that the salaries are endogenously

determined to have a positive return in sector A and that $c > 0$. In addition, $w_t \geq w^{AB}$.

The future starting wealth of the offspring of entrepreneurs in sector B is,

$$w_{e,t+1}^B = \beta\{w_t\hat{\mu}_t - \hat{\delta}_t\} \quad (34)$$

$$\hat{\mu}_t = \left(\frac{1+e\kappa}{\sigma}\right)(\rho - s_t^A(1 - \tau^s)) + (1 + r)(c - e + ce\kappa)$$

$$\hat{\delta}_t = \rho - s_t^B.$$

The term $\hat{\mu}_t > 0$ and $\hat{\delta}_t > 0$, since $s_t^A(1 - \tau^s) = s_t^B < \rho$ to have a positive return in sector B , and it has been assumed that $c > e$, where $c > 0$ and $e > 0$. In addition, $w^{AB} > w_t \geq w^B$.

The problem in analysing the dynamics of wealth in this model is to find whether the wealth of the dynasties in each occupation converges to a stable fixed point or whether wealth continuously expands over time. If we think of the relationship between w_t and w_{t+1} as $w_{t+1} = f(w_t)$ then the steady state occurs when w_{t+1} equals w_t , and we can call their common value \hat{w} . It is known that the conditions for the stability of the dynamics of linear recurrence relations with **constant coefficients** can be expressed by the following *Theorem 1*.

Theorem 1 *If \hat{w} is a fixed point of the first order recurrence equation $w_{t+1} = f(w_t) = R w_t + a$, then \hat{w} is a stable fixed point if $-1 < R < 1$ and an unstable fixed point if $R > 1$.*

Theorem 1 Proof. *Let v_t be the difference between w_t and \hat{w} . Then $v_t = w_t - \hat{w}$ and $v_{t+1} = w_{t+1} - \hat{w} = f(w_t) - \hat{w} = f(\hat{w} + v_t) - \hat{w}$.*

By Taylor's theorem it follows that

$$v_{t+1} \approx f(\hat{w}) + f'(\hat{w})v_t - \hat{w}.$$

But \hat{w} is a fixed point so $\hat{w} = f(\hat{w})$ and $f'(\hat{w}) = R$. Thus $v_{t+1} \approx R v_t$.

Since R is a constant, the error v_t decays to zero if $-1 < R < 1$. However if $R > 1$ the error v_t continuously increases. ■

To find the fixed points of earnings by occupation in this model, w_{t+1} is set equal to w_t . This process is carried out in the recursive relationship for the unemployed eq.(29), for workers, eq.(30), for entrepreneurs in sector A , eq.(33) and for entrepreneurs in sector B , in eq.(34). The fixed point for the unemployed is \hat{w}_u , for the workers \hat{w}_w , for the entrepreneurs in sector A \hat{w}_e^A and \hat{w}_e^B for the entrepreneurs in sector B .

$$\hat{w}_u = \frac{\beta\gamma}{1 - \beta(1 + r)} \quad (35)$$

$$\widehat{w}_w = \frac{\beta s^A (1 - \tau^s)}{1 - \beta(1 + r)} \quad (36)$$

$$\widehat{w}_e^A = \frac{-\beta \delta_t}{1 - \beta \mu_t} \quad (37)$$

$$\widehat{w}_e^B = \frac{-\beta \widehat{\delta}_t}{1 - \beta \widehat{\mu}_t} \quad (38)$$

Note that the fixed points \widehat{w}_u , \widehat{w}_w , \widehat{w}_e^A or \widehat{w}_e^B depend on the salaries, which depend on the distribution of wealth. Therefore the coefficients associated to how wealth changes over time, i.e. $(w_{i,t+1} - w_{i,t})$, are not constant and Theorem 1 therefore cannot be applied directly to analyse the dynamics of wealth distribution in this model. Therefore depending on the initial distribution of wealth W_t , the long run wealth distribution could converge to numerous different types of long run distributions. Nevertheless, under certain assumptions, Theorem 1 can shed light on the type of stability that each of the difference equations in this model can have.

Assumption 3 *The returns of individuals as entrepreneurs in either sector A or B are strictly higher than the returns they would earn being unemployed $\delta_t > \gamma$, $\widehat{\delta}_t > \gamma$, $\mu_t > (1 + r)$, $\widehat{\mu}_t > (1 + r)$, $\delta_t > 0$ and $\widehat{\delta}_t > 0$.*

Assumption 4 *A dynasty cannot become rich over time just by saving a fraction of its wealth $\beta(1 + r)w_{i,t}$. Therefore it will be assumed that $\beta(1 + r) < 1$.*

Assumption 5 *A dynasty of unemployed people cannot accumulate wealth over time sufficient to set up business in either sector A or B. Therefore, it is assumed that $\frac{\beta\gamma}{1 - \beta(1 + r)} < w^B$ $\frac{\beta\gamma}{1 - \beta(1 + r)} < w^{AB}$.*

Assumption 6 *The fixed point for workers' earnings lies below the wealth threshold to set up a business $w^B > \widehat{w}_w$ and $w^{AB} > \widehat{w}_w$, if salaries remain low over time $s_t^A(1 - \tau^s) = \gamma$.*

Assumption 7 *The fixed points for entrepreneurs' earnings in both sectors A and B are equal to or greater than the wealth threshold to set up business, $w^B \leq \widehat{w}_e^B$ and $w^{AB} \leq \widehat{w}_e^A$.*

If assumptions 1-6 are fulfilled then the long run distribution for each occupation can be characterised in the following propositions.

Proposition 1 *The long run earnings of workers and the unemployed are positive and stable if $\beta(1 + r) < 1$.*

Proof. *The earnings of unemployed and workers at time $t + 1$ are given by eq.(35)*

and eq.(36) respectively. Since the numerators of these equations are positive $\beta\gamma > 0$ and $\beta s^A(1 - \tau^s) > 0$, to have positive long run earnings, the denominator $1 - \beta(1 + r)$ must also be positive, therefore $\beta(1 + r) < 1$. Since the recurrence relation between w_{t+1} and w_t decays to zero only if $-1 < \beta(1 + r) < 1$, thus the fixed points are positive and stable if $\beta(1 + r) < 1$.

■

Proposition 2 *The long run earnings of entrepreneurs in sector A have a positive but unstable fixed point if $\beta\mu_t > 1$.*

Proof. The long run earnings for entrepreneurs in sector A are given by eq.(37). The numerator of this equation is negative since $-\beta\delta_t < 0$, $\beta > 0$ and $\delta_t > 0$. To secure a positive fixed point the denominator must also be negative which implies $\beta\mu_t > 1$, hence the fixed point for formal entrepreneur earnings is unstable. ■

Proposition 3 *The fixed point for earnings of entrepreneurs in sector B is positive, but unstable if $\beta\hat{\mu}_t > 1$.*

Proof. The long run earnings for entrepreneurs in sector B are given by eq.(38). The numerator of this equation, $-\beta\hat{\delta}_t < 0$ since $\beta > 0$ and $\hat{\delta}_t > 0$. To secure a positive fixed point the denominator must also be negative, which implies $\beta\hat{\mu}_t > 1$, hence the fixed point for entrepreneurs' earnings in sector B is unstable. ■

Propositions 1, 2 and 3 guarantee that the fixed points are positive and analyse their stability. In summary, those whose initial wealth is below $w_i < \hat{w}_e^B$ will become workers and their wealth will converge to $\hat{w}_w = \hat{w}_u$, that is assuming that $s^A(1 - \tau^s) = \gamma$. For entrepreneurs with initial wealth is in the range $w^B \leq w_i < \hat{w}_e^B$ being an entrepreneur in the informal sector represents merely a temporal occupation, as the United Nations has explained. In contrast for those entrepreneurs with wealth in the range $w_i > \hat{w}_e^B$ the informal sector represents a permanent occupation and these entrepreneurs will manage to expand their scales of production and eventually formalize their businesses.

Given that people whose wealth $w_i > \hat{w}_e^B$ expand their scale of production over time, this means that every period the offspring of these generations will receive larger bequests and will therefore further expand their scales of production, raising labour demand. Eventually this will lead to an excess demand for labour. If this is the case, the salaries will increase and for certain individuals that were entrepreneurs in the past, the rise in salaries will make it more attractive to become workers.

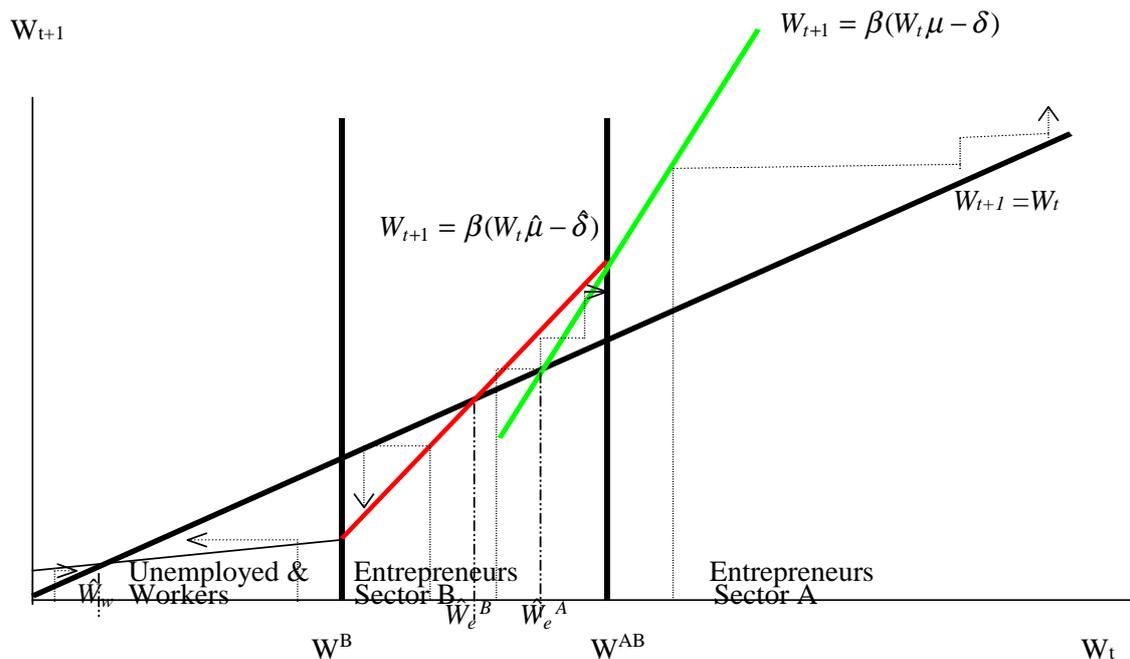


Figure 2: Dynamics of Wealth (Assuming $s^A(1 - \tau^s) = \gamma$)

Then, the increase in salaries will decrease the incentives to become an entrepreneur in either of the sectors. This will be reflected in a higher wealth threshold at which it is more profitable to become an entrepreneur. This will also affect the profitability of entrepreneurship, and fewer people will choose to remain entrepreneurs.

The dynamics of wealth will not follow a linear path, but the one presented in figure (3). The wealth of entrepreneurs in sector A will increase towards ∞ . This is denoted by the left curve in figure (3). Similarly, the wealth of the middle sized entrepreneurs in sector B will continuously expand, such that it becomes more profitable, at some point, for them to formalise their business and switch to sector A . Therefore their wealth will increase towards ∞ . However, the wealth of small entrepreneurs in sector B will decrease towards $-\infty$. The scale of production of these entrepreneurs is too small to keep financing the cost of replacing the depreciated machinery. Therefore, at some point they will be forced to shut down their business and either become workers or unemployed. The dynamics of wealth for entrepreneurs in sector B are denoted by the right curve in figure (3).

There is growth in this economy as long as there are middle size entrepreneurs in sector B that can keep expanding their scale of production. Growth will stop once the expansion of scales of production is constrained by the labour capacity of the economy. Hence, the wealth of entrepreneurs instead of tending towards ∞ will be constrained by an upper threshold

(\bar{w}^A) , given the economy's labour capacity. This upper threshold \bar{w}^A is denoted by the dot in the upper curve that intersects the 45° line in figure (3).

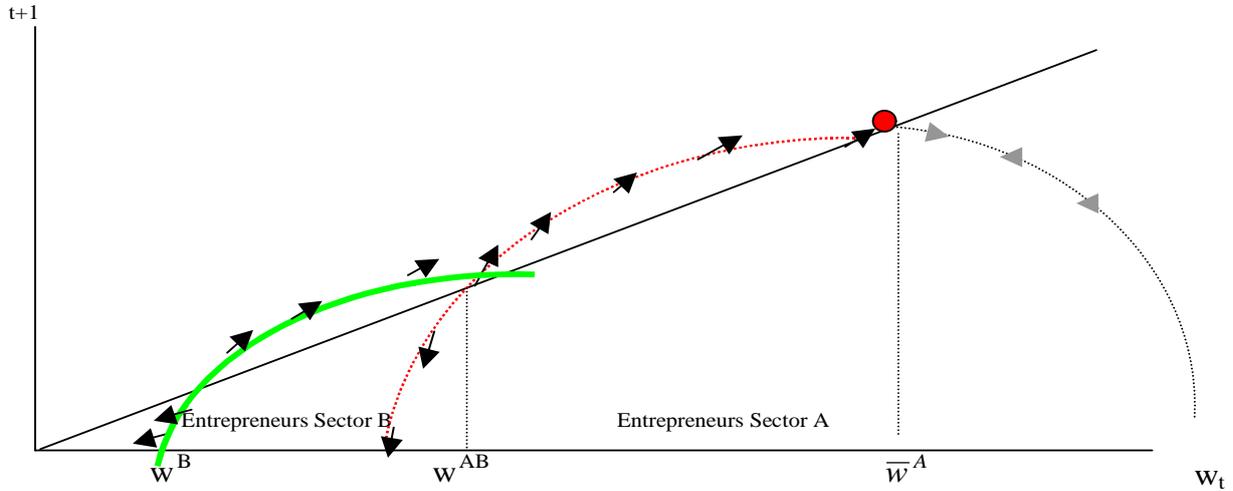


Figure 3: Long Run Stationary Distribution

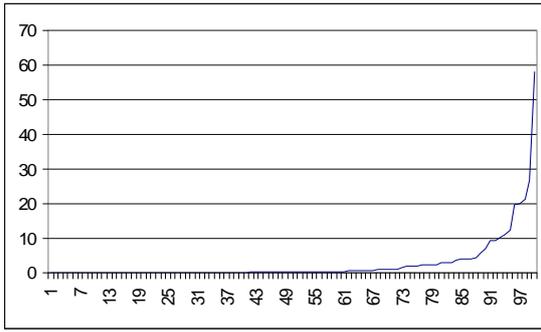
Figure (3) shows that some entrepreneurs in sector A and B keep expanding their scales of production, while others in sector B will shut down their business. However, it is not certain what happens to the dynamics of salaries. This depends on the distribution of wealth, how wealthy the entrepreneurs are in each sector and the inequality among entrepreneurs.

Proposition 8 *The initial distribution of wealth converges to either of four types of stationary distributions*

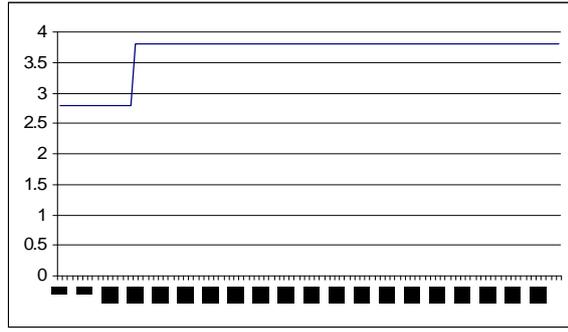
Stationary Distribution Type 1: The informal market disappears and the formal economy prevails. This stationary distribution is achieved when all entrepreneurs in sector B either expand their scales of production such that they formalise their business or they become workers.

Stationary Distribution Type 2: The informal and the formal economy coexist. This type of distribution can be achieved if the entrepreneurs in sectors A and B are hiring all the population and no entrepreneur can increase salaries in order to expand his scale of production.

Stationary Distribution Type 3: The only existing sector is the informal market. This stationary distribution is achieved when entrepreneurs in sector B can no longer expand their scales of production by increasing salaries. Since full employment is reached there is no possibility for them to expand and formalise their business.



Example I



Example II

Stationary Distribution Type 4: Full unemployment prevails. This stationary distribution will be achieved if the initial wealth of all individuals is below the wealth threshold necessary for setting up a business in either sector at the lowest possible salary γ , $w_{i,t} < \hat{w}_e^B$. This stationary distribution can also be reached, if all the entrepreneurs in the economy are engaged in sector B and their scales of production are so small that in the long run all firms shut down.

The dynamics of inequality depend on what happens to unemployment and salaries over time. The larger is the proportion of wealthy people, understood as those who can set up a business or remain in business, the more jobs will be available and the higher the salaries will be. Salaries will increase faster, the less poor the non-entrepreneurs are. This is because the reservation salary is not given only by γ , but actually by the maximum salary that every individual is willing to pay.

4 Numerical Examples

Three numerical examples are presented to illustrate the role of initial wealth inequality in determining the long run distribution of wealth. Each example will provide the main statistics of the initial and long run distribution and use the same parameters shown in table (3).

N	β	σ	r	ρ	γ	F	c	e	z	τ^p	τ^s
100	0.1	3.5	0.2	110	.05	.421	0.4	0.3	0.3	0.01	0.01

Table 6: Initial Parameters of Examples I-II

Example I (Formal economy prevails with one entrepreneur)

A first example is presented using the initial wealth distribution type I. In this example, in the first period there are 16 people that can set up business in sector *A*, one of these entrepreneurs sets up a considerable larger firm than the rest of formal entrepreneurs. Given the salaries that these 16 entrepreneurs offer, three potential workers prefer to set up business in sector *B*.

In the second period there was an increase in demand for labour and hence salaries increased, nonetheless inequality increased given that the returns of entrepreneurs grew at a higher rate than the returns of workers. In the third period, the biggest entrepreneur in sector *A* expands one more the size of his business by raising salaries. At this point in time he has employed the entire population and will continue to do so over time. This entrepreneur pays salaries high enough to avoid any competition in the labour market, which would reduce his number of workers and his scale of production. This leads to a constant fall in the salary paid, until it reaches the minimum value of the exit option of becoming unemployed. After this inverted-U episode, there is revival of inequality, given that the only entrepreneur in the economy keeps reducing salaries. In the long run, there is no unemployment, but the salaries are equal to the levels of subsistence. The aggregate wealth level increases considerably with respect to the initial wealth distribution, nonetheless most of the aggregate wealth is held by the single entrepreneur. For this reason inequality is close to one.

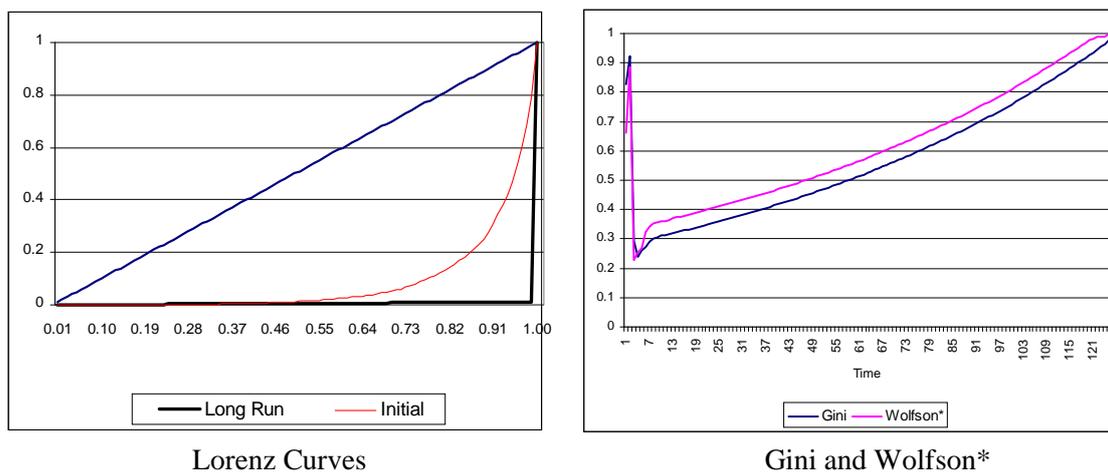


Figure 4: Dynamics of Inequality and Polarisation in Example I

Example II (Formal and informal markets coexist)

	Initial wealth distribution					Long run wealth distribution							
	Total Wealth	Mean	Min	Max	Gini	n^A	n^B	s^A	Total Wealth	Mean	Min	Max	Gini
Example I	273.0	2.7	0.0001	58	0.83	0	1	0.05	1,065	10.6	0.12	1,053	0.98
Example II	366.2	3.7	2.8	4.0	0.36	83	2	3.54	330	3.3	0.40	4.0	0.13
Example III	365.7	3.7	2.8	3.8	0.04	85	0	3.54	330	3.3	0.40	3.8	0.13

A second example is presented using the initial wealth distribution type II. In this example in the first period there are 2 individuals that set up business in sector A and 83 individuals that prefer to set up business in sector B . In the second period the 85 entrepreneurs in the economy (in sectors A and B) do not increase their labour demand considerably and therefore salaries do not rise. In the third period, all entrepreneurs raise their demand for labour, but full employment is reached and entrepreneurs in sector A cannot raise salaries to entice entrepreneurs in sector B into becoming workers. Since entrepreneurs in either of the two sectors can increase salaries to increase their scales of production, it is not possible for any entrepreneur to continue expanding his scale of production and therefore growth stops.

In the long run 2 entrepreneurs remain in sector A and 83 in sector B . Note that the total wealth decreases over time given that the wealth of the workers declined from 2.8 in the original distribution to 0.40 in the long run distribution and that no entrepreneur could expand considerably his scales of production.

Inequality increased during the first two periods given that entrepreneurs expanded their scales of production. By the third period when no one is able to expand further inequality remains constant over time. The long run distribution is more unequal than the original distribution (as shown in the next figure (??)).

Initial Wealth Distribution Type IV

The initial distribution type II is modified such that the two richest individuals that were able to set up formal businesses in example IV have the same wealth as each of the 83 entrepreneurs in the informal sector. For this reason the aggregate wealth, and the measures of inequality are marginally below those of distribution II.

Example III (informal market prevails)

This example uses the initial wealth distribution type III and the parameters shown in table (10). In this example at the initial wealth distribution 85 individuals have wealth above the wealth threshold w^B required to set up business in the informal market. Their wealth is below the wealth threshold w^{AB} and above the fixed point \hat{w}_e^B . In the initial period, these

85 individuals set up business in the informal sector. By the second period all entrepreneurs increase their wealth, but not enough to reach the wealth threshold w^{AB} . By the third period entrepreneurs once again increase their wealth and reach w^{AB} . Although the wealth of the 85 entrepreneurs increased, none of the entrepreneurs can afford to increase salaries to the level required for some entrepreneurs to prefer to become workers. Given that there is perfect equality among entrepreneurs, no one can increase his scale of production any further and hence entrepreneurs in the long run keep operating at the scale of production at which they operated in the third period. Therefore in the long run all the entrepreneurs in the economy operate in the informal market.

The aggregate wealth level decreases with respect to the initial wealth distribution. This is because each entrepreneur is operating at a very small scale and the wealth of workers decrease from 2.8 in the original distribution to 0.40 in the long run.

Inequality increased during the first two periods. From the third period onwards when no entrepreneur can expand further inequality remain constant. In the long run the wealth distribution is more unequal than the initial wealth distribution.

What can be inferred from the numerical analysis is that in order to accelerate the accumulation of wealth in the long run it is important to have a strong entrepreneurial sector (either in the formal or in the informal sector). In terms of the long run distribution of wealth it is important to enable small entrepreneurs (in the formal and in the informal sector) to remain in business, if a more egalitarian wealth distribution is to be achieved in the long run.

4.1 Discussion of the Model

In this model, due to fixed costs and credit constraints, not all individuals will be able to set up business in the formal sector. With a large initial wealth inequality, the fewer entrepreneurs are, the smaller the demand for labour and the lower the competitive salaries will be. In these conditions, there will be individuals that would prefer to operate in the informal economy in order to receive a higher return than the one they would obtain in the formal sector. Therefore, the larger the initial wealth inequality, the larger the informal economy will be.

An important insight of the model is the long run equilibria depend on the wealth distribution of the credit and non-credit constrained. In particular, the wealth difference among entrepreneurs matters. The larger the difference between entrepreneurs the more likely that

low salaries will be paid, since the largest entrepreneurs can drive out small entrepreneurs by simply increasing salaries marginally.

The informal economy serves as an additional source of employment and wealth that would otherwise not have existed, thereby contributing to the well being of those involved. The more numerous the middle size entrepreneurs in the informal economy, the more likely that the economy in the long run will formalize activities and the more likely that salaries will increase over time. Therefore the formalization of the informal economy will contribute to the reduction of inequality. In the long run the trend in inequality will depend on the change in salaries. If entrepreneurs (formal and informal) manage to expand their demand for labour and salaries over time, inequality will decrease over time. This contribution does not necessarily mean that the informal economy does not have negative side effects. Avoiding taxes reduces the tax revenue of governments. Further, workers employed in the informal economy are constrained from social security benefits such as pensions that they would otherwise obtain in the formal economy.

One of the main policy recommendations of this model is related to how to encourage the formalisation of business. The model shows that very small entrepreneurs will shut down business over time since they do not have enough wealth to replace their depreciated machinery. Providing these small firms with micro-credits is unlikely to help them in the long run, if it does not provide the funds necessary to expand their scales of production. Reducing the cost of entry, taxes and easing the access to credit markets will also contribute to the formalization of businesses.

5 Conclusion

The model presented in this article shows that due to differences in wealth not all individuals are able to pay the fixed cost associated with entering the formal sector, which provides credit at a lower interest rate than the informal sector. The salaries paid in the economy will depend on the number of entrepreneurs that will be able to set up business. If there is little competition in the labour market, then the salaries offered will be low. Hence, people who do not have enough wealth to become entrepreneurs in the formal sector will prefer to become (small) entrepreneurs in the informal sector. Therefore, the more unequal the country is, the more unequal the opportunities to become an entrepreneur in the formal sector will be,

hence the lower the salaries and the greater the incentives to become an entrepreneur in the informal sector. It is important to remark that the difference in wealth underlies the different occupational choices. However, inequality on its own is not the cause of the informal activities, but if combined with high entry costs then the proportion of formal entrepreneurs can be insufficient in providing attractive salaries to those who can set up business informal.

In addition to analysing the effect of inequality on the size of the informal economy, the article studied the dynamics of the informal economy. The model predicts that the informal economy will shrink as long as there are enough entrepreneurs expanding their scales of production to a level at which it is more profitable to formalise business, in order to access the lower interest rates in the formal credit sector.

This article has shown that the size of the informal economy is affected by inequality, the registration fees and the financial and legal environment. An insight has therefore being gained into the means that can be used to control the size of the informal economy. “Business-friendly” policies that reduce the cost and time required to set up a business are but one way of encouraging formal sector participation.

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