

Self-Employment and Labor Turnover

Cross-Country Evidence

William F. Maloney

The share of the workforce in self-employment and the level of turnover are shown to be unreliable measures of labor market distortion and rigidity. Both are shown to be more affected by standard economic and demographic variables — the level of formal sector productivity, real interest rates, and education levels — than by labor taxes and barriers to firing.



Summary findings

Maloney uses cross-country data from Latin America and OECD countries to test the predictions of a simple efficiency wage model (Krebs and Maloney 1998) about the share of the workforce in self-employment and the rate of labor turnover across the process of development and demographic transition.

The model is supported, with numerous demographic, economic, and labor market institutions appearing as important determinants of both self-employment and turnover. Social security taxes on firms and barriers to firing workers appear to reduce the size of the formal sector, and barriers to firing do appear to reduce turnover. But the level of formal sector productivity, real interest rates, and education levels generally have a greater impact.

A central lesson is that it is misleading to use the size of the informal self-employed sector and the rate of labor

turnover as indicators of distortion or rigidity without first adjusting for these factors. Somewhat speculatively, Maloney offers adjusted measures that suggest that Latin American labor markets are not especially distorted and are about average in flexibility, with important exceptions.

Central to the theoretical framework is the view that self-employment is a desirable destination for many salaried workers rather than the disadvantaged sector of a labor market segmented by union- or government-induced rigidities. To prevent the loss of investment in training to the informal sector, firms will pay above-market-clearing "efficiency wages," in the process creating unemployment or segmentation that may cut across lines of formality.

This paper — a product of the Poverty Reduction and Economic Management Unit, Latin America and the Caribbean Region is part of a larger effort in the region to understand the functioning of developing country labor markets and the impact of labor legislation. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Tania Gomez, room I8-102, telephone 202-473-2127, fax 202-522-0054, Internet address tgomez@worldbank.org. Policy Research Working Papers are also posted on the Web at <http://www.worldbank.org/html/dec/Publications/Workpapers/home.html>. The author may be contacted at wmaloney@worldbank.org. April 1999 (37 pages).

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1. Introduction

This paper develops and tests an integrated approach to understanding two outstanding questions central to understanding the functioning of LDC labor markets and the impact of labor legislation. Though the paper focuses primarily on Latin America, the issues and analysis are germane both to other LDCs and the industrialized countries.

The first is the role of the large informal sector in the region (see table 1). A traditional view argues that the sector testifies to government or union induced rigidities that force formal remuneration above market clearing and ration workers into informality.¹ We argue that this view is probably incorrect and that it is difficult to draw any conclusions about efficiency from sector size alone.

The second question centers on what recent findings of high turnover, a common measure of rigidities (see Nickell 1997), imply about the flexibility of labor markets in the region.² It is often asserted that high firing costs and excessive benefits in the formal sector prevent the efficient allocation of workers among jobs.³ However, as table 1 suggests, average tenure is shorter, and a larger fraction of the work force has been employed in their current position for less than two years in Latin America than in the OECD. We argue that this probably cannot be interpreted a priori as evidence of greater flexibility.

The structure of the paper is as follows: Section 2 heuristically develops a model that moves beyond the standard segmentation-based view of the relationship of formal and informal

¹ See Harris and Todaro (1970) for an early presentation of this view.

² See Maloney (1995) for Mexico, Gonzaga (1996) for Brazil, Anderson Shaffner (1997) for Colombia, Márquez and Pagés (1998) more generally. See Hopenhayn and Rogerson (1993) for a recent theoretical discussion.

³ See for example Burki and Perry (1997) *The Long March*.

sectors, and incorporates the increasing evidence that a large fraction of the employment in the informal sector is voluntary. It is developed in an efficiency wage context both because recent evidence suggests that much observed segmentation may arise endogenously rather than being imposed by labor unions or minimum wages, and because it permits explicit modeling of the determinants of turnover. Predictions can be made about how the size of the self-employed sector, the degree of segmentation in the market, and turnover should move with the development process and policy innovations.

Section 3 examines cross country data from Latin America, Europe and Asia with three objectives. The first two are straightforward: to test the predictions of the model about the size of the informal sector and rates of turnover with respect to several key labor market, productivity, and demographic variables suggested by the theoretical framework and second, to suggest the direction of possible influence of variables that are theoretically ambiguous. But somewhat speculatively, we also attempt to provide more informed estimates of the incidence of unmeasurable distortions that ration more workers into the informal sector or rigidities that decrease turnover. Since our theoretical framework abstracts from such exogenous phenomena, we tentatively measure their impact by the deviations from the model's predicted values. Though it is trivial to raise objections to this approach on either theoretical or empirical grounds, the results at once strongly coincide with the stylized facts about industrialized countries and challenge what is commonly thought about Latin America: with some predictable exceptions, regional labor markets do not appear unusually distorted or inflexible.

2. Motivation and Theoretical Overview

The empirical work here is motivated by a macroeconomic model based on micro behavior of workers describe in detail in Krebs and Maloney 1998. It is built as a growth model so that secular movements in labor productivity can be incorporated and makes predictions about movements in formal and informal sector employment, the degree market segmentation, and labor turnover rates across the course of the development process. It also attempts to incorporate two emerging stylized facts about LDC labor markets.

1. The informal sector is extremely heterogeneous containing both voluntary and involuntary members. The informal sector is frequently considered the disadvantaged segment of a labor marketed segmented by government or union intervention in the wage setting process in the formal sector.⁴ During downturns, the sector is thought to expand as it absorbs displaced workers, then contracting again with recovery.

While some fraction of the sector corresponds to this view, recent studies find that many of the informal employed are voluntarily so and should probably be viewed as unregulated entrepreneurs. Comparisons of formal/informal wage differentials traditionally used to show segmentation have been shown to be meaningless, and there appears to be high degrees of mobility among sectors.⁵ The Mexican micro-enterprise survey suggests that 70% of workers enter the sector voluntarily for reasons of independence or higher income and recent time series

⁴ See the classic statement of this view in Harris and Todaro(1974).

⁵ In the absence of any distortions, we should find a wedge between formal and informal incomes that incorporates the value of benefits forgone, the value of taxes evaded, the value of lifestyle differences between wage and self-employment, capital costs, implicit training costs and payments in kind. Without this information, wage comparisons tell us nothing about segmentation or relative welfare between sectors. See MacIsaac and Rama (1997) and Maloney (1995, 1997a.)

data from Mexico and Chile suggest that both the size of and transitions into the self-employed sector behave procyclically.⁶ There is increasing evidence both in the sociology and economics literature that suggests a life cycle view of the trajectory between formal and informal self-employment: in the absence of well-functioning credit markets and effective educational systems, workers may take formal sector jobs to accumulate human and financial capital and then quit to open their own business.⁷ In sum, there is ample evidence suggesting that self-employment is a desirable destination for many workers who voluntarily leave formal employment.

2. *In the absence of government or union induced rigidities, there is still strong evidence of "segmentation."* Recent work on Mexico challenges the customary view of the sources of labor market segmentation. Minimum wages are not binding (See Bell 1998) and the evidence suggests that union power is directed largely to the maintenance of employment and find no significant effect on wages.⁸ As Marquez and Ros (1990), noted, and has been confirmed by later studies for Peru (Shaffner,1998)and Guatemala (Funkhauser1998), wages of similar workers rise with firm size, much as they do in industrialized countries. Further, Márquez (1990), and Abuhadba and Romaguera (1993) find evidence consistent with efficiency wage effects in the high correlation of wage differentials among Chile, Venezuela, and Brazil and the

⁶ See Maloney (1997b) and Pages(1998). Pais de Barros finds no cyclical movement in Brazil. Saavedra in Peru finds a broadly countercyclical movement but this may be largely driven by secular trends.

⁷Aroca and Maloney (1998) model the transitions into informality as a destination of entrepreneurs and find evidence using logit techniques adapted to panel logit context.

⁸ See Maloney and Ribeiro (1998), and Hernandez -Laos (1998). Panagides and Patrinos (1994) find some wage effects, but these are likely to disappear when relevant firm characteristics, such as size, are included.

US. This evidence suggests that the conditional wage dispersion (wages adjusted for human capital) may be emerging endogenously and is not due to either government or union intervention.

Both stylized facts suggest an interpretation of the interaction of formal and informal markets rooted in the extensive literature on efficiency wages where firms *voluntarily* pay wages above the market clearing level.⁹ One common variant of these models arises from the difficulty of monitoring individual workers and the lack of any penalty from being caught “shirking” - any activity, or lack thereof, that might be detrimental to the firm. If wages are market clearing, a worker fired for shirking can simply get another job at the same wage. However, if all firms pay higher than market clearing wages, unemployment will be created in the economy that creates a disincentive to being laid off and hence to shirking.

Since in many Latin American countries, workers can be fired only with difficulty, the “turnover” variant of efficiency wage models seems more appropriate: Firms must invest resources in workers when they are hired, perhaps through training or through the process of recruitment, that will be lost if the worker leaves. Hence, it is worthwhile for firms to pay higher wages and raise the opportunity cost of leaving to other firms or jobs. This argument may be particularly compelling in LDCs given the life cycle model of self-employment developed above. **In an inversion of the commonly held view that higher than market clearing wages create informality, it may be that the attractiveness of self-employment causes firms to pay above market clearing wages.** This, in fact, does create a subset of the informal sector that is

⁹ For discussions of the theory of efficiency wages see Stiglitz (1974), Krueger and Summers (1988), Phelps (1994).

involuntarily self-employed and who are unable to easily move back into the formal sector.¹⁰

Thus, potential self-employed, aware of the high rates of failure of small businesses, will think twice about leaving formal employment if the probability of being rehired is reduced.¹¹

The efficiency wage approach has the advantage of dealing explicitly with the issue of turnover, the second of our central issues to be examined. However, it also complicates our view of the informal sector and what its existence reveals about inequality, poverty or labor market distortions. A large fraction of workers may treat the sector as a very desirable destination either to attempt to run a business, or as a place where workers quitting an undesirable formal sector job may search for another and for them the traditional conflation of informality with disadvantage or relative poverty are inappropriate. However, it is also clear that some fraction is trapped there involuntarily- that is the expected byproduct of efficiency wages.

Despite abstracting from wage rigidities introduced by minimum wage or unions, this approach is useful for understanding labor markets in the region. First, in Brazil, Chile, as in Mexico, government mandated minimum wage and the curbed power of labor unions are unconvincing as the principal sources of segmentation. Second, efficiency wage phenomena are likely to exist as an important underlying determinant of wage structure, however overlaid by

¹⁰ Some fraction of the informal sector serves the role of unemployment benefits in industrialized countries. This raises the possibility of an analogy between the size of the sector and the natural rate of unemployment (NAIRU). The large movements in formal/informal remuneration in LDCs can generating insights on the elasticity of the NAIRU to unemployment benefits in the industrialized countries where the lack of variation in wages/unemployment benefits have prohibited rigorous testing. (Katz and Blanchard 1997).

¹¹ For the worker's decision to enter self-employment, we have in mind a model something like the "noisy selection" model of Jovanovic (1982). Here, workers have only a very diffuse idea of their ability as entrepreneurs and whether they will be able to stay in business. Only by actually opening a business can they learn about their true underlying abilities. The ability to be rehired is therefore an important consideration in risking self-employment.

other local institutions, and they have long term implications for labor, education, and poverty alleviation policies. Third, careful modeling these effects aids in identifying abnormalities in informal sector size or turnover that may be interpretable as more reliable evidence of distortions that are not explicitly introduced through the model.

Though the model is general equilibrium in design, the intuition can be distilled to two equations. These can be broadly represented as an upward sloping “incentive curve” and as a downward sloping labor demand curve shown in figure 1. The curves are plotted with the probability of being hired in the formal sector on the X axis and formal wages *relative to the average in the self-employed sector* on the Y axis. The incentive curve II captures the essence of the efficiency wage story. It represents the constraint that firms face in trying to prevent workers from leaving with their training and opening a business in the informal sector. The higher the probability that a worker will be hired in the formal sector if the business turns out to be less successful than expected, the greater the likelihood of quitting his current formal sector job, and hence the higher the formal sector wage must be to persuade him from trying his luck. Though it is not a traditional labor supply curve, it incorporates the usual depressing effects on labor supply to the formal sector of increased attractiveness of the informal sector, or a rise in taxation of formal sector wages. The second curve DD is similar to the traditional labor demand curve. It can be argued that as wages rise, formal firms hire fewer workers and the probability of being hired falls.

2.2 Comparative statics

These two curves allow analysis of the impact of several important variables on the size

of the informal sector, what share of it is likely to be voluntary, and on rates of turnover. We analyze the impact of three broad classes of policy interventions or economic innovations: Increases in labor productivity or firm profitability, a rise in the benefit to being self employed and changes in hiring costs.

2.2.a Increases in labor productivity or firm profitability. (Z)

This includes technological progress, and of particular interest, a fall in labor taxes, or a reduction in any regulation that adversely affects productivity. Any of these changes has the effect of shifting the DD curve to the right along the II curve. (figure 2). As productivity increases, firms are willing to hire more workers, and hence to increase the probability of being hired. The movement along the incentive curve implies that a higher wage *relative to that in the informal sector* must be paid to retain workers. But this also necessarily implies that a larger fraction of informal workers is involuntary and would experience welfare enhancements upon finding a job in the formal sector. For each of the shocks discussed below, the rise in formal sector employment and wage therefore may have *negative* distributional effects.

The impact on turnover is ambiguous. Both wages and the probability of being hired rise over time with opposing effects on turnover and it is not clear, *ex ante*, what the net effect should be. Though the implied shifts of curves are the same for the following cases, it is worth highlighting certain aspects.

Technological progress: A secular rise in formal sector productivity due to technological progress has the effect of raising both the level of employment in the formal sector, and

the wage paid there. The model has the prediction, then, that as countries grow, a larger and larger fraction of those self-employed are involuntary and segmentation increases among the sectors. For very poor countries, salaried vs. self-employment may be very close substitutes, but in richer countries, perhaps Argentina, self-employment is, on average less desirable. This dynamic may offer some insight into the elusive Kuznets relation of worsening and then improving distribution with development. A poor country has a very large self-employed sector. As productivity rises, segmentation between the formal and informal sector increases and increases the wage differential between formal and informal sector workers, worsening distribution. However, eventually, the self-employed sector shrinks to so small a size that, though the differentials are great, the number of workers affected is small, leading to a relative improvement of the Gini. Using estimates of the important elasticities, section 4 shows this to be a plausible dynamic. The indeterminacy of turnover suggests that it is not obvious that LDC's should have higher or lower rates of turnover.

Regulations and Taxes: Any regulation that can be reinterpreted as a tax on firms-non-wage benefits, firing costs- or any economy wide regulation that leads to lowering the marginal product of labor reduces the size of the formal sector and lowers the formal sector wage. It is important, however, to bear in mind that this effect is most compelling if workers do not value these benefits. To the degree that they do, this is simply payment in a different form.

This even applies in some measure to restrictions on firings which can be seen as a tax equal to the option value of the ability to divest of an underperforming asset. To the

degree that the worker sees these costs as an insurance premium against termination, they are passed along to workers as lower wages with no impact. However, it is easy to generate scenarios where this might not be the case, and the net result is to reduce employment, and turnover.¹²

It is important to highlight that the distributional impacts of a reduction in labor taxes are the opposite of those generally postulated in the traditional view with a minimum wage or union induced wage rigidities. There, a reduction in taxes reduces total remuneration to the formal sector relative to the formal, and at the same time increases the size of the formal sector, with likely positive distributional effects. Here the result is less clear.

2.2.b Rise in the benefit to being self-employed, or a reduction in worker taxes (τ)

Anything that raises the benefit to being self-employed relative to being formally employed increases the rate of turnover and causes a shift in both the incentive curve and the demand curve (figure 3). In the former, for any probability of being hired, the formal wage must rise to offset the increased desirability of the informal sector. In the latter, the increased cost of retaining workers also shifts the labor demand curve left. What is clear is that employment in the formal sector falls.

This coincides with existing literature on unemployment in the OECD countries that increasingly focuses on the level and duration of benefits as the key determinant of

¹² See Bentolila and Bertola(1990) for a discussion of the impact of firing costs and labor demand.

unemployment. Nickell finds the duration to be the key determinant of long-run unemployment levels while Blanchard and Jimeno(1995) attribute the relatively high Spanish unemployment to the fact that Spaniards get access to benefits of indefinite duration if employed only 6 months of the last 4 years while Portuguese workers must have been working 1.5 of the last two years. Benefits of indefinite duration are similar in principal to self-employment as an alternative to formal work. The absence of unemployment benefits in LDCs has the effect of collapsing both the self-employed and the “unemployed” into one sector.

The impact on relative wages, however, is ambiguous since both curves shift left, hence it is difficult to say anything definite about distribution. This indeterminacy also prevents any ex ante statement about turnover despite the increased difficulty of finding a formal job.

Income or other taxes: Any tax that finances a public good or whose benefits are perceived as below its cost in terms of taxation renders the informal sector more attractive.

Internal mobility restrictions: Where internal reallocation in the formal firm is highly regulated, talented workers may choose to work on their own.

2.2.c Changes in Hiring Costs

Any policy that serves to lower the fixed costs of hiring (recruitment, training, etc.) reduces the loss involved with a quit and hence the magnitude of efficiency wage effects. Showing the effect graphically is difficult since it involves both shifting and changing the slopes of both curves. However, what is clear, is that in the limit where training costs fall to zero, there is no longer any need to pay efficiency wages, no segmentation, and there is an increase in formal sector employment. The impact on turnover is positive since there is no reason for firms

to prevent identical workers from leaving and replacing them with new ones.

Public education: Public education has long been justified on the grounds that it addresses the externality implicit in the efficiency wage story: the private sector will under-invest since the basic skills they pay to impart can be easily transferred elsewhere. To the degree that poor LDC education systems force both training and socialization costs on individual firms, the wage gap between self-employed and formal salaried workers will be larger, segmentation greater and distribution worse, and a larger fraction of the self-employed involuntarily employed. This offers another channel through which improving education may equalize the distribution of income in the economy.

Reduced Interest Rates: Reduced interest rates lower the cost of investment in human capital and thus lower hiring costs.

Better job matching and signaling: If the recruitment and selection process constitutes a sizeable fixed cost, any improvement in mechanisms to promote good matching, or that reliably signals workers' skills, such as the education certification schemes in Mexico, cause all the same desirable outcomes.

Trade Reforms: To the degree to which other reforms, such as that of the current account, increase the demand for skilled labor and raise implicit training costs, segmentation and wage dispersion may increase. This may offer one explanation for the increasing wage dispersion observed with trade liberalization in Mexico and Chile.

3. Cross Sectional Regressions

We next test these hypotheses on a cross section of countries for which a consistent set of productivity and distortion variables are available. In the first set of regressions, we examine the determinants of self-employment as a share of the total work force. In the second set, we focus on two measures of turnover. Using deviations from the predicted values of these regressions, we construct somewhat speculative measures of the magnitude of distortions and of rigidities.

3.1 Variables

The data sources and more detailed descriptions are listed in Appendix I.

3.1 Dependent Variables

Share of Workforce in Self-employment: The OECD tabulates the share of non-agricultural workers in self-employment or as owners of firms. To the degree possible, the same variable was created from the employment and household surveys from Latin America. We focus on self-employment rather than informality more generally for two reasons. First, we believe that it is the act of opening a business that is the central issue and that informality while important and often highly correlated is secondary.¹³ Second, data on informality in the OECD is largely unavailable and the LAC data sets differ in the variables available to use as proxies. Third, data on those employed in micro-enterprises is not available for the OECD. We assume that the total population employed in the self-employed sector, both as owners and workers is proportional to the share declaring themselves self-employed.

Mean Tenure in the Manufacturing Sector and Share of the Manufacturing Work Force with under Two Years of Tenure: These are two alternative variables available from the OECD and then generated from the LAC household and labor market surveys. We focus on manufacturing turnover because this is the best proxy for formal sector turnover that is available.

3.1.a Formal Sector Labor Productivity/Profitability (Z)

Industrial Value Added (Indust. V.A.): The log of industrial value added per industrial worker is

¹³ See Levenson and Maloney(1998) for a development of this view.

the proxy for formal sector labor productivity.

Social Security Tax-Employers (SSEmp): Social security (broadly defined) taxes as a share of the wage by worker. The model suggests that there may be different effects.

Employment Protection(Protection): An index of employment protection constructed by Gustavo Marquez that captures both the difficulty of laying off workers and the cost in terms of severance pay.¹⁴ Unfortunately, this leads to roughly a halving of the available observations and hence a separate set of regressions are run using this reduced sample.

3.1.b Rise in the benefits to being self employed, or a reduction in worker taxes. (τ)

Social Security Tax-Workers (SSWorker): Social security (broadly defined) taxes as a share of the wage by worker. Ideally, we would have a measure of labor productivity in the self-employed sector. Unfortunately, this is not feasible as even in the OECD possible proxies, such as wages in the commerce or other services are not consistent across countries. However, social security tax incidence on workers does capture an important element of the relative attractiveness of each sector.

3.1.c Hiring Costs.

Education (Education): The share of the appropriate age group with secondary education. No cross country direct measures of hiring costs are available. However, public education is a public good that addresses exactly the externality identified in the efficiency wage model. The more firms have to train, the more they have to lose by workers moving to another firm or to self-employment. We interpret any effect of this variable as working through training costs.

Real Interest Rate (Real Interest): The real interest rate affects the cost of training workers to raise future productivity as it would in the case of any other investment. We use the average of the 30-90 day borrowing rate deflated by changes in the CPI in most cases. While this is not generally the rate at which larger corporations borrow, it is none the less a rough indicator of the cost of investing in workers in the economy.

3.1.d Other Variables:

Duration of Unemployment Benefits: (U Benefits): Some share of the self-employed in Latin America would be found unemployed in the industrialized countries where unemployment

¹⁴ Chief Economist Office of the IDB.

benefits exist and are often generous. Its exclusion as an alternative to self-employment may bias results. For OECD countries with traditional unemployment benefits, the variable takes the value of the duration of unemployment benefits which Nickell (1997) found this to be the most important variable for explaining levels of unemployment. For Latin America and other countries, we calculate the standard severance pay package given the mean tenure (or predicted if unavailable).

Youth (Youth): We include one demographic measure as well, the share of the working population found between the ages of 16 and 20. The model implicitly assumes homogeneous work forces across countries. This is clearly not true as the share of young workers is much higher in Latin America than in the OECD countries. This variable is most relevant to the turnover regressions where traditionally young workers have higher rates of turnover as they shop around for careers. But it may also have a similar interpretation in the self-employment regressions.

Latin Dummy (LA): We include a dummy for being from the Latin American region. In theory, this may capture any difference between OECD economies and the region, including labor legislation.¹⁵ Ideally, we would like to eliminate the significance of this variable by including the labor market variables that it may be proxying for.

3.2 Results

The results must be interpreted with caution. First, we have at best 40 observations and in our most courageous moments, only 17. This in some cases can make the results sensitive to the countries included. Second, the data are not uniform. Most of the OECD variables were gleaned from presumably consistent publications of that organization while the Latin variables were individually extracted from not necessarily consistent survey data. The LAC dummy may pick up these data discrepancies.

Despite these potential pit-falls, the regressions prove surprisingly robust and consistent

¹⁵ We included a squared income term as well but it was never significant. This does not, however preclude more exotic non-linear functions.

with the model. The three Formerly Socialist Countries in the sample, Czech Republic, Hungary and Poland have extraordinarily low self employed sectors given their income level and affected the results. Since it seems likely that the repression of entrepreneurial freedom under communism is related to this result, we did drop these. However, the addition or subtraction of most of the other countries might change the parameter values some, but the overall story remains the same.

3.2 Results: Self Employment

The results are broadly consistent across the regressions. Column 1a in table 2 presents the complete regression with all variables included with the exception of the employment protection measure. As is clear, the employers' social security tax, the real interest rate, the level of education, the share of young people enter significantly and of predicted sign. Progressive parsing out of the less significant variables in column 1b makes the labor productivity and educational variables significant. In no case was the worker's share of social security remotely significant. Part of this poor performance may be due to measurement error. In roughly 25% of the cases, the social security law dictates a progressive tax that varies greatly across the range of incomes. We chose the midpoint of this range, but we can have no way of knowing if, in fact, this represents that average tax on labor. Similarly, the unemployment benefits variable is never significant, nor, in this case, is the LA dummy.

The significant variables enter of the signs predicted by theory. Most important in terms of magnitude is formal sector labor productivity. Taking the extreme values of this variable would account for 9.6 points of the variance in the share of self-employments detailed in column

1 of table 3. Figure 4 illustrates the same, but important conclusion: a large self-employed sector is not *ipso facto* evidence of distortions, but that the opportunity cost of self-employment is lower in poorer countries.

The relative youth of Latin America's population also explains much of the variance with the spread across the sample accounting for 8.8% of the higher share in self-employment. The education variable that measures the degree to which firms must bear the burden of financing overall education would account for roughly 7.5 percentage point difference. Real interest rates are also surprisingly important. Peru's very high self-employed sector (46%) and high real interest rates (67%) are clearly dominating the relationship although even dropping this outlier yields a significant coefficient. The difference between real interest rates of under 5% as in the OECD vs often above 30% in Latin America is worth over 6%. Once again, the importance of ensuring macro-economic stability, and reducing risk to bring down interest rates seems clear.

In general, these effects dwarf the impact of any of the three labor market variables. Across the range observed, social security taxes on employers explain relatively little of the size of the sector, 3.2 percentage points in the share of self-employment.

The same exercise was repeated with the smaller sample arising from using the Marquez protection index, 1c-1e. With fewer observations, the apparent collinearity of the productivity variable and education variables makes identifying the "correct" parsimonious form difficult (1d-1e). However, in all cases, the employment protection index has the impact of increasing the size of the self-employed sector. But, again, the difference between the highly protective Bolivia, Honduras, Mexico, Peru or Spain compared to the unprotective US or UK is worth only about 1.35 percentage points in the share of self-employment, a fairly small impact. The results are

similar to those of Marquez (1998) who also found a positive impact of his protection index, as well as a negative sign on GDP per capita which may be seen as a proxy for formal sector productivity.

In sum, the three labor distortion variables, the tax on salaries, on payroll, and restrictions on hiring and firing have relatively small impacts compared to those of the productivity, real interest rate, education variables and, in the larger sample, the relative youth measure. Thus, given the level of productivity in a country which again, may be affected by labor legislation, it is hard to argue that these distortions are responsible for the size of the sector.

The Adjusted Size of the Informal Sector: A Measure of Unobserved Distortions?

Can we say anything about distortions on which we have little reliable information, such as union or government induced wage rigidities from these regressions? Perhaps. In theory, the residuals of the regression capture the impact of all variables not explicitly included in the regression, including other labor market distortions. It is absolutely correct to argue that they also include any country specific variables, and any error in measuring sector size which cast doubt on using the residuals for this purpose. However, this critique applies to the use of the raw sector sizes as well and if sector size is thought to contain information, then the adjusted values obtained from the residuals are probably more appropriate.

Table 3 tabulates three sets of residuals from regressions on subsets of the significant explanatory variables. The results tell a reasonable story with a few exceptions. The first set of residuals are those from regressing only on formal sector labor productivity only. The complete re-ranking of size shows immediately the importance of compensating for productivity, or more

generally level of development when drawing inferences from the size of the sector. Among the OECD countries, they tell a story that is broadly consistent with the literature and suggest that the approach is not entirely misguided. The U.S., Canada show up as relatively clean, while Spain, Greece and Italy appear heavily burdened. Among the Latin countries, Costa Rica, Honduras, Guatemala, Chile, Paraguay, Brazil are all below trend in their share of the work force in self-employment and hence, arguably, with less onerous legislation than the mean, while Colombia, Argentina, Uruguay, Venezuela and Peru far above.

The second set of residuals add the structural variables measuring share of young people in the work force and the level of education, as well as the level of interest rates. The extremeness of this last variable and the difficulty of measuring it may distort the results some. Mexico is now firmly below trend and Chile, with relatively moderate interest rates, is actually above, although not by a significant amount. Peru now emerges as far less pathological than previously, but it still is joined by Argentina, and Venezuela as appearing to have a high level of unobserved distortions.

The third set of residuals add to the regressors the burden of taxation for social security. Consistent with the previous findings, this does little to change the overall ranking although Mexico's sector share is now even more below trend and Colombia approaches trend.

The final set of residuals attempts to incorporate the Marquez index. To take advantage of the more precise parameter estimates from the large sample, they are constructed by taking Resid 3 and regressing it on the measure of employment protection for the countries for which it was available. In general, Latin America shifts up in the rankings due to their overall higher firing costs. Now, Costa Rica, Bolivia, Mexico, Honduras, and El Salvador, and Paraguay appear to

have fewer residual distortions than the U.S. or most OECD countries. The Latin Countries that still appear with residual distortions are Venezuela, Argentina, Peru and to a lesser degree Colombia and Chile.

Again, this entire exercise is distorted to the degree that sector size is poorly measured, or that included variables are correlated with those excluded. Still, as a measure of segmentation, it is probably better than conventional comparisons of wages among sectors, and suggests a fairly robust story. Numerous countries in the region do not appear to be unduly saddled by labor legislation relative to that elsewhere.

These results are somewhat at odds with some previous work. Loayza (1996) built a model of informality that focuses largely on issues of taxes and regulation of business. He also generates standardized estimates of the size of the informal sector as a share of production, based on the VAT evasion rate. Chile, Argentina, and Costa Rica to have the lowest adjusted size and Peru, Panama, and Bolivia to have the largest. Given the possible divergence of VAT evasion rates from the relative share of employment in self-employment, these differences are, perhaps, not surprising. The results are also not entirely consistent with the indexes of distortion calculated in *The Long March*, a regional reform perspective published by the World Bank, which showed Peru, Chile and Colombia among the most liberalized and Mexico, Bolivia and perhaps Brazil among the least. This divergence, again, may be due to data problems-Chile may count its self-employed more conscientiously. But it also may be the case that enforcement varies greatly, and that a formally rigid market may, in practice, be quite fluid.

3.3 Results: Turnover

The turnover results are more difficult to interpret first, because of the fewer degrees of freedom available, and second because the theory is far less clear about what the signs should be. Nonetheless, the results are provocative.¹⁶

Mean Tenure

Columns 1a to 1c in table 4 present various specification of average tenure in manufacturing employment. Column a includes all variables in the specification, again with the exclusion of the protection variable. Neither the LAC, Youth, Unemployment Benefits enter significantly. Labor productivity enters both in levels and with its square suggesting a non-linear relationship. Taken at the mean, labor productivity appears to have a *negative* impact on tenure. This can be reversed with the exclusion of all other variables, but the inclusion of the share of the population with secondary schooling reverses its sign. Thus, although the OECD countries have more stable work forces, it appears that it is the fact that they are educated, rather than rich that drives the result. Both taxes on social security appear to increase tenure and real interest rates decrease it. Again, these results are consistent with the theoretical framework.

The reduction in sample to 17 observations with the inclusion of the employment protection variable leaves only the productivity, social security tax on employers and protection variables significant. The latter enters with predicted sign, suggesting that it does negatively affect turnover and importantly. The difference across the range from the U.S.(1) to Mexico to Venezuela (37) accounts for 3.24 years on a mean of about 9.

¹⁶ See Márquez and Pagés (1998) for a graphical treatment of these issues. The econometric results here are broadly consistent with their findings.

Table 5 presents a set of residuals for the average job tenure regression analogous to those previous. With the usual caveats about small sample size and the possible correlation of omitted variables with those included, Venezuela, Bolivia, Brazil, Bolivia appear with greater than average turnover when adjusted for productivity while Paraguay, Argentina, Honduras and Panama are below suggesting less. When adjusted for education levels and interest rates, Brazil shows closer to mean turnover and Panama now is above. Adding employers' social security contributions has the effect of bringing Honduras up above mean turnover and moving Panama below.

The share of the manufacturing workforce with under two years of seniority.

The results for the second measure of turnover, the share of the manufacturing workforce with under 2 years of tenure are broadly consistent but suggest the sensitivity of the results when sample sizes are so small. Labor productivity, the real interest rate, the employers contribution to social security, and education variables enter significantly and with signs consistent with the previous results. As column 2a suggests, the education variable proved very unstable with the youth variable included. However, because the youth variable entered with the sign opposite to that expected, the preferred regression was that presented in 2b. 2c suggests that in these regressions, the Marquez protection variable does not enter significantly. The residuals are not presented in tabular form for this regression.

3. The Overall Picture

Figures 5a and 5b plot the residuals from the second set of residuals (productivity, education, real interest rate, youth) from the self-employment regression and from the turnover

regressions to see if the combination of the two can reveal anything about the functioning of a given labor market. Though speculative, we will interpret these residuals as measuring labor market distortion (self -employment above the conditional mean) and rigidity (average tenure above the conditional mean). In the North East quadrant of figure 5a, rigid and distorted economies, we find Greece, Italy and Spain, all European countries renowned for repressive labor codes. It is, however, interesting to note that only one Latin country appears in this quadrant, perhaps unsurprisingly Argentina, but in figure 5b it will show higher than average turnover. In both graphs, Honduras, Paraguay, also appear somewhat rigid although less distorted than average. Among most flexible and undistorted in the South West quadrant we find, unsurprisingly, the U.S. and Canada, accompanied by Panama, Bolivia, Brazil. Venezuela, Peru. There is some sensitivity of the results to which measure of turnover is used. Using the share of workers with under 2 years of tenure, Figure 5b suggests that Argentina has above average flexibility and Brazil, below average. The graphs were redone replacing industrial value added per worker with purchasing power parity adjusted per capita GNP. The placement of countries changed little suggesting that the results are not very sensitive to the exact measure of labor productivity used. In sum, with some exceptions and with strong caveats about the reliability of the results, Latin labor markets do not appear exceptionally distorted, or inflexible.

4. Conclusion

This paper has presented the results of cross country regressions motivated by an efficiency wage model of the LDC economy. The model departs from the assumption that for many workers, informal self-employment is a desirable destination for salaried workers rather

than the disadvantage sector of a market made dual by union or government induced wage rigidities. Nonetheless, segmentation will always be present in all labor markets, even in the absence of unions or minimum wages so long as firms seek to retain workers in whom they have invested. Firms will pay above market clearing “efficiency wages” to lower turnover and in the process, create unemployment or segmentation that may cut across lines of formality. The predictions about the size of the self employed sector and turnover were tested using cross sectional OECD and Latin American data and generally supported.

The size of the informal sector can tell something about the impact of labor legislation on efficiency or distribution, but only if adjusted for demographic and other variables that theory suggests are important. Raw measures of sector size are not a reliable measure of distortions or inequality. The adjusted size of the informal sector suggests that, Venezuela, Peru, Argentina, and perhaps Colombia emerge as having relatively high levels of distortion by global standards, while Brazil, Costa Rica, Panama, Bolivia, Mexico, Guatemala, Honduras, and Paraguay have lower than average distortions. Such crude comparisons of adjusted sector sizes may offer an alternative to meaningless comparisons of earnings across formal and informal sectors. The divergence of these measures from those created from formal labor legislation in *The Long March* may suggest differences in enforcement, or the ability of the market to work around oppressive regulations.

Comparisons of raw turnover rates across countries tell us little about true labor market flexibility. Theory and preliminary empirical work suggests that many variables affect turnover in significant ways. Once these are considered, Latin American labor markets appear of average flexibility: Paraguay, Honduras, and perhaps Argentina and Brazil appear more rigid than

average while Bolivia, Panama, and perhaps Peru are less.

Barriers to firing workers, and social security taxes on firms appear to reduce the size of the formal sector. Anticipation of costly firing may lead to a reluctance to employ new workers while high non-wage benefits raise labor costs. That said, empirically, the level of formal sector productivity, real interest rates, and education levels in general have a larger impact on the size of the informal sector than labor market taxes or barriers to firing.

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Appendix I: Data Sources

1. Tenure variables of the OECD countries are from the following sources:

Table 2: Measures of the Sluggishness of Employment and of Adjustment Costs, Page 11, in Stephen Nickell, "Labour Market Dynamics in OECD Countries", Centre for Economic Performance, Discussion Paper #255, August 1995

Table 5.5: Distribution of Employment by Employer Tenure, 1995, Page 138,

Table 5.6: Average Employer Tenure by gender, Age, Industry, Occupation, 1995, Page 139, in "OECD Employment Outlook, July 1997",

2. Self-employment rate of the OECD countries is from "OECD Labour Force Statistics 1976-1996."

3. Self-employment rate and tenure variables of the Latin America and the Caribbean countries are from various CEPAL surveys of the following years: Argentina 1992, Bolivia 1995, Chile 1995, Colombia 1995, Costa Rica 1995, El Salvador 1995, Guatemala 1989, Honduras 1995, Mexico 1994, Panama 1995, Paraguay 1995, Peru 1996, Uruguay 1995, Venezuela 1995.

4. Per capita GNP and wages of Industrial workers are from Table 1: Basic Indicators, Page 214, 215 and Table 12: Structure of the Economy: Production in "World Development Report 1997",

5. Employment Protection variables provided by Gustavo Marquez, Chief Economist Office, IDB.

6. Social Security variables are from Table 3: Contribution rates for social security programs - OECD countries (1997), and Table 5.8: Social security and non-wage labour costs, in "Social Security Programs Throughout the World - 1997".

Figure 1: Equilibrium in Formal Sector

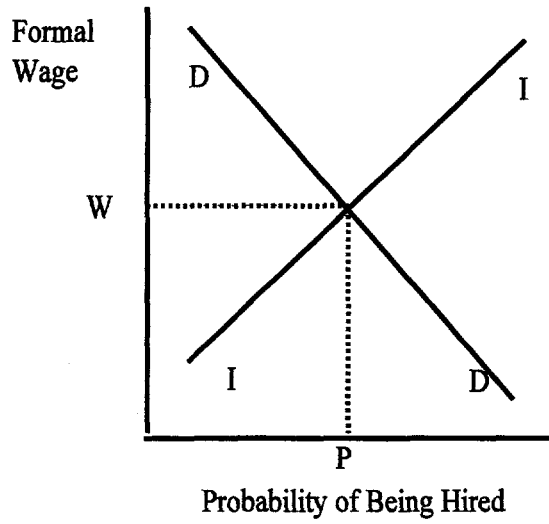


Figure 2: Formal Sector Productivity Gain (Z)

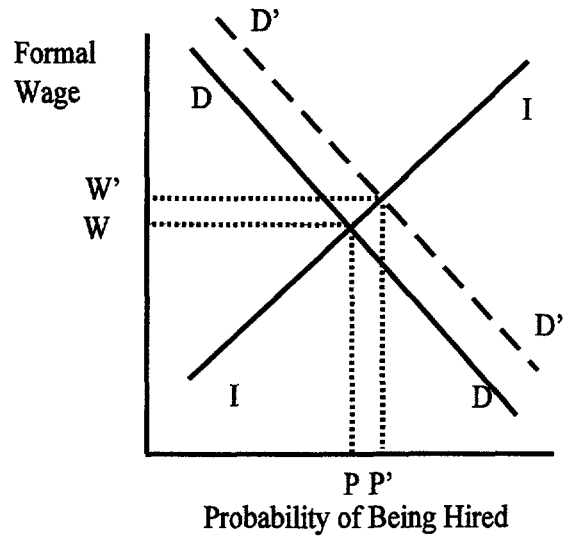
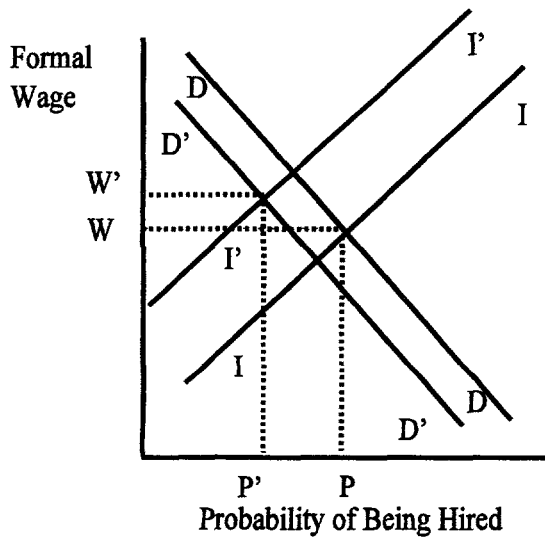


Figure 3: Rise in Informal Attractiveness (τ)



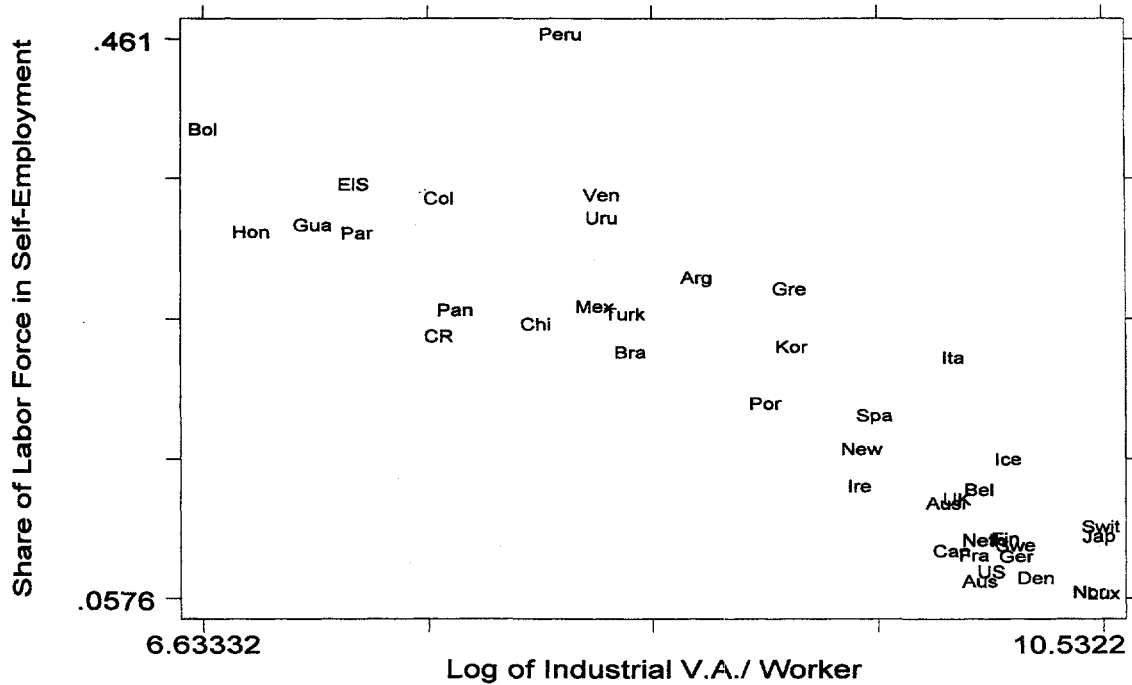


Figure 4: Self-Employment vs. Industrial Productivity

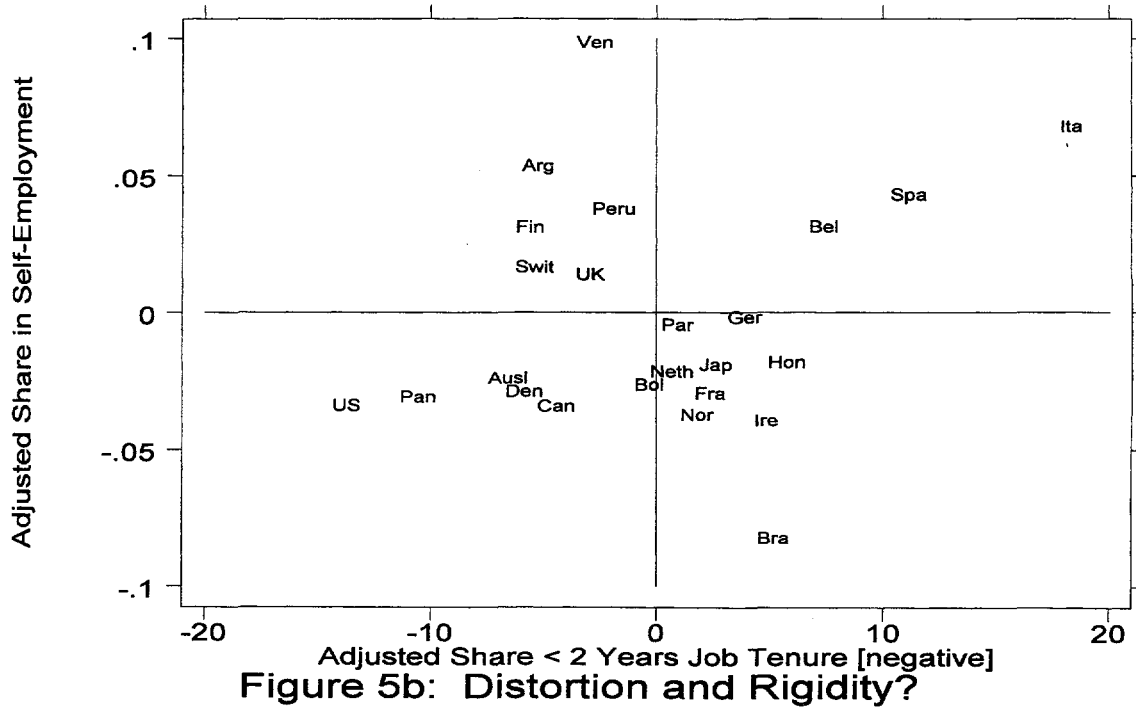
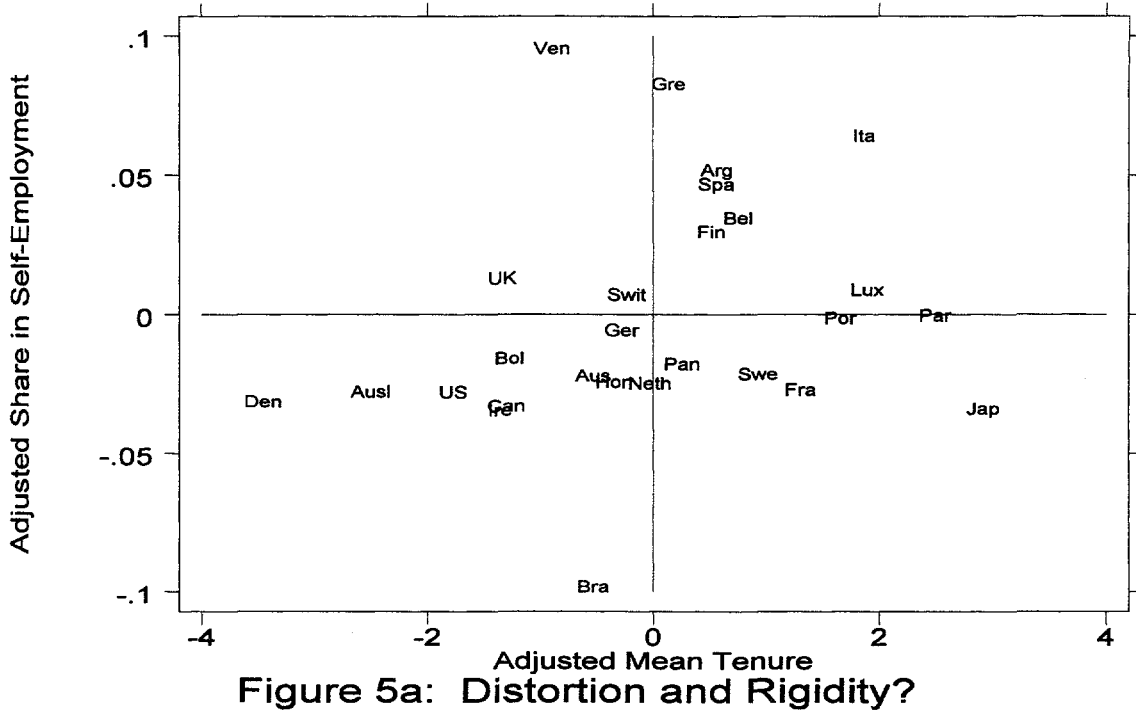


Table 1: Size of Informal Self-Employment and Turnover Rates

	LAC	OECD
% Workforce in Informal Self-Employment	31.5	12.9
% < 2 Years Seniority (Manufactures)	38.1	24.5
Average Tenure (Manufactures)	7.61	10.5

Table 2: Determinants of Self-Employment

	Self-Employed as Share of Work Force				
	1-a	1-b	1-c	1-d	1-e
C	0.26 (1.33)	0.36 (2.46)	0.11 (.36)	0.25 (1.46)	0.50 (3.29)
Indust. V.A.	-0.02 (1.26)	-0.03 (2.24)	0.00 (.02)	-0.01 (.25)	-0.05 (3.19)
SS Worker	-0.09 (.89)		0.02 (.14)		
SS Emp	0.16 (2.81)	0.16 (2.81)	0.09 (.95)	0.00 (3.69)	0.15 (1.63)
Protection			3.90E-03 (2.58)	4.50E-03 (3.69)	4.00E-03 (2.93)
U Benefits	4.00E-04 (.72)		-1.20E-04 (.01)		
Real Interest	0.22 (3.91)	0.23 (4.71)	0.23 (3.29)	0.24 (4.13)	0.21 (3.21)
Secondary	-1.00E-03 (1.91)	-1.00E-03 (2.37)	-1.50E-03 (1.53)	-1.60E-03 (2.4)	
Youth	3.86 (2.33)	4.14 (2.8)	1.79 (.63)		
LAC	0.04 (1.14)		0.02 (.32)		
NOBS	36	40	19	20	20
R2	0.92	0.90	0.94	0.93	0.90

Note: t-statistics below coefficients.

Table 3: Residuals of Self- Employment Regressions
(Ranked by Deviation from Predicted Share)

Country	% Self-Emp	Resid 1	Country	Resid 2	Country	Resid 3	Country	Resid 4
Costa Rica	24.4	-7.6	Costa Rica	-7.9	Brazil	-8.9	Brazil	-7.2
Honduras	31.8	-6.8	France	-7.5	France	-5.5	Costa Rica	-6.4
Austria	6.6	-5.9	Austria	-7.2	Costa Rica	-5.5	Bolivia	-5.2
Panama	26.2	-5.1	Honduras	-4.7	Austria	-3.9	Mexico	-4.8
US	7.3	-4.8	Sweden	-4.5	Sweden	-3.5	France	-3.3
Canada	8.9	-4.6	US	-3.6	Mexico	-3.3	Honduras	-3.1
Guatemala	32.3	-4.1	Brazil	-3.0	Norway	-2.9	Portugal	-2.3
France	8.6	-4.1	Guatemala	-2.7	US	-2.9	Guatemala	-1.1
Denmark	6.9	-3.6	Germany	-2.5	Ireland	-2.8	El Salvador	-0.4
Ireland	13.5	-3.3	Portugal	-2.5	Bolivia	-2.6	Ireland	-0.4
Chile	25.2	-3.2	Finland	-2.5	Canada	-2.2	Paraguay	-0.2
Paraguay	31.7	-3.2	Canada	-2.4	Portugal	-2.1	Denmark	0.7
Germany	8.5	-2.8	Paraguay	-2.3	Netherlands	-1.2	Spain	0.9
Netherlands	9.6	-2.7	Panama	-1.9	Japan	-1.1	US	1.0
Norway	5.9	-2.7	Ireland	-1.9	Guatemala	-1.0	Germany	1.0
Luxembourg	5.8	-2.3	Norway	-1.6	Honduras	-1.0	Chile	1.1
Sweden	9.3	-1.9	Bolivia	-1.4	Panama	-1.0	Netherlands	1.5
Brazil	23.2	-1.8	Mexico	-1.3	Germany	-0.5	Colombia	1.7
Finland	9.7	-1.8	Belgium	-1.1	Paraguay	-0.3	Peru	2.4
Australia	12.3	-1.4	Chile	-1.1	Denmark	0.0	Italy	2.6
Bolivia	39.2	-1.2	Netherlands	-1.0	Korea	0.3	Argentina	2.7
UK	12.6	-0.7	Luxembourg	-0.9	Australia	0.3	UK	2.7
Portugal	19.5	-0.7	Spain	-0.5	Uruguay	0.4	Belgium	3.5
New Zealand	16.2	-0.5	Korea	-0.2	Luxembourg	0.7	Venezuela	6.1
Mexico	26.5	0.2	Turkey	0.4	El Salvador	0.8	Greece	6.6
El Salvador	35.2	0.2	Colombia	0.4	Belgium	1.5		
Turkey	26.0	0.7	Denmark	0.5	Turkey	1.5		
Belgium	13.3	0.8	UK	1.1	Chile	1.8		
Japan	9.9	1.7	El Salvador	1.9	Spain	2.2		
Colombia	34.2	2.3	Australia	2.7	Italy	2.2		
Spain	18.6	2.4	Japan	2.8	Finland	2.2		
Switzerland	10.6	2.5	Argentina	2.9	Iceland	2.3		
Iceland	15.5	4.0	New Zealand	3.1	UK	2.3		
Korea	23.6	4.3	Italy	3.2	New Zealand	2.9		
Argentina	28.5	5.9	Iceland	4.7	Argentina	3.1		
Uruguay	32.8	6.8	Switzerland	5.0	Switzerland	3.1		
Venezuela	34.4	8.4	Uruguay	5.3	Colombia	3.9		
Greece	27.7	8.4	Greece	7.2	Peru	4.3		
Italy	22.8	9.4	Venezuela	8.2	Greece	7.3		
Peru	46.1	18.6	Peru	17.2	Venezuela	8.9		

Notes: Res 1 from regression on formal productivity. Res 2 from regression that also includes employers social security contribution. Res 3 includes also education, youth, and real interest rates. Res 4 are residuals of Res 3 on Job Protection.

Table 4: Determinants of Turnover

	Manufactures					
	Mean Tenure			% < 2 Years		
	1-a	1-b	1-c	2-a	2-b	2-c
C	60.58 (3.09)	74.35 (4.23)	43.30 (6.03)	-288.38 (3.82)	-288.67 (4.78)	-272.71 (2.23)
Indust. V.A	-11.95 (2.35)	-16.21 (3.99)	-3.19 (4.88)	84.40 (4.17)	77.61 (4.02)	73.37 (2.47)
I.V.A. sq	0.64 (2.07)	0.92 (3.99)		-4.84 (3.84)	-4.31 (3.89)	-3.98 (2.12)
SS Worker	8.13 (3.29)	8.68 (3.62)		-2.51 (.16)		
SS Emp	7.00 (1.79)	6.23 (1.79)	11.65 (5.86)	-46.92 (-4.63)	-44.45 (3.92)	-41.84 (2.54)
Protection			0.09 (2.99)			-0.05 (.21)
U Benefits	-0.03 (-1.13)			-0.13 (-1.42)		
Real Interes	-7.41 (1.92)	-7.10 (1.89)		14.45 (1.65)	21.44 (2.22)	24.14 (1.98)
Secondary	0.05 (2.15)	0.04 (2.23)		-0.07 (.69)	-0.24 (2.57)	-0.31 (2.11)
Youth	-39.23 (.48)			-754.73 (2.38)		
LAC	-0.70 (.41)			10.13 (1.33)		
NOBS	25	26	17	23	24	16
R2	0.63	0.68	0.81	0.50	0.65	0.54

Note: t-statistics below coefficient.

Table 5: Residuals of Average Job Tenure in Manufacturing Regressions
(Ranked by Deviations from Predicted Tenure)

Country	vg. Tenure	Resid 1	Country	Resid 2	Country	Resid 3
Denmark	7.80	-3.35	Denmark	-3.76	Bolivia	-1.84
Australia	7.00	-3.08	Australia	-2.69	Venezuela	-1.56
Venezuela	5.77	-1.87	Ireland	-1.78	Austria	-1.49
Bolivia	6.22	-1.84	Bolivia	-1.69	Denmark	-1.47
Brazil	6.25	-1.50	US	-1.38	Netherlands	-0.95
Switzerland	10.60	-1.43	UK	-1.11	US	-0.81
US	9.20	-1.40	Venezuela	-1.10	Ireland	-0.79
Canada	8.90	-1.25	Canada	-0.98	Italy	-0.54
UK	9.00	-1.20	Switzerland	-0.65	Australia	-0.46
Ireland	8.30	-0.93	Austria	-0.36	UK	-0.45
Netherlands	10.30	-0.21	Panama	-0.29	France	-0.43
Germany	10.80	-0.09	Brazil	-0.24	Germany	-0.27
Austria	10.60	0.14	Germany	-0.03	Spain	-0.26
Greece	9.00	0.34	Netherlands	0.03	Honduras	-0.16
Panama	7.84	0.45	Honduras	0.21	Switzerland	0.16
Honduras	8.39	0.56	Greece	0.39	Sweden	0.17
Sweden	11.50	0.60	Spain	0.40	Canada	0.29
Argentina	8.89	0.83	Finland	0.75	Argentina	0.30
Italy	11.20	1.03	Sweden	0.75	Brazil	0.36
Japan	13.10	1.09	Argentina	0.97	Belgium	0.39
Belgium	11.80	1.34	Belgium	1.15	Greece	0.47
Finland	12.30	1.53	France	1.32	Finland	0.69
Spain	10.90	1.53	Japan	1.63	Panama	1.00
France	12.10	1.71	Italy	1.68	Japan	1.45
Portugal	10.40	1.92	Portugal	1.80	Portugal	1.55
Paraguay	9.93	2.44	Luxembourg	2.43	Luxembourg	2.22
Luxembourg	14.70	2.63	Paraguay	2.54	Paraguay	2.44

Notes: Resid 1 from regression on formal sector productivity. Resid 2 from regression that also includes real interest rate, and education. Resid 3 includes also employers' social security contribution.

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