

# **Can Social Programs Reduce Productivity and Growth? A Hypothesis for Mexico**

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## **ABSTRACT**

Social programs can reduce productivity and growth as they inadvertently generate perverse incentives for workers and firms. The core hypothesis is that these programs segment the labor market, tax formal salaried employment and subsidize informal salaried and non-salaried employment. Larger than optimal self-employment and employment by informal firms lowers aggregate labor productivity. In turn, differences in the cost of labor produce differences in returns to capital across firms, some formal legally hiring salaried workers and some informal illegally hiring salaried workers. Given the cost of credit, higher labor costs for formal firms distort the allocation of investment in favor of the informal sector; this investment is distributed in many small firms that may fail to exploit advantages of size as a result of firms' strategies to evade social security contributions. This lowers the average productivity of capital causing dynamic productivity losses. The analytical argument is linked to empirical evidence indicating that differences in labor and capital productivity between sectors and firms contribute to explain differences in productivity growth across countries, on one hand; and to evidence suggesting a negative association between productivity and informality, on the other. A subsidiary hypothesis is that social programs are partly financed by reducing public investment rather than raising taxes, limiting the expansion of growth-promoting public infrastructure. The paper suggests that social programs that lower total factor productivity together with the effects of lower public investment partly account for Mexico's lackluster growth and productivity performance in the context of intensified international competition and the erosion of the advantages of the North American Free Trade Agreement.

## I. Introduction

Mexico's low growth and reduced competitiveness has become a critical area of concern. In the last decade the average annual growth rate of per capita GDP was 2.1%; and for the last five years 0.4%. Productivity growth has also been slow relative to other countries;<sup>1</sup> as a result, the country's competitiveness has fallen. This lackluster performance has generated a search for explanations and appropriate policy responses, all the more puzzling as it occurs after important reforms in the last twenty years aimed at making the economy more competitive and efficient; and after benefiting from unusually favorable international conditions, particularly over the last few years.

Given Mexico's openness to trade explanations have centered in the performance of sectors producing key non-traded intermediate inputs or in the behavior of labor and capital markets. Attention has focused on the high costs of transport; the monopolistic features of the telecommunications sector; the low rates of lending to firms by commercial banks; the high cost and uncertain supply conditions associated with public monopolies in the energy sector; the rigidities in the labor market derived from onerous firing and hiring regulations; and the relatively low levels of education of the work force.

Without diminishing the merit of these factors or weighing their relative importance, I argue that there is another source of low growth and stagnant productivity overlooked so far: an incentive structure associated with social programs that induce workers and firms into low productivity jobs and investments, respectively.

At first sight it may seem counterintuitive to argue that social programs can reduce productivity and growth, as a large literature argues that a healthier and more educated labor force is a positive factor for growth; furthermore, an equally large literature argues that a country with a more equitable income distribution will more likely experience higher and sustained growth rates.<sup>2</sup> And clearly, in a country like Mexico with a very unequal income distribution and an important share of the population living in poverty, social programs are indispensable to redistribute income and promote equality of opportunities.

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<sup>1</sup> Bassi et al. (2006) find that average product per worker in Mexico grew at an average annual rate of 1.4% between 1995 and 2004, substantially below the rates observed in OECD countries. Duval (2006) estimates a similar average rate of 1.3% for the period 1988 to 2004.

<sup>2</sup> An excellent summary of these arguments is World Bank (2005).

I do not dispute these assertions; in fact, I strongly coincide with them. Eradicating poverty and increasing equity are not only valuable goals in their own right, but in my view pre-requisites for sustainable growth in Mexico. My point is that the combination and features of the programs chosen to deliver health, pension, housing and other benefits to workers de facto generate a perverse incentive structure that work against the long run interests of workers, particularly those with low incomes. The challenge, therefore, is not to remove these programs but to reform them so they go hand-in-hand with increasing productivity and faster growth, not against. It is a question of means, not ends.

I focus on the programs by which workers receive health insurance, housing loans and pensions, principally, based on their labor status. There is no discussion of education or other social programs that provide benefits independently of a particular form of participation in the labor market.<sup>3</sup> I center attention on the division of social security programs for salaried workers, on the one hand, and social protection programs for non-salaried workers, on the other; on the bundled or unbundled nature of benefits in each case; and on the differences in their methods of financing. I show that these features are key determinants of the effective cost of labor faced by firms hiring salaried and non-salaried workers, and thus of firms' profitability.

This paper can be interpreted as contributing to the literature arguing that microeconomic distortions in factor markets are determinants of aggregate productivity and growth; see Banerjee and Dufflo (2004). Its novelty lies in pointing out that social programs can segment workers and firms into a formal and an informal sector, and that this segmentation is important not only from the social point of view --as similar workers receive different social benefits-- but also from the point of view of growth and productivity.<sup>4</sup> More particularly,

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<sup>3</sup> I also do not discuss poverty reduction programs directly targeted on poor households, although if these programs conditioned benefits on the labor status of poor workers similar results obtain; see Levy (2006a).

<sup>4</sup> Analyses of segmentation in the labor market usually focus on minimum wages or, of greater relevance for Mexico, on the effects of regulations regarding firing and hiring of workers. But labor regulations and social security regulations go hand-in-hand. They are either observed or evaded jointly by firms and workers. From a quantitative point of view, however, the impact of social security regulations exceeds that of labor regulations. In Mexico the costs of the former are approximately 30% of wages, while the contingent costs of the latter are estimated by Heckman and Pages to be around 3.2% of wages (2004, table 3, p. 30). In any case, from my perspective labor regulations should be considered social programs since their purpose is to protect workers, just as social security provisions. The analysis here extends to incorporate the effects of these regulations; see Levy (2006a). However, I focus on social security because in Mexico there is an explicit attempt by the government, backed by increasing budgetary resources, to practically replicate social security benefits for informal workers through a parallel system of social protection generating incentive problems that add to the ones associated with the better-known labor regulations.

the paper tries to identify the links between informality and factor productivity. This matters greatly for Mexico for a simple but powerful reason: the majority of firms and workers are in the informal sector. If social programs are a cause of informality, and if the microeconomic distortions associated with informality reduce productivity and growth, then social programs can harm productivity and growth, more so if they are expanding rapidly as is the case in Mexico.

The paper is organized as follows: section II describes relevant characteristics of Mexico's social programs and key features of its labor market. Section III exploits the standard two-sector static general equilibrium framework to link these characteristics to the distribution of employment and labor productivity by sector. It then extends the set-up to introduce evasion of social security laws and explores how this behavior affects the productivity of labor and the allocation of investment. Section IV briefly surveys papers that give guidance as to the magnitude of these effects. Section V concludes with remarks on the relevance for Mexico of social policy reform to increase productivity and accelerate growth.

## **II. Social Security and Social Protection**

### **II.1 Benefits and Coverage**

Mexico provides social benefits to workers based on labor status. On one hand, social security is a right of salaried workers only, and an obligation of firms only with respect to the salaried workers they hire.<sup>5</sup> Coverage of social security involves a wide set of benefits: (i) health insurance, (ii) day-care services for children; (iii) life insurance; (iv) disability pensions; (v) work-risk pensions; (vi) sports and cultural facilities; (vii) retirement pensions; and (viii) housing loans. These benefits have two relevant characteristics: they are paid out of workers and firms contributions; and they are bundled in the sense that workers and firms must pay for all of them, regardless of whether workers desire all or only a subset.<sup>6</sup>

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<sup>5</sup> Articles 12 and 13 of the Social Security Law and article 20 of the Federal Labor law make a key distinction between salaried and non-salaried workers, where the former are defined as those performing subordinated work for a boss (firm) in exchange for a wage. The words "subordinated" and "wage" are very relevant here, as they leave open whether workers engaged with firms under risk-sharing or effort-eliciting contracts receiving a commission or profit-sharing are subordinated or not, and are receiving a wage or not. If they are not, as is the established legal doctrine in Mexico, then firms hiring workers with non-wage contracts are not obligated to affiliate their workers to social security, although from a strictly economic point of view these are also profit maximizing firms and the commissions paid are the equivalent of wages (except that they are based on output or other measurable characteristic, as opposed to hours worked which in these cases may not be observed).

<sup>6</sup> Henceforth social security coverage is equated with affiliation with IMSS (Instituto Mexicano del Seguro Social).

On the other hand, the self-employed and workers with non-salaried relations with firms are excluded from social security. However, these workers benefit from various health, housing, day care and, more recently, pension benefits --grouped here under the label of social protection programs-- which differ from social security in two relevant senses: one, benefits are not bundled as workers can voluntarily access one (say, a health program) without necessarily accessing another one (say, a housing program). And two, benefits are paid out of general revenues and not with workers or firms contributions.<sup>7</sup>

Associating coverage of social security with “formality” and lack thereof with “informality” the labor force divides into a formal and an informal sector, with formal/informal workers receiving social security/social protection benefits. In principle, this division should coincide with salaried and non-salaried workers. But this is not so, since as a result of evasion of social security laws there are salaried workers with social protection benefits that add to informal employment. Table 1 describes the magnitudes of each in 2005. Note that 36% of salaried workers evade social security laws.

**Table 1**  
**Mexico’s Labor Force, 2005**  
(thousands of workers)

	<b>Number</b>	<b>Share</b>
<b>I. Formal</b>	<b>13,832</b>	<b>34.1</b>
I.1) > 3mw	6,007	14.8
I.2) ≤ 3mw	7,824	19.2
<b>II. Informal</b>	<b>26,707</b>	<b>65.9</b>
II.1) non-salaried > 3mw	2,860	7.0
II.2) non-salaried ≤ 3mw	16,147	39.9
II.3) salaried (evasion)	7,699	19.0
<b>III. Total</b>	<b>40,539</b>	<b>100.0</b>

Source: Levy (2006b). Notes: The table excludes public sector workers; mw=minimum wage, so that > 3mw refers to workers earning more than 3 times the mw, taken here as the cut-off point between workers with “high” and “low” wages. 3 mw is close to the mode of the wage distribution of workers registered in IMSS.

## II.2 Mobility of Workers

A critical feature of Mexico’s labor market is large scale mobility of workers between the formal and the informal sector. Here I summarize the results of an exercise where the length of stay in the formal sector --measured by affiliation with IMSS-- of nine million individual workers is followed from

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<sup>7</sup> These benefits may be perfect or imperfect substitutes for those offered by social security; see Levy (2006b).

July 1997 to July 2005.<sup>8</sup> Interestingly, only 11.6% of low wage workers were enrolled with IMSS for nine complete years over the nine-year period, as opposed to 42.4% of high wage workers. At the other end, of all low wage workers enrolled in IMSS in 1997 almost 18% were in the formal sector for only one year over the last nine; this contrasts with 7.6% of high wage workers. All in all, the average low wage worker who in 1997 was enrolled in IMSS had social security coverage for only 4.3 out of the nine years during which he could have been covered, or 48% of his working time; the corresponding average for high wage workers is 6.5 years, or 72% of his working time.

More generally, workers in Mexico have spells of formality with social security coverage, and spells of informality with social protection coverage; these transits are more frequent the lower is the worker's wage. These results are confirmed using a different data base, the Encuesta Nacional de Empleo Urbano, which is also a panel data set that follows workers' formal-informal transits (although for only a year). According to this data in 2005 16% of low wage workers who began the year in the formal sector ended it in the informal; and 10% who started the year in the informal sector ended it in the formal (Levy (2006b)). Calderon-Madrid (2006) computes transition matrices for Mexican workers between formality and informality for years of high and low GDP growth (1997, 2001 and 2005) and finds similar results, suggesting as well that the phenomenon is not a result of the business cycle.<sup>9</sup> On the other hand, transits from formality and informality into open unemployment are very small, and spells of open unemployment are very short; see the evidence in IDB (2004). Note there is no unemployment insurance in Mexico.

In sum: there appear to be no substantive barriers for workers to enter the formal sector and be covered by social security.<sup>10</sup> The formal-informal dichotomy is a characterization of the legal status of workers at a point of time, not a permanent separation of individual workers into two mutually exclusive sub-sets. The dichotomy, further, is less useful for lower wage workers. For

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<sup>8</sup> The exercise begins in July 1, 1997 when the current Social Security Law came into effect. There were 9 million workers affiliated with IMSS then of which 3 million earned more than 3 mw ("high") and 6 million 3 mw or less ("low"). The exercise measures number of years in formality, given that the worker was in IMSS in 1997. Workers with 56 years of age or more in 1997 are excluded from the data base, so departures from formality are not due to retirement; when the worker is not in the formal sector he is in the informal, openly unemployed, has dropped out of the labor force or migrated abroad; see Levy (2006b).

<sup>9</sup> See Gong et al. (2004), Navarro and Schrimpf (2004), Kaplan et al. (2005), and Bosch and Maloney (2006). Duryea, et. al (2006) study nine middle income countries and find that labor mobility is highest in Mexico.

<sup>10</sup> Evidence also suggests that minimum wages are not binding; see Maloney and Nuñez (2004) and Bell (1997).

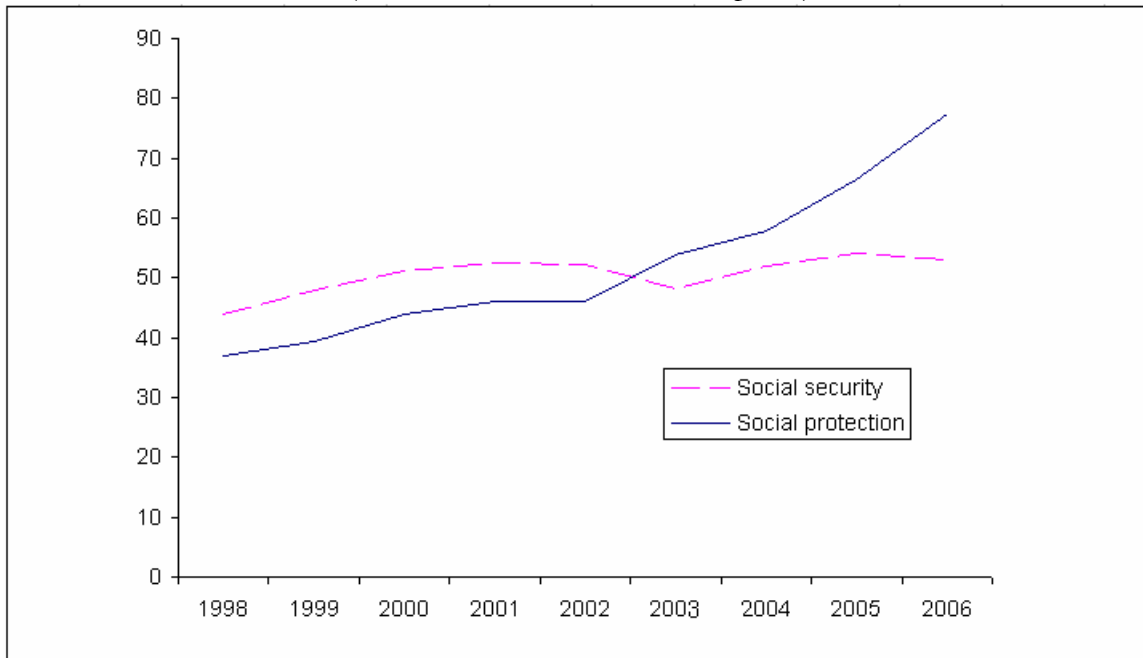
these workers the problem is not accessing a formal job; the problem is that for a variety of reasons there is very erratic permanence in formality.

Transits between formality and informality raise fundamental questions for Mexico's social policy. It is not the purpose of this paper to pursue this issue. But it is nonetheless relevant because it signals that social security is not working according to design, particularly for low income workers; and because under these circumstances the productivity of all workers is reduced.

### II.3 Budgetary Resources

Graph 1 shows government subsidies for social security and social protection programs since the start of the current Social Security Law in 1997.<sup>11</sup> Resources for social protection include various federal health and housing programs, principally, and exclude state or municipal resources for similar programs thus underestimating total resources for these programs.

**Graph 1**  
**Federal Subsidies for Social Security and Social Protection Programs**  
(thousands of millions of 2006 pesos)



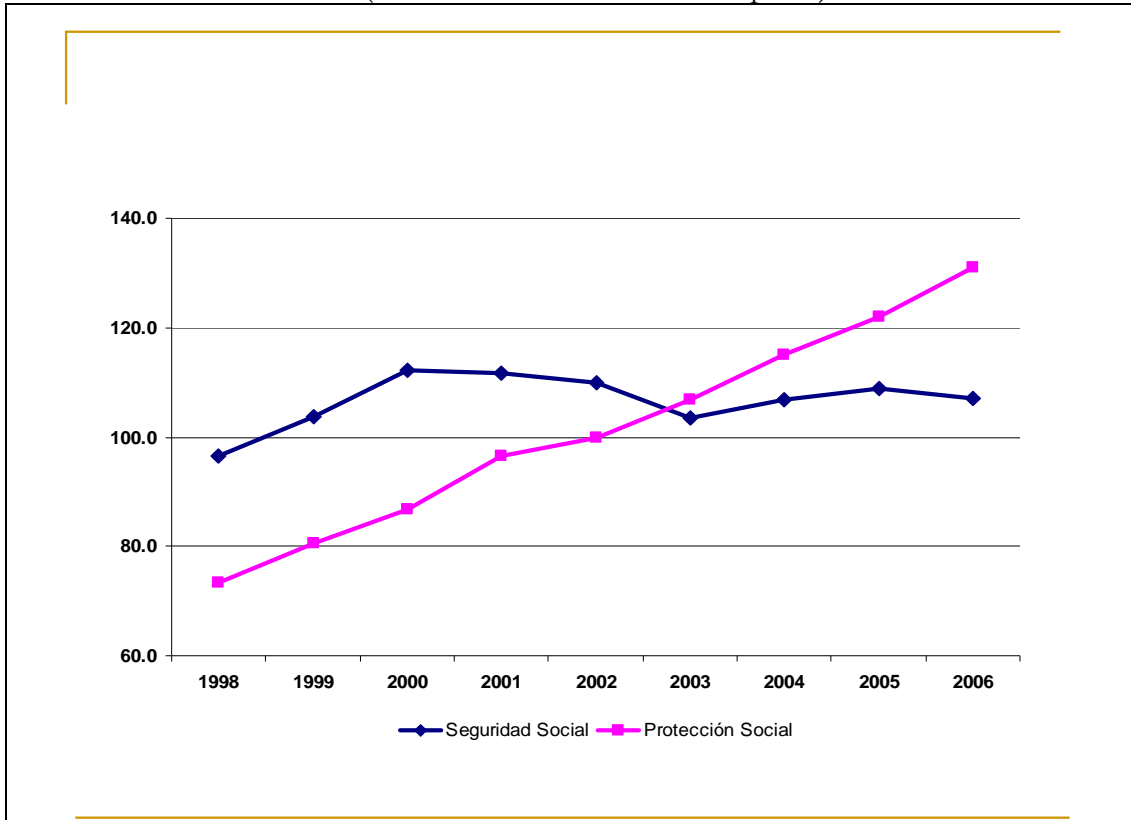
Source: Levy (2006b). Resources for 1997 are not shown as the Social Security Law started in the middle of that year; resources for 2006 are in accordance with the approved budget and may vary by the end of the year.

<sup>11</sup> Resources for social security refer only to government subsidies for worker's retirement pensions and health insurance; they exclude the costs of pensions of the transition generation from the previous Social Security Law, as these are not benefits received by workers that are currently in the labor market. These costs derive from the change in the pay-as-you-go retirement pension system to a defined-contribution pre-funded system.



Graph 2 shows total available resources for public health services to formal and informal workers. The first includes contributions by firms and workers and government subsidies for social security health services. The second includes federal and state resources for social protection health programs operated by federal and state agencies.

**Graph 2**  
**Public Resources for Health Services**  
(thousands of millions of 2006 pesos)



Source: Levy (2006b).

Graphs 1 and 2 depict two simple but powerful facts: (i) in the period 1998-2006 federal subsidies for social protection programs have grown much faster than for social security (110 vs. 21% in real terms) and since 2003 are larger in absolute terms; and (ii) even including social security contributions by firms and workers as of 2003 there are more resources to provide health services to workers in the informal sector than in the formal sector.

I end this section noting that social protection programs are no longer considered transitory by the government, “until economic growth allows more workers to find a formal job with social security coverage”. Benefits from some of these programs are now legally similar to social security entitlements

and their joint delivery, although not legally bundled as with social security, is pursued as an explicit policy goal.<sup>12</sup>

### **III. Social Programs and Productivity**

#### **III.1 Static General Equilibrium**

This section describes a framework to identify the efficiency effects of social security and social protection programs. The total labor force  $L$  is divided into salaried and non-salaried employment, with social security and social protection coverage, or into formal and informal employment,  $L_f$  and  $L_i$ , respectively. Assume these are all unskilled low wage workers.

In the absence of evasion (see below), informal employment includes two types of workers: the self-employed and those with a non-salaried labor relation with a firm. The self-employed might own a productive asset (say, a sewing machine, a half hectare of land, a truck, a mixer to make fruit juices for sale in city streets) and may exploit that asset on their own in a small self-owned firm (perhaps with one or two assistants); critically, the amount of time they devote to work with their own assets depends on the wages they could earn working as salaried or non-salaried employees for somebody else (which measures the opportunity cost of their own time). Alternatively, the self-employed might own no productive assets at all but still work on the own (parking or washing cars in the street, say).

Informal workers, however, can also borrow working capital and sell products in the streets (contraband, newspapers, candy, and so on). Or they can work for a firm selling its products door-to-door or in the streets (cosmetics, food, lottery tickets). Because their effort cannot be monitored (as hours worked are variable and the work-place is mobile), when employed by a firm these workers receive a “commission” and not a wage. As a result, they are non-salaried. But in a labor market characterized by mobility across sectors, the level of these commissions depends on the wages and benefits in salaried employment as the latter measure the opportunity cost of their time. The key point is that the decisions of workers with or without productive assets to

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<sup>12</sup> In 2006 a Presidential Decree created the National Council for Social Protection with, among others, the following purpose: “To guarantee the observance of social protection policy, insuring the functional integration of benefits in health, housing and savings for retirement, among others, that the Federal Government offers to the population lacking social security coverage”. My translation of article 4 of the Decree published in the Federal Register (Diario Oficial de la Federación) on February 27, 2006.

devote part or all of their time to various forms of non-salaried work depends on the earnings they can obtain in these occupations and the benefits derived from social protection programs vis-à-vis the wages and benefits of social security; see Levy (2006a) for more discussion.

Firms divide between formal and informal, respectively hiring salaried and non-salaried workers. I initially take the number of firms and the capital stock as given in each sector and assume that there is no evasion of social security laws. As a result, all firms hiring salaried workers register them with IMSS and are formal firms, while all the self-employed or workers in a non-salaried contractual relation with a firm together constitute the informal sector. Firms produce output according to:

$$(1a) Q_f = Q_f(K_f, L_f) \quad \text{and} \quad (1b) Q_i = Q_i(K_i, L_i)$$

where  $K_f$ ,  $K_i$  is the (fixed) capital stock in each sector. At this point it is convenient to think of (1a) and (1b) as firm-level production functions, although firms are not indexed as their numbers are fixed in each case.

Let  $T_f$  be the costs of social security benefits and  $w_f$  the formal sector wage so formal firms' cost of hiring a worker are given by  $(w_f + T_f)$ .<sup>13</sup> Formal firms hire workers up until the point where the value of their marginal product,  $MPL_f$ , equals  $(w_f + T_f)$ . For various reasons, however, formal sector workers might not attach a value to social security benefits equivalent to their costs.<sup>14</sup> Let  $\beta_f \in [0,1]$  be workers' valuation coefficient of social security benefits so that their utility from a formal job is  $(w_f + \beta_f T_f)$ . Clearly, if workers value social security fully, so that  $\beta_f = 1$ , formal firms labor costs equal formal workers utility; conversely, if workers do not fully value these benefits, so that  $\beta_f < 1$ , there is a wedge between what the formal firm pays and what the worker receives. This wedge is equal to  $(1 - \beta_f)T_f$  and is exactly equivalent to a tax on salaried employment (not on labor).

In the informal sector there are no social security costs. Firms (including firms owned by the self-employed) hire workers so that the  $MPL_i$  is equal to  $w_i$ , where this wage should be interpreted as equivalent to the commissions paid

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<sup>13</sup>  $T_f$  is usually expressed as a fraction of the wage but is easier to express it in absolute terms. Note that  $T_f$  includes all other costs associated with hiring a formal worker: labor taxes and, more importantly, the contingent costs of hiring and firing workers derived from labor regulations; see Heckman and Pages (2004).

<sup>14</sup> Levy (2006b) discusses these reasons in the case of Mexico.

for non-salaried labor; or to the remunerations obtained by the self-employed net of the quasi-rents on their own productive assets (if they own any); or to the remunerations earned by the self-employed parking or washing cars or in any other occupation requiring only labor inputs. At the same time, informal workers get benefits from social protection programs whose costs per worker are  $T_i$ , valued by them at  $\beta_i T_i$  with  $\beta_i \in [0,1]$ . Note, critically, that neither self-employed workers nor workers in non-salaried relations with firms pay for  $T_i$ , while  $T_f$  is paid by workers and firms in the formal sector. So while it may be the case that  $\beta_f T_f > \beta_i T_i$ , so that workers value more social security than social protection benefits, it is also the case that the former are costly and the latter free. Of course, it may also be the case that  $\beta_f T_f < \beta_i T_i$ .

Letting  $p^w$  stand for the exogenously given output prices, the equilibrium in this economy is represented by:<sup>15</sup>

$$\begin{aligned}
 (2a) \quad & p^w \partial Q_f / \partial L_f - (w_f + T_f) = 0 \\
 (2b) \quad & p^w \partial Q_i / \partial L_i - w_i = 0 \\
 (2) \quad & \\
 (2c) \quad & w_i + \beta_i T_i = w_f + \beta_f T_f \\
 (2d) \quad & L_i + L_f = L
 \end{aligned}$$

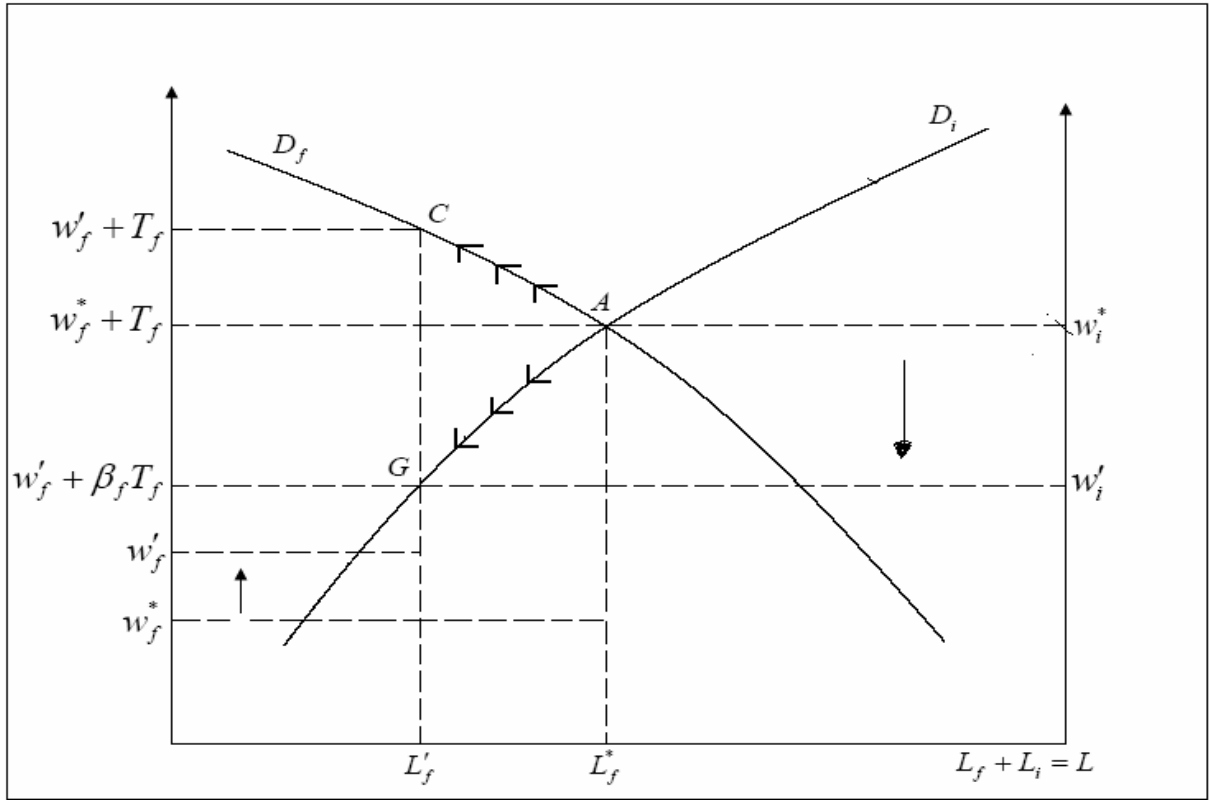
where (2a) and (2b) are the profit-maximizing conditions for formal and informal firms, (2c) is the utility maximizing condition for workers, and (2d) the equilibrium condition in the labor market.

Graph 3 depicts the distribution of employment with the demand for formal labor  $D_f$  drawn from the left hand side and the demand for informal labor  $D_i$  from the right hand side, in the standard two-sector general equilibrium set-up.  $D_f$  and  $D_i$  result from the aggregation of individual firm demand curves for labor in each sector and in the case of  $D_i$  includes the demand for self-employment. The key properties required for the analyses are that they be negatively-sloped and shift exogenously with output prices.

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<sup>15</sup> To ease notation I do not index goods by sector or firm. Output can be thought of as a Hicks-composite of many goods whose relative prices are fixed. In a more elaborate model one could differentiate goods across sectors or let goods be imperfect substitutes. The key assumption is that output prices are exogenous (say because all goods are traded). Attention is centered here in the market for factors.

**Graph 3**  
**Social Security with a Formal and an Informal Sector**



What is the impact of social programs? Consider first the case where social security is fully valued and there are no social protection programs. This is obtained by solving (2) with  $\beta_f = 1$  and  $T_i = 0$ . In this case the equilibrium is at point A, with  $L_f^*$  workers employed in the formal sector and  $L_i^*$  (not drawn, but equal to  $(L - L_f^*)$ ) in the informal.

Workers in the informal sector receive a wage of  $w_i^*$ , while workers in the formal sector get  $w_f^*$ . However, when the value of the social security benefits received by formal workers is considered, worker's utility is the same across sectors. Note that the MPL in the formal sector,  $(w_f^* + T_f)$ , is equal to the MPL in the informal,  $w_i^*$ , so that the allocation of labor in the economy is efficient. A well functioning social security system, interpreted here as  $\beta_f = 1$ , maximizes output at world prices and the productivity of labor (and workers' wages). Note as well that when  $\beta_f = 1$  informal employment is the same with or without social security, as is the level of output of informal firms.

Evidently, informality in the sense of lack of social security coverage is inevitable in a legal framework that excludes non-salaried labor from the

obligations of social security. As a result, some level of informality will always be present because in any economy there are many valid reasons for non-salaried employment relations: because firms and workers find it profitable to engage in such relations for risk-sharing or effort-eliciting reasons; and because many workers might also find it profitable to work on their own.<sup>16</sup> Informality in this context is as efficient as formality, except that informal workers consume a different bundle of goods than formal workers as a result of the existing legal framework: formal workers freely dispose of their wage  $w_f^*$  and are forced to consume benefits worth to them  $T_b$ , while informal workers freely dispose of their wage  $w_i^*$  and may or may not use part of their wage to purchase health insurance, save for a retirement pension, and so on.

Consider now the solution to (2) when  $\beta_f < 1$ , so that social security is not fully valued, but assume still that there are no social protection programs (so  $T_i = 0$ ). Note in graph 3 that at  $(w_f^* + \beta_f T_b) < w_i^*$  workers in the formal sector are less well-off than in the informal. This induces workers to move out of the formal sector with formal employment falling from  $L_f^*$  to  $L_f'$  (and informal employment increasing). But with fewer formal workers  $w_f$  inevitably increases, from  $w_f^*$  to  $w_f'$ . A key point here, however, is that formal firms still have to incorporate into their labor costs the full amount of social security contributions,  $T_b$ , regardless of whether workers value them fully or not; inevitably, their labor costs increase. This induces formal firms to move from point A to point C, where  $MPL_f$  is equal to  $(w_f' + T_b)$ . On the other hand, if more workers are now in the informal sector, they can only be employed if their wages fall from  $w_i^*$  to  $w_i'$ ; this allows informal sector firms to increase their employment from point A to G, where the  $MPL_i = w_i'$ , and induces more workers to be self-employed. Note that at  $w_f'$  and  $w_i'$  workers are indifferent between formal and informal employment because  $(w_f' + \beta_f T_b) = w_i'$ .

In this equilibrium the productivity of formal workers is  $(w_f' + T_b)$ , while that of informal workers is  $w_i'$ . Since  $w_f$  and  $w_i$  moved in opposite directions, it is now the case that formal workers are more productive than informal workers. But this is not the result of them being more educated; nor is it the result of a barrier to entry into formal employment. The differences in productivity between similar workers are caused by an undervalued social security system. Note also that since formal firms face higher labor costs they are less competitive than before; that is why they employ fewer workers and their output is less.

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<sup>16</sup> Because they have entrepreneurial abilities or because they own productive assets (including land).

Another characteristic of this equilibrium is that now informal employment results not only from a legal design that ex-ante excludes non-salaried workers from social security coverage, but also from a social security system that does not work well. The result is not surprising: if firms and workers are being forced to pay for something, but consider that they are receiving less than that, they will turn to non-salaried informal activities. The fact that GDP and labor productivity fall as a by-product of their behavior is something that they are probably unaware of, nor care about.

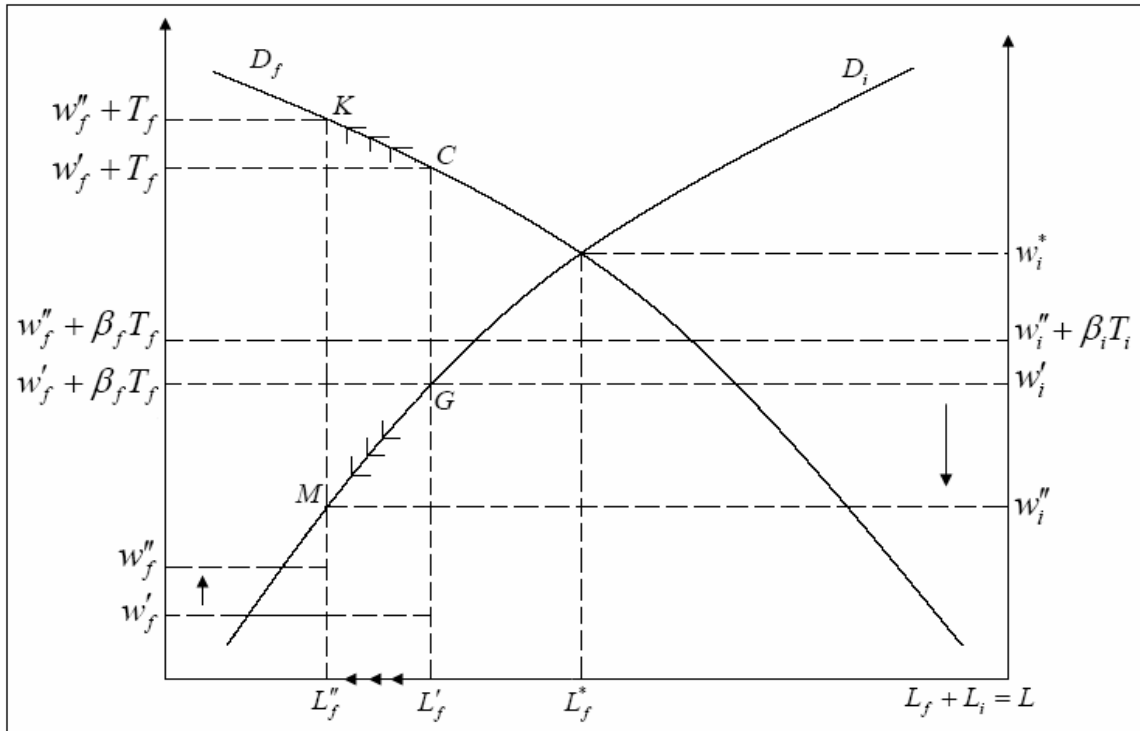
The shift from  $[w_f^*, w_i^*]$  to  $[w_f', w_i']$  impacts quasi-rents on capital. In the formal sector the future flow of quasi-rents on  $K_f$  and the price of capital goods falls. The opposite happens in the informal one; productive assets in the informal sector become more valuable: the half-hectare of low quality land exploited by a rural worker; the mixer or stove used by urban workers to make food for sale in city streets; or the sewing machine used by workers in their own home to make clothing for sale in a tiangis (market in nahuatl). At  $\beta_f = 1$  these assets would probably not be used; at  $\beta_f < 1$  they are valuable.

Graph 4 depicts what happens to wages, labor productivity and the distribution of workers between sectors when social protection programs are introduced, so that (2) is now solved with  $T_i > 0$ .<sup>17</sup> At points G and C workers in the formal sector would be receiving  $(w_f' + \beta_f T_f)$ , while workers in the informal  $(w_i' + \beta_i T_i) > (w_f' + \beta_f T_f)$ . But this makes formal workers worse off than informal workers, inducing the former to move to the informal sector. As the supply of labor to the formal sector falls wages there increase from  $w_f'$  to  $w_f''$ . As a result, formal firms' labor costs are higher and they reduce formal employment, which falls from  $L_f'$  to  $L_f''$ . However, the additional workers in the informal sector can only be employed there if wages fall from  $w_i'$  to  $w_i''$ .

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<sup>17</sup> The government quite understandably introduces these programs because it wants to provide social benefits for workers excluded from social security. These programs might be considered transitory and imperfect substitutes for social security “until economic growth extends social security coverage to all workers”, as was the case in Mexico for a long time; or may be considered permanent and improved in scope to become closer substitutes for social security, as has occurred more recently. But the attempt to correct for the design flaws and operational problems of social security with these programs generates three problems. One, these programs will further reduce social security coverage as they depress salaried employment. Two, they are not bundled as is social security so while health insurance coverage is extended, for instance, the number of workers forced to save for retirement pensions falls (as is the number of workers covered by disability or work-risk insurance). And three, they induce workers into lower productivity jobs. This last point is the one emphasized in this paper, but from the point of view of social policy it is important to note that social protection programs extend protection to workers along some dimensions but reduce it along others.

**Graph 4**  
**The Labor Market with Social Security and Social Protection**



What is the effect of social protection programs on labor productivity? In the formal sector the productivity of workers is  $(w_f'' + T_f)$  as firms are at point  $K$ . In the informal it is just  $w_i''$  as firms are at point  $M$ . The result is that the productivity difference widens (contrast distance  $KM$  vs. distance  $CG$ ). Differently put: social protection programs generate productivity losses additional to the ones created by an undervalued social security system. Note that output and quasi-rents of formal firms fall more. The intuition is simple:  $\beta_f < 1$  acts as a tax on salaried employment in the formal sector;  $T_i > 0$  worsens things as it acts as a subsidy to informal employment.

The shift from  $[w_f', w_i']$  to  $[w_f'', w_i'']$  resulting from  $T_i > 0$  distorts further the price of productive assets, falling/increasing more in the formal/informal sector. The extensive margin to exploit low-quality land expands, and simple (and often old) capital assets like sewing machines, trucks, and mixers and so on are put to use rather than put to rest.

I highlight a result from graph 4 that may be initially surprising but that is not really so: with social protection programs informal and formal workers are both better-off. Despite the fact that wages in the informal sector fall, they now receive benefits that they were not getting before; and because there are



fewer formal sector workers, their wages increase. So it is the case that  $(w_f'' + \beta_f T_f) = (w_i'' + \beta_i T_i) > (w_f' + \beta_f T_f) = w_i'$ . It is noteworthy that workers are better off despite that fact that they are less productive and the economy is less efficient. This happens because there are benefits that (apparently) nobody is paying for: the cost of social protection programs.<sup>18</sup>

Since the MPL in each sector is  $(w_f + T_f)$  and  $w_i$ , respectively, using (2c) I obtain:

$$(3) \text{MPL}_f - \text{MPL}_i = [(1 - \beta_f)T_f + \beta_i T_i] > 0$$

This expression identifies the two components of the productivity loss: the first is the output loss in the formal sector caused by incompletely valued social security, and it is greater the lower is the value of  $\beta_f$ . The second is the output loss in the formal sector caused by social protection, and it is greater the higher is the value of  $\beta_i$ . Note that  $\beta_f$  and  $\beta_i$  have opposite effects: improving the valuation of social security augments productivity as formal employment increases; but improving social protection lowers productivity by inducing over-employment in the informal sector. The total productivity loss is the value of GDP at world prices foregone because there are too many workers employed in low productivity jobs in the informal sector, and too few workers employed in high productivity jobs in the formal sector. This is:

$$(4) \text{Annual GDP Loss} = p^w \{ [Q_f^*(\cdot, L_f^*) + Q_i^*(\cdot, L_i^*)] - [Q_f''(\cdot, L_f'') + Q_i''(\cdot, L_i'')] \}$$

$$= p^w \int_{L_f''}^{L_f^*} [\partial Q_f / \partial L_f - \partial Q_i / \partial L_i] dL$$

which using (3) can be approximated by:

$$(5) \text{Annual GDP Loss} \approx [(1 - \beta_f)T_f + \beta_i T_i] \Delta L$$

where  $\Delta L(T_f, T_i, \beta_f, \beta_i)$  is the difference between  $L_f^*$  and  $L_f''$  in graph 4 and consists of two components: the shift from  $L_f^*$  to  $L_f'$  as a result of  $\beta_f < 1$ , and the shift from  $L_f'$  to  $L_f''$  as a result of  $T_i > 0$ .

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<sup>18</sup> Of course, these programs must be paid for, but this is done from general taxes or from other sources like oil rents; their costs are not internalized by workers and firms in the informal sector.

As seen, in a context where the capital stock is fixed the interaction of social security and social protection programs operates through a wedge in the cost of labor to firms across sectors. It is useful to summarize this in  $\delta = (\text{cost of labor in the formal sector}) / (\text{cost of labor in the informal sector})$ . Since the cost of informal labor to firms is simply  $w_i$ , using (2c) again I find:

$$(6) \quad \delta = (w_f + T_f) / (w_f + \beta_f T_f - \beta_i T_i)$$

Expression (6) serves to map the range of values for  $\delta$  given possible combinations of social security and social protection programs. At one extreme, if social security is fully valued and there are no social protection programs,  $\delta = 1$ . In this context, a labor market segmented by social programs has no effects on labor productivity. The other extreme occurs when social security is not valued at all while social protection programs are present and fully valued, so that  $\delta = (w_f + T_f) / (w_f - T_i)$ . I summarize this in:

$$(7) \quad \delta_{\max} = (w_f + T_f) / (w_f - T_i) > 1 = \delta_{\min}$$

How large could  $\delta_{\max}$  be? To answer this question assume the formal wage is unity. In Mexico  $T_f$  is approximately 35% of  $w_f$  so without social protection programs  $\delta_{\max} = 1.35$ .<sup>19</sup> With these programs the wedge is higher. If we assume their benefits are half of social security  $\delta_{\max} = 1.35 / 0.825 = 1.63$ . Even if benefits are one fourth one obtains  $\delta_{\max} = 1.35 / 0.92 = 1.47$ , so the difference in the cost of labor would be close to 50%. As shown in graphs 1 and 2 in Mexico both  $T_f$  and  $T_i > 0$  so unless workers attach no value to social protection benefits, on one hand, and fully value social security benefits, on the other,  $\delta > 1$  somewhere in the range given by (7).<sup>20</sup>

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<sup>19</sup> Social security contributions are 29.5% of the wage; contingent costs of hiring are 3.2%; and state labor taxes 2%, so  $T_f = 34.7\%$ . The calculation ignores federal labor taxes and profit-sharing to workers which could increase  $T_f$ .

<sup>20</sup> As noted, resources for social protection programs have increased rapidly; this would move  $\delta$  toward  $\delta_{\max}$ . On the other hand, IMSS (2006, ch. X) shows that the availability of infrastructure for social security health services has been falling steadily over the last twenty-five years: the number of hospital beds per beneficiary has fallen from 1.85 in 1980 to 0.83 in 2005 and the number of doctors' offices in first level health clinics from 0.60 to 0.42. This would move  $\beta_f$  away from unity and  $\delta$  toward  $\delta_{\max}$ .

### III.2 Dispersion in the Cost of Labor

The discussion so far has assumed that all workers have homogeneous valuations of social programs, i.e., that:

$$(8a) \beta_f^\ell = \beta_f \quad \text{and} \quad (8b) \beta_i^\ell = \beta_i \quad \forall \ell \in L$$

There are many reasons why this may not be so, however. Workers' risk-aversion or time-discount rates may differ making some value health insurance or savings for retirement more than others, for example. But even if all workers had equal preferences, there are practical reasons why social security and social protection programs will be valued differently by identical workers. These have to do with the quality of services provided given variations in the availability of health, day care and housing infrastructure across regions. This implies that even if statutory benefits are the same for all, the real value of these benefits is not. Under these circumstances workers with equal abilities and preferences self-select into different jobs some preferring informal ones (where there are better social protection services), and some formal (where there are better social security services). And, evidently, to the extent that social protection services improve relative to social security services --see graphs 1 and 2-- this self-selection process reduces the supply of labor to the formal sector and increases it to the informal. Alternatively, if some regions of the country have more social security infrastructure (say, the North) while other regions have more social protection infrastructure (say, the South), then all else equal informal employment will be proportionately less in the North.

Using (8) in (6) generates a continuum of  $\delta$ 's that can be ordered between  $\delta_{\min}$  and  $\delta_{\max}$  from the worker who most values social security relative to social protection to the worker who least values it. Equilibrium wages will depend on the number of workers of each kind. The important point is that workers of equal abilities, characteristics and preferences will receive different wages. I do not pursue this here for reasons of space, but clearly this will be associated with a dispersion of productivity losses in the economy.

### III.3 Evasion and Informal Salaried Employment

The wedge in the cost of formal and informal labor when  $\delta > 1$  induces firms and workers to evade social security laws, generating salaried employment without social security coverage, labeled here  $L_{if}$ .<sup>21</sup> Whether this occurs or not

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<sup>21</sup> Because I focus on the incentives of social programs I refer to evasion of social security laws only, but this behavior should be interpreted more broadly involving evasion of labor regulations as well as taxes and

depends on the gains from evading, which are positive when  $\beta_f < 1$  even if there are no social protection programs ( $T_i = 0$ ), on one hand; and the penalties associated with evading the Law, on the other hand. Let  $F > T_f$  be the fine imposed on a firm hiring salaried workers but not registering them with IMSS; and let  $\lambda \in [0,1]$  be the probability of being fined. It is natural to assume that  $\lambda$  increases with the level of evasion, measured here by the number of workers hired by firms but not registered with IMSS.

On their part, workers accept salaried employment without social security benefits only if the firm compensates them with a higher wage than  $w_f$ ; call this  $w_{if}$  the wage paid to salaried workers by firms evading social security. At the same time, evading workers receive social protection benefits as I assume these programs cover all workers without social security, regardless of whether this is because they are non-salaried or because they are salaried but illegal workers (as is the case in Mexico). Since the worker values social security benefits in  $\beta_f T_f$  it follows that  $(w_{if} + \beta_f T_i) = (w_f + \beta_f T_f)$  for workers to accept salaried employment without social security. The (expected) cost of labor to informal firms hiring salaried workers, on the other hand, is  $(w_{if} + \lambda F)$ . Equilibrium in the labor market with evasion of social security is given by:

$$\begin{aligned}
(9a) \quad & p^w \partial Q_f(L_f + L_{if}) / \partial L_f - (w_f + T_f) = 0 \\
(9b) \quad & p^w \partial Q_f(L_f + L_{if}) / \partial L_{if} - [w_{if} + \lambda F + (\partial \lambda(L_{if}) / \partial L_{if}) \cdot F \cdot L_{if}] = 0 \\
(9c) \quad & p^w \partial Q_i / \partial L_i - w_i = 0 \\
(9) \quad & \\
(9d) \quad & w_i + \beta_i T_i = w_{if} + \beta_i T_i \\
(9e) \quad & w_{if} + \beta_i T_i = (w_f + \beta_f T_f) \\
(9f) \quad & \lambda = \lambda(L_{if}) \quad ; \quad \lambda' > 0 \quad ; \quad \lambda(0) = 0 \\
(9g) \quad & L_i + L_{if} + L_f = L
\end{aligned}$$

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registration with various authorities. But note that the risks of evasion are highly correlated. If employment increases the risk of detection from IMSS inspectors increases. But more employment means more output, and selling more output increases the risk of detection by authorities from the Finance Ministry. In turn, the gains from evasion are not only savings on social security costs but also on taxes and other costs of formality.

Informal employment ( $L_i + L_{if}$ ) now results from a legal design that excludes non-salaried workers from social security; from a social security system that does not work well; from social protection programs; and from the response of firms and workers to these circumstances through evasion of social security. The latter is not a minor issue in Mexico since as can be seen from table 1  $L_{if}/(L_f + L_{if}) = 0.36$ . Differently put, in the absence of evasion in 2005 social security coverage would have been 55% higher than what it was!

Depending on the mix of legal and illegal employment firms hiring salaried workers can be classified as fully formal ( $L_f > 0, L_{if} = 0$ ), fully informal ( $L_f = 0, L_{if} > 0$ ), and mixed ( $L_f > 0, L_{if} > 0$ ). Aside from all other parameter values, this depends critically on the probability that the firm is detected,  $\lambda$ . Equation (10) suggests a plausible form for  $\lambda$ :

$$(10) \quad \lambda(L_{if}) = \begin{cases} 0 & \text{if } (L_f + L_{if}) < \underline{L} \\ L_{if}^\alpha & \text{if } (L_f + L_{if}) \in [\underline{L}, \bar{L}] \\ 1 & \text{if } (L_f + L_{if})_f > \bar{L} \end{cases} \quad ; \quad \alpha > 1$$

where  $\underline{L}$  is perhaps 9/10 workers, and  $\bar{L}$  50. The combination of (9) and (10) generates a distribution of firms by size of employment: fully informal firms with up to ten salaried workers (here labeled micro and small firms); mixed firms hiring between 9/10 and 50 workers combining registered and unregistered workers (here labeled medium size firms); and fully formal firms with 50 workers or more registering all their workers (large firms).<sup>22</sup>

Table 2 shows the number and the distribution of registered firms with IMSS by number of salaried workers. Table 3 shows the distribution of firms by number of salaried workers employed according to the Economic Census.<sup>23</sup>

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<sup>22</sup> Of course, there may be other reasons that can make a small firm be fully formal (or at least mixed), like having access to government procurement programs or to subsidized credit programs.

<sup>23</sup> The tables are indicative since they are not fully comparable. IMSS figures are for 2005 while Census figures are for 2004. Moreover, the Census varies its definition of small/medium/large firms depending on whether they are in commerce, services or industry. Levy (2006b) discusses these differences but they do not affect the central message: there is a very large number of firms with few salaried workers each evading IMSS.

**Table 2**  
**Firms and Salaried Workers Registered with IMSS, 2005**

<b>Workers by firm</b>	<b>No. of firms</b>	<b>%</b>	<b>No. of workers</b>	<b>%</b>
1 – 10	651,698	81.1	1,967,797	15.1
11 – 50	112,988	14.1	2,444,933	15.9
51 or more	38,516	4.8	8,551,972	69.0
<b>Total</b>	<b>803,202</b>	<b>100.0</b>	<b>12,966,702</b>	<b>100.0</b>

Source: Levy (2006b).

**Table 3**  
**Firms and Salaried Workers Registered in the Economic Census, 2004**

<b>Type of firm</b>	<b>No. of firms</b>	<b>%</b>	<b>No. of workers</b>	<b>%</b>
Small	2,849,091	94.8	6,829,379	33.0
Medium	114,171	3.8	6,037,296	29.2
Large	41,883	1.4	7,814,500	37.8
<b>Total</b>	<b>3,005,145</b>	<b>100.0</b>	<b>20,681,175</b>	<b>100.0</b>

Source: Levy (2006b).

Despite methodological differences in the definition of firm size, the contrast is sharp and revealing. At one extreme there are approximately 40,000 large firms that account for about 38% of total salaried employment (about 7.8 million workers), and for about 70% of all formal employment (about 8.5 million workers). At the other extreme there are about 2.8 million micro and small firms that account for 33% of salaried employment (about 6.8 million workers); but only around 650,000 firms with up to 10 workers are registered with IMSS accounting for 15% of formal employment (about 2 million workers). I conclude that evasion of social security (or illegal salaried employment receiving social protection benefits) is concentrated mostly in small firms, although a non-negligible amount occurs in medium size firms.

### **III.4 Marginal Labor Costs, New Investments and Factor Productivities**

Depending on production functions and parameter values (9) and (10) admit a large number of solutions. In some cases informal salaried employment will co-exist with formal salaried employment in the same industry; in some others the whole industry might consist only of informal firms; and yet in some others only formal firms might be present. In parallel, the wage rates given by (9) determine as well the level of non-salaried and self-employment.

To gain further insights, in this and the next sub-section I shift to a partial equilibrium analysis and ignore non-salaried and self-employment in the

informal sector. I analyze a simple case with only two firms hiring salaried labor, one fully formal and one fully informal, both producing the same good.<sup>24</sup> Assume wage rates in both sectors are given. Assume as well both firms have access to the same technology in the sense of knowing the same information about production blueprints. (In fact, both firms might not be far away from each other.) Note now from (9a) and (9b) that  $(w_f + T_f) > (w_{if} + \lambda F)$ . Since average labor costs are lower for the informal firm, the formal firm will have a higher capital/labor ratio.

It is critical to highlight, on the other hand, that the response of labor costs to changes in employment differs between firms. To see this, contrast the marginal costs of hiring one more worker (or MCL, marginal cost of labor). From (9a) and (9b) again and assuming constant wage rates:

$$(11a) \text{MCL}_f = w_f + T_f \quad \text{so that} \quad \partial \text{MCL}_f / \partial L_f = 0$$

$$(11b) \text{MCL}_i = w_{if} + \lambda F + \partial \lambda(L_{if}) / \partial L_{if} \cdot F \cdot L_{if} \quad \text{so that} \quad \partial \text{MCL}_i / \partial L_{if} > 0$$

This result is important: formal firms can expand employment at constant labor costs, while informal firms that initially have a cost advantage because they are evading social security contributions face increasing (expected) labor costs. This because hiring more workers increases the probability of being fined, and the fine is imposed on all workers hired not only on the last worker hired that caused the firm to be caught. There is, so-to-speak, an endogenous limit to the expansion of informal firms; their cost advantage is rapidly eroded with size.<sup>25</sup> Informal firms will be, on average, smaller than formal firms.

Differences in labor costs will influence investment decisions. I want to make two points. One, social programs increase the relative profitability of investments in informal vs. formal firms. And two, investments in the informal sector are biased in the direction of creating new firms rather than expanding

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<sup>24</sup> Think of products like jeans, shoes, toys or shirts produced in a maquiladora plant and the backyard of a house, respectively.

<sup>25</sup> This depends on the steepness of  $\lambda(L_{if})$ . Note too that the advantage of informality is rapidly lost because size not only increases expected labor costs but also the probability of being fined by the tax authorities. This could be modeled as informal firms facing de facto an output price that is inversely proportional to output even if they produce traded goods. Differently put, even though they are small firms they face a negatively marginal revenue product curve and not a horizontal demand curve. The pressure for smallness would now come from both the output price and the cost of labor.

existing ones. To make these points assume there are “I” resources available to be invested (from increased domestic savings, say). The question is whether this investment is channeled to the formal or the informal sector, and how.

I tackle this noting that investment alternatives in the informal sector are to augment the capital stock in established firms but remaining informal (option A); to create a new informal firm (option B); or to investing while turning formal and registering with IMSS the additional workers hired and paying a cost of formality of C (option C). On the other hand, investment alternatives in the formal sector are expanding the firm (option D); or creating a new firm (option E). Let one unit of investment “I” purchase one unit of capital  $K$ , assume there are no indivisibilities, and let  $\Delta L^k$  ( $k = A, B, C, D, E$ ) be the additional labor required in the firm to expand output with the additional investment.<sup>26</sup> The additional profits made by investing “I” in each case are:

$$(12a) \quad \Pi^A = \{p^w[(K_i + I), (L_{if} + \Delta L^A)] - [w_{if} + \lambda(L_{if} + \Delta L^A)F](L_{if} + \Delta L^A)\} \\ - \{p^w(K_i, L_{if}) - [w_{if} + \lambda(L_{if})F]L_{if}\}$$

$$(12b) \quad \Pi^B = p^w(I, \Delta L^B) - [w_{if} + \lambda(\Delta L^B)F]\Delta L^B$$

$$(12c) \quad \Pi^C = \{p^w[(K_i + I), (L_{if} + \Delta L^C)] - [w_{if} + \lambda(L_{if})F]L_{if} - (w_f + T_f)\Delta L^C - C\} \\ - \{p^w(K_i, L_{if}) - [w_{if} + \lambda(L_{if})F]L_{if}\}$$

$$(12d) \quad \Pi^D = \{p^w[(K_f + I), (L_f + \Delta L^D)] - (w_f + T_f)(L_f + \Delta L^D)\} \\ - \{p^w(K_f, L_f) - (w_f + T_f)L_f\}$$

$$(12e) \quad \Pi^E = p^w(I, \Delta L^E) - (w_f + T_f)\Delta L^E - C$$

Note from (12a) that if the informal firm grows its marginal and average costs of labor increase as there are more workers in the same firm. In turn, (12b) measures profits investing “I” on a new informal firm with lower average labor costs. The change in profits if the informal firm expands and becomes

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<sup>26</sup> Differently put,  $I/\Delta L^k$  is the capital/labor ratio of the new investment, which may or not be equal to the capital/labor ratio existing in the firm (so firms can grow by capital deepening or capital widening).



formal is given by (12c).<sup>27</sup> In the case of expansion of the formal firm, (12d), note that there are no additional costs of formality, while these need to be paid if a new firm is set up (12e); in these last two cases all workers are formal.

How do social programs impact (12)? I answer this writing  $\Pi^k = \Pi^k(T_f, T_i, \beta_f, \beta_i)$  and calculating the impact on the profitability of each investment option of changes in the parameters defining social programs. Noting from (9e) that  $w_{if} = (w_f + \beta_f T_f - \beta_i T_i)$  the results are in Table 4.

**Table 4**  
**Social Programs and the Profitability of Investment Options**

Social program/ Investment option	$T_f$	$\beta_f$	$T_i$	$\beta_i$
<b>A</b>	-	-	+	+
<b>B</b>	-	-	+	+
<b>C</b>	-	0	0	0
<b>D</b>	-	0	0	0
<b>E</b>	-	0	0	0

Note: These are the constant wage rates (partial equilibrium) effects of  $\partial \Pi^k / \partial SP^j$ , where  $SP^i$  refers to the corresponding parameter of social programs.

Concentrating on the valuation of social security and resources for social protection programs (column three for  $\beta_f$  and four for  $T_i$ ) the table shows that deteriorating social security services makes investments in the informal sector more profitable than investments in the formal sector; the same happens if more resources are allocated to social protection programs. In both cases the reason is the same: the wage for informal salaried labor,  $w_{if}$ , falls. Note from section III.1 that if I allow for general equilibrium effects through changes in  $w_f$  and  $w_i$  these results are strengthened since, as seen, both a lower  $\beta_f$  and a higher  $T_i$  increase  $w_f$  and reduce  $w_i$ . Incorporating these effects changes the zeros in column three to positives and in column four to negatives. In this case deteriorating social security services, on one hand, and enhanced social protection services, on the other, both increase the profitability of informal firms' investments and reduce it for formal firms'. The same happens with the mixed firm because, at the margin, it faces the incentives of a formal firm.

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<sup>27</sup> C could be just registration and transaction costs. But there could be other costs as well. For instance, an illegal firm in the backyard of a house can pay for its electricity at the usually lower rate for household consumption, but as a registered firm it would have to pay at the usually higher commercial rate. (In the extreme, as a formal firm it could perhaps not steal electricity, but it could do so as an informal one.)

Of course, in each option the change in profits from the additional investment of “I” needs to be compared with the cost of capital (or credit) to firms. If the relevant rates are  $r_f$  and  $r_i$  in the formal and informal sector, respectively, then each  $\Pi^k$  needs to be compared with  $r_f I$  or  $r_i I$ .<sup>28</sup> In principle the ranking of  $\Pi^{k's}$  serves to identify the most profitable investment option, although distortions in the capital market could revert the allocation of investment.<sup>29</sup> But the point being made here is different: given  $r_f$  and  $r_i$ , a bias in social programs in favor informality increases the profitability of investments in this sector relative to the formal one, and a larger share of the economy’s investment resources will flow to the informal sector. And, all else equal, a larger informal sector lowers average labor productivity. In this context, note that expression (5) measuring the output loss associated with social programs was calculated for a given distribution of the capital stock between the formal and the informal sector. But investment changes this distribution overtime, and it can do so in the direction of augmenting or reducing (5). My first point is that fostering social protection augments it.

The analysis suggests as well that some industries are more prone to informality than others. In general, informality will be more likely in salaried activities with decreasing, constant or mildly increasing returns, as well as in activities where indivisibilities in investment are not important. It is difficult to think of informal firms making cars or steel, but it is easy is to think of informal firms making clothing, shoes, jewelry, furniture, food and a myriad of products and services. This is important as it brings out that informality also biases the sectoral composition of output within salaried activities. This can be captured by writing (12) not only for firms choosing between investing being formal and informal in the production of a given good, but for each industry or relevant product aggregation. The first effect that I discuss here would then be reflected not only in a bias towards informality in a given sector, but in the bias of aggregate investment towards activities/industries where the conditions facilitating informality are present.<sup>30</sup>

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<sup>28</sup> I compare the flow of profits with the cost of the capital investment. Alternatively one can compare  $r^k = \Pi^k / I$ ,  $k = A,B,C,D,E$  as the rates of return in each option and compare these directly with  $r_f$  and  $r_i$ .

<sup>29</sup> There is a large literature explaining why  $r_f \neq r_i$  as a result of imperfections in the capital market. For the purposes of this paper, however, it does not matter whether the cost of credit is the same or not for all firms as I take these rates as exogenous.

<sup>30</sup> In general one would expect a bias in favor of services and commerce vis-à-vis manufacturing. Note also that if the degree of tradeability across sectors differs, then social programs will also distort the allocation of investments between traded and non-traded sectors.

I turn to the second point relative to the distribution of investments in the informal sector between expanding firms and creating new ones. Inspection of (12a,b,c) suggests that if there are constant or decreasing returns to scale  $\Pi^B > \Pi^A$  and  $\Pi^B > \Pi^C$ .<sup>31</sup> The reason is clear:  $\Pi^B > \Pi^A$  because the expanded labor force working in one informal firm is more costly than the labor force working separately in two informal firms (i.e.,  $\lambda(\Delta L) < \lambda(L_{if} + \Delta L)$ ). The same reason explains why  $\Pi^B > \Pi^C$ : investing in a new informal firm has lower labor costs than investing in the existing informal firm while turning formal (more so if the transaction costs of formality are high).<sup>32</sup> On the other hand, if there are increasing returns to scale, the investment could be channeled to the same firm, if the cost advantages of larger size dominate the cost disadvantages of more costly labor. Finally, for sufficiently strong returns to scale (or advantages of size) the firm could register some workers with IMSS (if  $\Pi^C > \Pi^B > \Pi^A$ ); this is facilitated if C is low. There are clearly many possibilities, but from the point of view of productivity the important cases occur when economies of scale or advantages of size are unexploited as investment is channeled into new informal firms because social programs make this the most profitable alternative.

To sum up: given the cost of credit, technology and other parameters, the ranking of  $\Pi^{k's}$  --differently put, the direction in which new investments will flow-- depends on social programs. These programs can distort investment decisions as much as imperfections in the capital markets and induce investment into the formal sector in larger and more capital intensive firms; or into the informal sector in smaller and more labor intensive firms. What the analysis shows is that if resources for social programs are tilted in favor of social protection more investments will be channeled to the informal sector; that some of these investments will take place in the form of very small firms; and that overtime this will lower the economy's total factor productivity.

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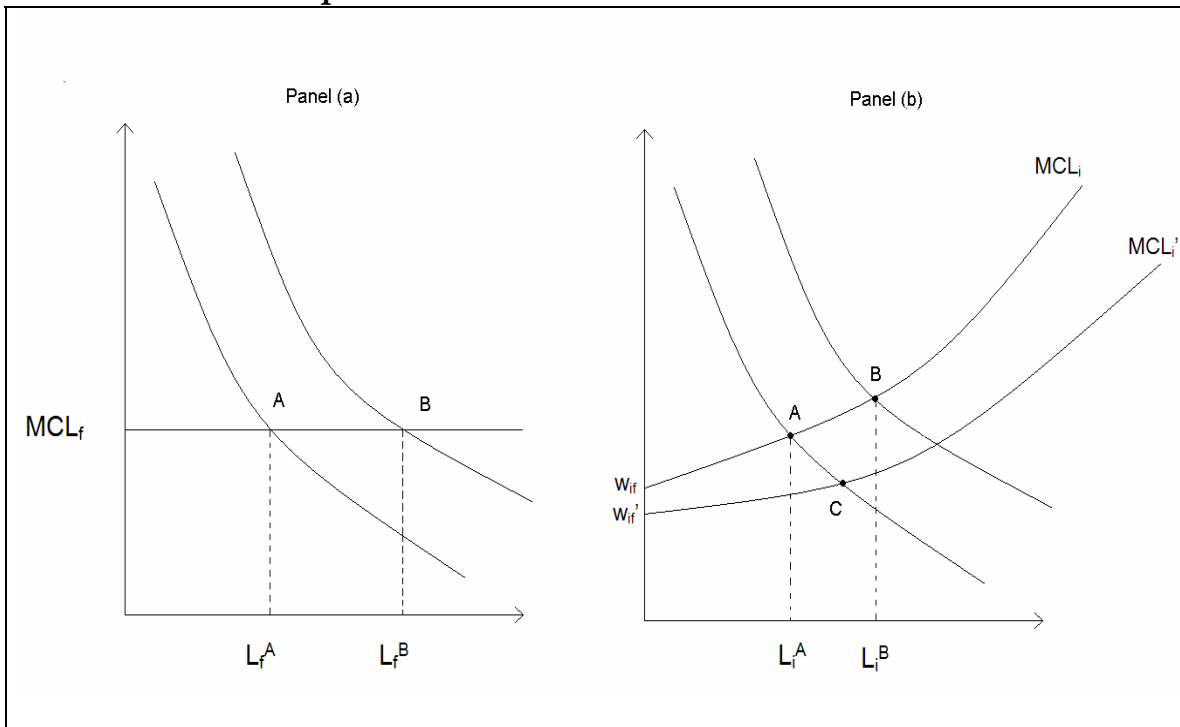
<sup>31</sup> The expression is inexact since, as noted, the capital/labor ratio associated with the expansion of the existing firm need not equal the one in the existing firm. The idea is more general and encompasses any advantage associated with larger firm size even if there are constant returns to scale: economies of scope, more resilience to negative output shocks, more labor training, lower cost of credit, more technology adoption, and so on.

<sup>32</sup> This also suggests that attempts to reduce informality by lowering C while leaving the rest of the incentive structure favoring informality intact will not have strong results; see Bruhn (2006) and Kaplan et al. (2006). Results will be even weaker if while C is lowered T<sub>i</sub> is raised (as happens in Mexico).

### III.5 Partial Equilibrium Comparative Statics

In this sub-section I explore the effects of changes in output prices and social programs on the composition of formal and informal employment. Graph 5 depicts the demand curve for labor and the marginal cost of labor for a fully formal and a fully informal firm. Panel (a) shows the marginal cost of labor for the formal firm intersecting with the demand curve for labor at point A, with  $L_f^A$  workers employed (and associated output  $Q_f^A$ ). Panel (b) shows the same for the informal firm, with  $L_i^A$  workers hired (and associated output  $Q_i^A$ ). Note that for the informal firm the marginal cost of labor starts below  $(w_f + T_f)$  at  $w_{if} = (w_f + \beta_f T_f - \beta_i T_i)$ .

**Graph 5**  
**Comparative Statics in Formal and Informal Firms**



Consider the effects of two changes. First, an outward shift in the demand for labor caused by a higher output price; second, an expansion of social protection programs represented by an increase in  $T_i$ . When output prices increase (say, because of better access to the United States market as a result of the North American Free Trade Agreement, Nafta), employment expands in both firms, but proportionately more in the formal one; contrast the distance  $(L^B - L^A)$  in each panel. As a result, the composition of employment shifts towards formality; this is the usual result observed in a “growth period”.

Assume now the initial equilibrium is at point B and that output prices fall (say, as a result of increasing competition from China or of faster productivity growth in the rest of the world). The employment contraction is stronger in the formal firm, and the share of informal employment in total employment increases; this is the usual result observed in a “slowdown period”.<sup>33</sup>

Turn to the effects of an increase in social protection with again points A in both panels as the initial equilibrium. Since the wage paid by the informal firm is  $w_{if} = (w_f + \beta_f T_f - \beta_i T_i)$ , as  $T_i$  increases  $w_{if}$  falls to  $w'_{if}$ , shifting outwards the  $MCL_i$  to  $MCL'_i$  so that for given output prices the informal firm moves to point C (this expands employment to  $L_i^C$ , not drawn in panel (b) so as not to clutter the graph), while the formal firm keeps employment constant at  $L_f^A$ . Social protection programs make illegal salaried employment more profitable and increase the share of informal employment in total employment.

Assume now these changes occur sequentially: first, starting from points B stronger international competition increases the share of informal employment as both firms move to points A. Second, the government responds to this change channeling more resources to social protection programs as it observes that there are now more informal workers; see graphs 1 and 2 again. Aggregate labor productivity falls. Differently put: a policy response to increased international competition favoring social protection programs is, from the point of view of productivity, the wrong policy response.

Is the policy response appropriate from the social point of view? To answer this note from graph 4 that the increase in  $T_i$  insulates all workers from the lower real wages associated with their reduced productivity. However, because the composition of employment changes social security coverage falls. Fewer workers are forced to save for retirement and for a housing loan, or forced to purchase disability, health and work-risk insurance; more workers have the option to access any combination of these benefits. So the answer would seem to depend on the government’s social policy: what social benefits does it want to force all workers to consume?<sup>34</sup>

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<sup>33</sup> The composition of informal employment changes, however. Self-employment and non-salaried informal employment increases to compensate for the fall in formal and informal salaried employment. Thus, informality acts as shock absorber in downturns aside from its structural role; see Bosch and Maloney (2006).

<sup>34</sup> The full answer, however, needs to address as well the issue of how the government will pay for them. As noted, the cost of social protection programs is not internalized by firms and workers in the informal sector, so unless taxes are raised from some other sources the policy response may be unsustainable; see Levy (2006a).

One could think, in a very stylized fashion, that the comparative statics described are suggestive of events in Mexico in the last few years after the initial gains derived from Nafta (since China entered the WTO?).<sup>35</sup> One could think as well that the persistence of this policy response will continue to have negative consequences for productivity growth. And one could think, finally, of a vicious circle of increased informality, expanded social protection programs, lower productivity and competitiveness, increased informality.....

### III.6 Summing Up and a Subsidiary Hypothesis

I summarize the channels by which social programs impact productivity. First, in a static framework with a given distribution of the capital stock and assuming there is no evasion of social security laws, the combination of social security and social protection increases informal employment, reduces average labor productivity and workers' real wages, and causes a loss of GDP (measured by (5)). There are more self-employ workers in low productivity occupations and more workers in non-salaried relations with firms. Prices of productive assets increase in the informal sector and fall in the formal.

Second, if the quality of social security and social protection services is not everywhere the same, the tax on formal salaried employment and the subsidy to informal non-salaried employment differs across regions. This induces a bias in favor of self-employment and non-salaried activities in regions with relatively better social protection services, and a bias in favor of salaried employment in regions with relatively better social security services. The cost of labor to firms will vary across regions.<sup>36</sup>

Third, with evasion of social security there is an addition to informality coming from firms illegally hiring salaried workers. These firms directly compete with legal firms hiring workers with social security coverage, and because they face lower average labor costs informal employment expands. This informal salaried employment is distributed in many small firms given that marginal labor costs are increasing at the individual firm level. All else equal, informal firms are smaller and more labor-intensive than formal firms.

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<sup>35</sup> Formal employment at the end of 2005 was similar to the level observed in 2000 despite annual growth in the labor force at around 2%; see Bassi et al. (2006). Most of the formal jobs lost during the period occurred in manufacturing, with services and commerce compensating partly for the fall. The authors note that "Never before --neither in the debt crisis of 1982 nor in the fatidic 1995 when the economy collapsed by 6.2% had the basis of formal employment been corroded as it happened during the period 2000-2003" (p.7, my translation).

<sup>36</sup> If these regions are, respectively, the North and South of Mexico, this contributes to widen regional productivity differences, in addition to the impact of Nafta; see Dávila et al. (2002).

Fourth, in the absence of evasion investment is distorted towards non-salaried and self-employment activities, given the tax on salaried labor and the subsidy to non-salaried labor. (Or given that the price of productive assets in non-salaried activities increases.) Overtime this will change the distribution of the capital stock in favor of non-salaried activities.

Fifth, the allocation of investment is further distorted if there is evasion. The profitability of investments in informal firms illegally hiring salaried labor increases relative to formal firms. Given the cost of credit a larger share of total investment flows to informal firms and to activities with low returns to scale and few indivisibilities. These investments, finally, are biased in the direction of creating new firms as opposed to expanding existing ones, potentially limiting the exploitation of advantages of size.

The effects just summarized are inherently associated with the combination of social security and social protection programs; one could call them “social policy-induced microeconomic distortions that lower productivity growth”. But the source of funds used to finance social protection programs may add a different channel that impacts productivity and growth. One could call this “the budgetary implications of expanding social programs”. In particular, the expansion of these programs may be financed by increasing taxes or reducing other government expenditures; or by reducing investments in public infrastructure; or with increasing oil rents (luckily); or with increased indebtedness. None of these alternatives is dictated by the inherent characteristics of social programs; but the choice made matters for growth.

In this context I note that the expansion of social programs depicted in graphs 1 and 2 has not been financed by higher taxes. Over the period 1998-2006 the share of non-oil revenues in GDP has been constant: 14.2% in 1998 and is budgeted to be 14.1% in 2006. Revenues from oil rents, on the other hand, have increased from 6% of GDP in 1998 to 8.8% in 2006. However, the share of oil revenues allocated to public investment has fallen steadily, from 48% in 1998 to 30% in 2006. Excluding investments in the energy sector, public investment in highways, irrigation, ports, transport facilities and infrastructure in general has been constant over this period: 209 billion pesos in 1998 and is budgeted to be 210 billion pesos in 2006, with an annual average of 211 billion (in pesos of 2006). During this same period the labor force has grown over 20% (Levy, 2006b). One can hypothesize that reduced public investment per worker also contributes to low growth in Mexico.

## **IV. Suggestive Results on Microeconomic Distortions, Informality and Productivity**

In principle, measuring the static productivity costs of social programs requires estimating (9) and measuring the dynamic costs via investment decisions needs estimating (12). This complex task is not undertaken here. In this section I only review papers that provide evidence or present simulation studies consistent with the hypotheses expounded in section III.

### **IV.1 Estimates from other Countries**

Hsieh and Klenow (2006) measure the gaps in the marginal products of labor and capital in approximately 40,000 manufacturing establishments in India and 110,00 in China aggregated in 4-digit sectors, focusing on how these gaps impact firms size, productivity and capital intensity. In particular, they analyze the effects of dispersion in exogenously given capital taxes and subsidies to firms that are about +/- 27% of the mean value for India and +/- 112% in China. They find that removing these distortions to equalize the marginal product of capital across industries approximately doubles manufacturing output in both countries. Further, if capital is allowed to accumulate to equal its rental rate, manufacturing output could increase by a factor of more than four in the case of India and by a factor of three in China.

These are large numbers and one can quibble with some of the assumptions, but the key point is that the aggregation of distortions in a key factor --in their case capital-- has a large macroeconomic impact of productivity. Their model is different from the one presented here but one can easily think of a symmetric result in their model where there are exogenously given distortions in the cost of labor across firms. Mutatis mutandis this would provide measures of the productivity costs of differences in the marginal product of labor (here endogenous as a result of social programs).<sup>37</sup>

Banerjee and Dufflo (2004) focus in microeconomic distortions that produce differences in the cost of capital to firms within India and argue that these distortions can partly explain the productivity differences between

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<sup>37</sup> Interestingly, the authors quote a study by the McKinsey Global Institute arguing that "...a key factor behind the low productivity in the retail sector in Brazil is that labor market regulations drive up the cost of labor for supermarkets, but do not affect retailers in the informal sector. Therefore, despite their low productivity, the lower cost of labor faced by informal sector retailers make it possible for them to command a large share of the Brazilian retail sector" (p.3).



manufacturing plants in India and the United States. They also note, however, that some element of fixed costs is required to fully explain these differences. But their results are interesting as they show that distortions affecting factor productivities at the micro level can go a long way in explaining differences in total factor productivity across countries.<sup>38</sup>

## **IV.2 Informality and Productivity in Mexico**

Various papers explore the link between informality and productivity in Mexico. Duval (2006) observes a negative association between labor productivity and informal employment. He notes that sectors with the highest share of informal employment in total employment are also the sectors with the lowest productivity growth for the period 1988-2004, finding that industries like financial services, mining and electricity show constant and high rates of labor productivity growth, while industries like construction, personal services, agriculture and commerce show practically stagnant labor productivity. Finally, he observes that after the crisis of 1994-95 the negative correlation between productivity growth and informality has strengthened.

Fajnzylber et al. (2006) study the dynamics of micro and small firms in Mexico using propensity score matching techniques to contrast formal firms with access to credit, participating in a business association, paying taxes and receiving training, with informal firms that decide not to participate in these societal institutions. They observe large informality in micro and small firms, noting that less than 10% of these firms have received credit or training and less than 17% participate in a business association. Their main finding is that increases in broadly defined formality have the potential for increasing profits and survival rates, and to bring micro-firms closer to their optimal sizes. Although they do not provide an explanation for smallness, their findings are consistent with the hypothesis that informal firms are below their optimal size, along the discussion of section III.

López-Acevedo (2006) focuses on the relation between firms size and technology adoption. Using firm level data for 1992-99 she finds that the firms in Mexico most likely to adopt new technology are large (aside from other attributes). In parallel López-Acevedo and Tan (2006) focus on firms' investments in workers training and identify positive impacts of these investments on labor productivity. Using the same data set the authors find

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<sup>38</sup> The authors discuss various factors accounting for differences in the cost of capital to firms in the same country (credit constraints, lack of insurance, and so on). The key point, however, is capital is mis-allocation, with firms in the same sector using different technologies with different factor productivities.

that small and micro firms are between one fifth and one sixth less likely than large firms to invest in workers' training either in-house or with external providers. Unfortunately, in both cases the analysis does not distinguish between formal and informal firms, although an indirect inference could be made by firm size to the extent that a large share of small firms is informal. This would suggest that the tax on firms' growth associated with social programs negatively impacts these two dimensions of productivity.<sup>39</sup>

### IV.3 Formal-Informal Wage and Labor Productivity Differentials

Differences in the cost of labor across sectors are key elements linking social programs to productivity. One approximation to these differences can be obtained from estimates of wage differentials between formal and informal workers. The exercises that I am aware of, however, produce inconclusive results as to the value of  $(w_f - w_i)$ . The problem partly derives from the fact that data for different years is used, partly from the fact that different methodologies are applied, and partly from difficulties in measuring wages appropriately in the informal sector.<sup>40</sup> On one hand, Macías and Meléndez (2006) estimate these differentials for 2004 finding that on average wages for workers in the urban informal sector exceed wages in the urban formal sector by approximately 21%.<sup>41</sup> They also find important dispersion around the mean differential, statistically associated with access to social security benefits and workers' characteristics that would influence the valuation of these benefits. Note that if we ignore social protection benefits the results of Macías and Meléndez imply a value for  $\beta_f$  of approximately 0.60 (normalizing  $w_f$  at unity

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<sup>39</sup> There are other dimensions of firms' behavior that impact productivity which I do not review here for reasons of space. Micro and small firms have higher failure rates than larger firms. Higher failure rates increase labor turnover. As a result, the mostly unskilled workers hired by these micro and small firms are at times in illegal salaried employment, at times in legal salaried employment, and at times in self-employment. This helps to explain why low wage workers have more mobility than high wage ones (as commented in section II.2). Low wage workers have "precarious jobs" because they work for "precarious firms". In turn, high turnover reduces the valuation of social security because some benefits are a function of time in formality, and induces low wage workers to self-select into the informal sector. See Duryea et al. (2006) and Levy (2006a).

<sup>40</sup> For example, when the informal worker is self-employed exploiting his own productive asset part of his earnings are the quasi-rents on this asset which need to be separated from his pure labor income. Other informal workers might not own a physical asset, but they do "own" an intangible asset if, for example, they have privileged access to a particularly valuable street corner where sales (of contraband, food, etc.) are high because of intense traffic. (In some cases these workers might have to pay a rent to a mafia controlling these streets, but this is difficult to identify in the data.) In rural areas there are difficulties not only because some self-employed own land, but also because at times payment is in kind and this may also be difficult to identify.

<sup>41</sup> Their estimates are derived from the Encuesta Nacional de Empleo y Seguridad Social, which is an extension of the ENEU with questions included to measure use of social security services.

and recalling that  $T_f = 0.35$ ).<sup>42</sup> On the other hand, Navarro and Schrimpf (2004) with the 1997-98 ENEU find higher wages in the formal sector than in the informal. They ascribe these differences to a process of self-selection where workers seek jobs in the sector where they have a comparative advantage, and expressly reject the hypothesis of barriers to entry into formality providing additional evidence supporting the formal-informal labor mobility hypothesis. These findings are consistent with those mentioned in section II.2.

I highlight here that the results of this paper do not depend on the sign of  $(w_f - w_i)$ , as inspection of (2c) indicates, nor on the sign of  $(w_f - w_{if})$ . What is critical is that the  $MPL_f > MPL_i$ , as this is what causes the productivity loss from over-employment in the informal sector. Expression (3) captures this and it is positive as long as  $\beta_f < 1$  and/or  $\beta_i T_i > 0$ .<sup>43</sup> To measure the implicit taxes and subsidies to labor derived from social programs the parameters that need to be estimated are the  $\beta$ 's more than the wage differentials on their own.

While this econometric work is performed, I carry out a simple exercise to provide an illustration of what these differences in labor productivities could signify. The 2005 ENEU shows that the hourly wage for workers with up to primary education is 19.7 pesos for formal workers; and 17.9 and 26.1 for informal salaried and self-employed workers, respectively. I use here as a measure of  $MPL_i$  the weighted average of workers in the informal sector, which is 22.1. On the other hand, since  $T_f = 0.35$ , the  $MPL_f = 19.7*(1.35) = 26.6$ . This implies that formal workers are 20% more productive than informal workers ( $=26.6/22.1$ ). The annual output loss per worker inefficiently employed in the informal sector is then 12,960 pesos ( $= [26.6-22.1]*8*30*12$ ). The total annual output loss according to (5) is in turn  $12,960\Delta L$ . How large could  $\Delta L$  be? Clearly, a lower bound is  $L_{if}$  informal salaried employment, although as discussed in section III even without evasion informal employment is larger than optimal when  $\beta_f < 1$  and/or  $T_i > 0$ . If we just take the lower bound of  $L_{if}$  table 1 indicates that  $\Delta L = 7.7$  million workers, yielding an estimate of (5) of 99.8 thousand million pesos, or approximately 1.3% of GDP for 2005.

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<sup>42</sup> However, social protection benefits are present and it is difficult to think they have no value. This would call for joint estimation of  $\beta_f$  and  $\beta_i$  with an equation like (2c). As far as I know this has not been attempted so far, but my presumption is that an approach that expressly accounts for benefits in the informal sector could modify the estimates of wage differentials obtained in these econometric exercises.

<sup>43</sup> Alternatively, the relevant sign is not of  $(w_f - w_i)$  but of  $[(w_f + T_f) - w_i]$ .

This cost is paid during every year that these distortions persist. Adding inefficient non-salaried employment to  $\Delta L$  would augment this figure.<sup>44</sup>

#### IV.4 Balance

None of the evidence discussed above can be interpreted as proof of the hypothesis offered in this paper. My purpose in this section was only to present three sets of findings consistent with this hypothesis as well as some illustrative numbers. The first set is not directly related to informality or to social programs. But the simulations studies for other countries cited here are valuable on their own right because they show that microeconomic distortions in factor markets can explain productivity differences between countries and within countries, and that these effects are potentially large.

The second and third set of findings is related to Mexico and focus on informality. The second set does not establish causality with social programs, but links informality of firms and workers to the productivity of capital and labor and consists of three parts. One, there is evidence showing that labor productivity is lower in sectors where the share of informal employment in total employment is higher. Two, there is evidence indicating that informal firms are sub-optimally small. Three, some indirect evidence shows that informal firms engage in less labor training and technology adoption than formal firms.

The third set of findings is centered on the behavior of the labor market, and consists of two parts. One, there is evidence of wage differentials between workers of similar characteristics, although there is no consensus as to their magnitude. Two, various sources of evidence indicate that labor mobility across sectors is very vigorous, particularly for low wage workers, pointing out in turn that the assumption of binding minimum wages or other barriers to entry into formality is not a reasonable description of events in Mexico.

The illustrative calculations, on their part, should not be interpreted as estimates of the productivity costs of social programs. Clearly, a much more careful exercise needs to be performed. Yet the results are suggestive. They

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<sup>44</sup> On the other hand, note that (5) is an approximation of (4) for “small”  $\Delta L$ . As employment expands in the formal sector  $MPL_f$  would fall, and the opposite would happen to  $MPL_i$ . This would lower the estimate. Borrowing standard approximations from trade theory the “triangle” would be  $\frac{1}{2}$  the calculated amount, or 0.6% of 2005 GDP (considering only that  $\Delta L = L_{if}$ ; adding  $(L_f^* - L_f^*)$  from graph 4 would significantly augment it). But even if this is not done, the estimate of the output loss is not small. For instance, it exceeds the budget of Mexico’s large-scale poverty reduction program Progres-a-Oportunidades by more than 50%!

should probably be criticized as overly conservative since a proper evaluation needs to include also the impact of social programs on the allocation of investment discussed earlier; as well as other impacts on informal firms' behavior with regards to labor training and technology adoption. The only point that I make is that these numbers matter in an overall assessment of Mexico's growth and productivity underperformance.

The central point of the paper is not quantitative, however. It is that informality should be seen as an equilibrium phenomena resulting from the simultaneous optimizing decisions of workers and firms given the incentives that they face to participate in the formal or informal sector; and that informality reduces productivity and growth. Incentives to firms and workers, on the other hand, derive from multiple sources, not only from social programs. As noted in passing at various points, firms also react to the transaction costs of formality, to the costs of credit, and to the taxation regime to mention a few. Workers seek jobs not only based on wages and social benefits, but also on other characteristics like flexibility and hierarchy. Thus, one cannot conclude that social programs are the only cause of informality. But I think one can conclude that social programs contribute to informality, and that they are a quantitatively important component of the incentive structure faced by firms and workers.

If this conclusion is accepted the rest follows. Given all other factors associated with informality, if social programs are tilted in the direction of informality at the margin they enlarge it, and they enlarge the associated productivity losses; this the more so if fiscal resources keep on flowing in the direction of social protection programs at the rate observed in the last few years. If subsidies are offered conditional on a behavior, and taxes imposed conditional on the opposite behavior, what should we expect?

## **V. Concluding Remarks**

How important are the perverse incentives implicit in social programs relative to other explanations of Mexico's low growth and stagnant productivity? It is difficult to provide a quantitative answer to this question, as it hinges on a comparison of how various factors operate differentially on the growth process. Clearly, an uncertain and low quality supply of energy limits growth as high-cost telecommunications or a poorly educated work-force, to mention some of the factors mentioned in the introduction.

This paper does not claim that social programs are, from a quantitative perspective, the main source of Mexico's lackluster growth and productivity performance. Nevertheless, it does argue that social programs are distorting key determinants of growth and productivity: the market for labor and the decisions of firms in dimensions that impact their competitiveness. Informality is not innocuous: it lowers the productivity of workers and distorts the investment decisions of firms.<sup>45</sup>

But regardless of the quantitative magnitude of the effects of informality on productivity, there is something qualitatively different between the issue highlighted here --in a nutshell, well-intentioned but badly-designed social programs-- and the factors mentioned in the introduction affecting Mexico's growth. This is the fact that public resources are used to lower the productivity of labor, a non-traded input not only essential for competitiveness but whose returns are central to workers' welfare; and that in doing so the productivity of firms is also reduced.<sup>46</sup> This contrasts with the other factors that result from politically powerful private or public monopolies or trade unions, or from the difficulties of increasing tax revenues. One could argue that there is something troublesome about these social programs, call it perhaps self-inflicted harm, particularly if they are partly financed with rents from a (transitory?) positive oil shock and partly by sacrificing growth-promoting public investments.

I am evidently not advocating removing social programs. My point is different. It is that the segmentation of firms and workers into formal and informal associated with social security/social protection programs division is bad economic policy (aside from bad social policy). Mexico is caught in a self-made dilemma between increasing worker's welfare through various forms of social interventions, on one hand; and appropriate incentives to workers and firms to seek productivity-increasing jobs and investments, on the other. Unless Mexico escapes from this dilemma both workers' welfare and productivity will suffer for a very basic reason: a sustained increase in workers' standard of living cannot be divorced from worker's underlying productivity unless there is a permanent and stable source of external rents. History shows, however, that this is unlikely or at least very risky. Because in the end there is

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<sup>45</sup> In my view studies about productivity and growth in low and middle income countries fail to place sufficient attention to the impact of informality on workers' and firms' behavior; this despite the fact that informality usually accounts for more than half of the labor force and a majority of firms.

<sup>46</sup> The government also uses public resources to increase workers' and firms' productivity (particularly small and medium) through programs that provide training, consulting services, access to credit, facilities for technology adoption and the like. A World Bank (2004) report notes there were 130 such programs in Mexico.

no dilemma, Mexico needs to reform its social programs to increase productivity and growth; social policy is economic policy.

At the same time, I also argue that reforming social programs is required to improve equity and to effectively reach the government's social objectives. Today similar workers are subject to different treatments; social security and social protection are not the same. It is not the same to force workers to save for retirement in one case, and give them the option to do so in the other; it is not the same to force workers to save for a housing loan in one case, and give them the option to obtain one in the other; it is not the same to force workers to purchase life, health and disability insurance in one case, and give them the option to do so in the other; and it is not the same to bundle all these obligations as a single one in one case, and unbundled them as any combination of options in the other. Paradoxically, a reform of social programs motivated by the need to increase growth and productivity is also a reform to increase equity and social welfare; equal treatment for equal workers.

There is another side to this. Reforms essential for growth and productivity --in energy, telecommunications, taxation, education-- have stalled in Mexico over the last years as a result of many causes. Some might argue that this is because previous reforms in privatization, pensions, deregulation and trade liberalization generated (or are perceived to have generated) more income inequality as their benefits were largely captured by a few households, or concentrated in a few regions. Others might argue that these reforms have generated macroeconomic stability, but little growth and few "good" jobs. Whatever the diagnosis, the result is that the social consensus behind more reforms "along the same lines" has weakened; yet these reforms are essential to regain Mexico's competitiveness and grow at higher rates.

If this assessment is correct, reconstituting the social consensus might contribute to the approval of growth-inducing reforms, particularly in the context of Mexico's evolving democracy. Perhaps nothing could contribute more to this purpose than creating "good" jobs rapidly. But this will be more difficult to achieve if social programs continue along their current path. As shown, the problem is not that there are no formal jobs; the problem is that these jobs are fragile and pay low wages, making many workers opt for informal jobs; and the problem is that behind these "fragile jobs" are equally "fragile firms". Stable jobs with increasing wages will be created at a sufficiently fast pace only if the incentives for firms and workers to increase productivity are there.

Today these incentives are insufficiently strong, resulting in stagnant productivity growth and stagnant wages. However, using social protection programs to increase workers' welfare to correct for this situation in my view is a mistake even ignoring the issue of these programs' financial sustainability, as it only worsens the productivity problem. This is why reform of social programs should be high in the economic agenda; all the more so if one does not ignore the issue of financial sustainability. And if this reform implies more equity, as any serious reform would, so much the better. Social policy reform for equity and growth.

A reform of social programs that contributes to growth, productivity and equity has two pre-requisites. First, these programs must not discriminate in the nature of benefits to workers on the basis of their labor status. Second, they must be paid for with the same sources of revenues, without sacrificing public investments or consuming transitory oil rents.<sup>47</sup> Changing policy to achieve this requires an understanding of the political forces that sustain the current equilibrium --in particular, the link between social programs and political legitimacy-- and a gradual transition strategy; but a good place to begin is recognizing that Mexico has been moving in the opposite direction.

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<sup>47</sup> Levy (2006a) provides more discussion.



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