

# On Defining and Measuring the Informal Sector: Evidence from Brazil

ANDREW HENLEY, G. REZA ARABSHEIBANI  
Swansea University, UK

and

FRANCISCO G. CARNEIRO\*  
The World Bank and Universidade Catolica de Brasilia, Brazil

**Summary.** — Recent debate on the reasons for the informal sector has led to renewed focus on how to operationalize the measurement of informal employment. This paper investigates congruence between three empirical measures of the rate of informality using Brazilian household survey data for the period 1992–2004. Sixty-three percent of the economically active are informal according to at least one definition, but only 40% are informal according to all three. Regression analysis is used to shed further light on differences in these measures. Appropriate measurement is therefore of high significance to policy analysis and design of appropriate strategies to reduce informality.

© 2008 Elsevier Ltd. All rights reserved.

**Key words** — informal employment, social protection, entrepreneurship

## 1. INTRODUCTION

Informal employment is a concept used extensively to describe insecure forms of economic activity in the developing world. Such activity may include self-employment or own-account work, employment in fragile micro-businesses or family-run activity, as well as employment where the employer fails to provide appropriate access to social protection or formal registration of any contractual relationship. The nature of informal employment is such that switching between sectors may be frequent and that individual workers may be simultaneously engaged in activity in both formal and informal sectors. The growth and scale of informal employment in many developing countries has been traditionally attributed to the displacement of workers into insecure forms of labor market attachment as the only feasible alternative to unemployment (Fields, 1975; Mazumdar, 1976).<sup>1</sup> More recently following the work of Fields (1990), a number of authors (Cohen & House, 1996; Gong & van Soest, 2002; Maloney, 1999; Marcoullier, Ruiz de Casilla, & Woodruff, 1997; Pradhan & van Soest, 1995; Pradhan & van Soest, 1997; Saavedra & Chong, 1999) question this interpretation of informality. The informal sector may be more complex, comprising within itself multiple sectors some of which may comprise displaced workers, but others which allow workers better financial opportunities and/or better working conditions such as choice over hours of work. Perry *et al.* (2007) identify two broad groups: the informal salaried and those engaged in independent work. However, as the authors note in an extensive discussion and analysis of the Latin American context, within these groups informality may arise for a multiplicity of motivations and reasons. One strand of research has highlighted the dynamic “micro-entrepreneurial” nature of informal economic activity (Cunningham & Maloney, 2001; Maloney, 2004; Pisani & Pagán, 2004a; Pisani & Pagán, 2004b). This view of informality is well established and can be traced back to the work of Hart (1972). A final view (and one which we do not address in the present paper)

concerns the relationship between informality and illegal or tax-evading activity (see Gërkhani, 2004; Loayza, Oviedo, & Servén, 2005).<sup>2</sup> Each of these alternative views shares in common the idea that informal activity may be freely chosen by some workers. These individuals either perceive state social protection to be poor “value for money” or do not wish to have the conditions of their employment relationship (such as hours of work) restricted by tight “one-size fits all” labor market regulation and social protection (Perry *et al.*, 2007). Alternatively they may be attracted by the prospective job satisfaction or income stream associated with a successful transition into entrepreneurship, or may perceive the relative benefits of illegal or unregistered activity to outweigh the risks of detection.

The size of the informal sector is of particular interest to economic policy makers concerned to promote the development of a micro-entrepreneurial sector. This concern arises because of its perceived contribution to dynamic economic efficiency, possibly as a response to growing competitive pressures brought about by trade liberalization. On the other hand, policy makers may be concerned that significant numbers, perhaps even a majority of workers in developing countries have little or no social security provision. This means that they have little on which to fall back in the event of illness, unemployment, or old age, beyond personal wealth and extended family support. More generally, the size of the informal sector may provide an indicator of the scale of poor working conditions. A narrower but nevertheless important concern may be to reduce informality in order to widen the base of direct taxation. Further policy concerns may relate to the extent to which open unemployment is an accurate indicator of labor

\* The findings, interpretations, and conclusions in this paper are entirely those of the authors only. They do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent. Final revision accepted: September 5, 2008.

market performance, if unemployment is partly hidden in the informal sector.

This discussion of alternative perspectives on informality brings into sharp focus the question of the most appropriate way to define and measure the informal sector. This is a question that has attracted appropriate attention from labor statisticians under the auspices of the ILO, notably the International Conference of Labor Statisticians (see, in particular, *International Conference of Labor Statisticians*, 2003) and, since 1997, the Delhi Expert Group on Informal Sector Statistics. The agreed definition of informal employment follows from appropriate definition of the informal sector. However such employment is not exclusively found in the informal sector, and may include family workers contributing labor service to formal enterprises as well as employment within the household. In turn the precise definition of the informal sector has attracted the attention of statisticians (Husmanns, 2004). While an informal enterprise will be unincorporated and/or may not be registered for the purposes of tax or social security, the exact definition may depend on the national circumstances (International Labor Office, 2000). Despite detailed efforts to agree an international standard definition, there remains tension between conceptual definitions of informality and what is empirically measurable. This may arise from the paucity of data on a sector which by its nature is problematic to define. Researchers tend to fall back on the pragmatic and judicial use of data on employment status and sectoral affiliation, and may provide limited discussion of the sensitivity of any conclusions drawn to the issues of measurement and definition. An implicit assumption is that international comparisons of the scale of informality, which may be based on very different empirical measures, are valid. Over the last 20 years or so the growing availability of household and living standards surveys, such as the LSMS data collected by the World Bank, has improved the evidence base for many developing economies. However such surveys are typically not sufficiently rich to permit an evaluation of alternative definitions of informality, and could be subject to further improvement.<sup>3</sup> As a result some researchers may prefer to rely on direct collection of primary data.

Household survey data available for Brazil are a notable exception to this. Large scale annual household surveys (the Pesquisa Nacional por Amostragem de Domicílios or PNAD) contain detailed information on individual household member economic status. They permit some comparison of alternative informality definitions. Firstly individual informality can be examined at the level of employer compliance with state labor market regulation through the possession of a registered labor contract (signed labor card). Secondly informality can be examined at the level of individual social protection coverage, through membership of a social security institute. Finally, informality can be examined, as it is in many studies for which information on contract registration and social protection coverage is non-existent, by addressing the scale of micro-entrepreneurship activity. In practice, this means an examination of individual employment status (type of employment or self-employment) combined with information, if employed or an employer, on the sector and scale of the business activity.

The principal concern of this paper is to investigate different empirical implementations of the concept of informality, and to examine the extent to which these different measures are coincident. The question of coincidence will be examined in detail through regression analysis, undertaken to shed light on the ways in which different empirical measures of informality are capturing the same or different groups of workers.

The main conclusion to be drawn from this research is that the different measures of informality capture in part different groups of workers. It cannot be assumed that alternative measures are broadly consistent. Any conclusions drawn from detailed analysis or modeling of informality need to be robust to the choice of measurement. This is particularly important given recent discussion on the subject. Any particular choice of definition or measurement may be conditioned by a priori perspectives or hypotheses about the nature and role of the informal sector.

The remainder of the paper is structured as follows. Section 2 provides a detailed discussion of the existing literature and in particular on the way in which informality has been measured. Section 3 discusses the Brazilian data source used and the different measures of informality to be analyzed. Section 4 examines the degree of coincidence in these measures. Section 5 documents a multivariate analysis to investigate commonalities and differences in the way in which the different measures of informality are associated with demographic, employment, and household characteristics. Section 6 provides conclusions.

## 2. MEASURING INFORMALITY

The practice of defining informality in terms of the economic status of the individual (self-employed or own-account worker, domestic worker, small scale employer, *etc.*) in conjunction with the characteristics of the employer (small scale, no collective bargaining, *etc.*) is well established in the literature. A substantial number of early analyses of informality simply assume that the informal sector corresponds to sole traders (own-account workers) and those in small or micro enterprises. "Small" or "micro" is defined arbitrarily and may depend on questionnaire design. For example Pradhan and van Soest (1995), Pradhan and van Soest (1997) and Maloney (1999) use a measure of fewer than six employees for Bolivia and Mexico, respectively; Funkhouser (1996) uses fewer than five employees for an analysis of five Central American economies; Marcoullier *et al.* (1997) use fewer than six for Mexico and Peru; Cohen and House (1996) use fewer than 20 for Sudan; Livingstone (1991) uses fewer than ten for Kenya. Galli and Kucera (2004) undertake an international comparative study across 14 Latin America countries. They employ a measure which combines the non-professional self-employed and domestic workers with employees in the firms of either fewer than 5 or 10 employees (depending on the country). Comparability is compromised because of limited detailed information on the size distribution of firms.

Where authors have been particularly concerned to highlight the role of informality in promoting entrepreneurship this measurement approach has been explicitly preferred over alternatives. However, defining informality as equivalent to the "entrepreneurial" sector side-steps the important conceptual question of how large does an establishment have to become for it to cease to be part of the dynamic, entrepreneurial sector. Some authors have introduced a further distinction into the definition of the informal sector by including some industrial activities and excluding others (most notably professional service activities). Such an approach excludes the possibility that some employees in small establishments may have contracts of employment which conform to labor market regulations and may contribute to social insurance schemes. It also excludes the possibility that some large private sector employers may not provide registered employment contracts or encourage employee contributions to social insurance schemes. Similar objections might apply to domestic

and temporary workers who are often entirely classified as informal.

The economic significance attached to whether an employment relationship conforms to state labor contracting regulations depends on the degree to which those regulations impart inflexibility in the extent to which both parties can tailor the terms and conditions of employment to their best advantage. So, for example, if regulations permit flexible hours of work with no effective upper constraint then the economic impact of signing a formal contract compared to working informally may be less, and the rationality for participating in the informal sector reduced. As noted by the *World Bank* (2002), significant lay-off costs in Brazil, if a formal contract is terminated, may be one of the main factors pushing employers toward offering unregistered employment.

That both employees and employers may prefer to enter into either unregistered or registered employment relationships hinges on the balance of the advantages and disadvantages. This is the central argument behind the recent work (such as *Maloney*, 2004), which rejects the traditional view that the informal sector is a labor market segment populated by displaced workers queuing for good jobs in the rationed formal sector. Persuasive evidence in support of this is in *Maloney* (1999). He uses Mexican panel data to examine between-sector and within-sector transitions. The definition of informality used is based on establishment size rather than contract status. However, no evidence is found to support the proposition that those newly entering informal employments are more likely to be young displaced workers waiting for better jobs. On the other hand recent research, also using Mexican data, by *Duval-Hernandez* (2006) questions *Maloney's* conclusion. He compares the empirical performance of a model of free entry into the formal sector with formal sector rationing. The former model is rejected by the data. Contract status might provide a good discriminator for informal status if the allocation of workers to the informal sector is governed by a free assessment of the costs and benefits of labor contract registration. Thus, informality ought to be measured not according to the nature of the job or the employer but according to the worker's legal status. But in practice the informal sector may exist for a complicated mix of reasons. Some workers may choose, rather than compelled, to be there because jobs are more flexible or because self-employment is more attractive. Others may be displaced involuntarily into the sector. Any operational measure will need to encompass the range of groups within the informal sector.

The practical problem with measuring informality in terms of illegal employment is that data on contract status may simply not exist, particularly if the employee does not know whether the employer is conforming to employment regulations. For the self-employed or for own-account agricultural workers such a measure has no relevance since an own-account worker cannot contract with themselves. In some countries, of which Brazil is a notable example, employers are required to indicate to workers that the employment relationship is legally registered. So a third party such as a statistical agency can establish this with a reasonable degree of accuracy. Therefore, the informal sector in Brazil has attracted particular attention from researchers.

Where information on contract status is not available or relevant, the principal alternative indicator of informality is social security status. The paper that is widely regarded as the seminal empirical study on the informal sector (*Merrick*, 1976) employs such a measure to investigate the urban labor market of Belo Horizonte in central eastern Brazil. For employed workers informality is defined by the absence of mem-

bership of a social security institute. Subsequent work which has adopted the criterion of no social protection or non-payment of social security taxes for distinguishing informal employees includes *Portes, Blitzner, and Curtis* (1986), *Marcoullier et al.* (1997), *Maloney* (1999), and *Saavedra and Chong* (1999). The absence of social protection is regarded as an important indicator of informality, focusing attention on the potential costs of informality in the event of adverse economic circumstances. The consequences of informality so measured may depend on the economic position of the individual within the household: that is whether they are the main or secondary earner, and on the social protection status of other household members. This measure also focuses attention on the inefficiency of social protection systems as a possible driver of the growth in informality. However household or individual surveys typically used may not provide information on the social security status of the self-employed or small employer. So studies often rely on a "hybrid" definition of informality in which employees are classified according to social security status. Own-account workers are classified as entirely informal and employers classified according to either or both the size of their business (number of employees) or the activity of the business.

A small number of previous studies have investigated the sensitivity of rates of informality to choice of measure. *Marcoullier et al.* (1997) compare the size of the informal sectors in El Salvador, Peru and Mexico based on firm-size<sup>4</sup> and on non-payment of social security taxes. The latter measure produces a considerably higher estimate of the size of the informal sector (43.2% compared to 30.8% of workers in the case of Mexico in 1990). However, depending on country, between 89% and 97% of the self-employed and small-firm employees do not pay social security taxes. This definition is preferred for the econometric analysis of the wage differential between the two sectors because it is more comprehensive. *Saavedra and Chong* (1999) similarly find that the informal sector is larger when measured by social security coverage rather than the firm size (54.8% compared to 53.3% in Peru in 1995). Although this difference is not as great as in the *Marcoullier et al.* study, the two measures display substantially different trends and cycles. The authors take the view that the social security-based measure is more useful because it shows informality falling with economic growth around a counter-cyclical movement. They use this measure in the subsequent analysis of the earnings differential between the two sectors.

A more recent paper, *Gong, van Soest, and Villagomez* (2000), examines the scale of informality in Mexico in the early 1990s using various measures. Measuring the rate of informality according to job type (self-employed plus piece-rate workers) provides an estimate of 37.6%. Measuring informality according to firm size (less than six employees) provides an estimate of 30.4%. Eighty-nine percent of informal workers according to either measure have no social security coverage, whereas only 26.2% and 19.2% of those classified as formal under the job type and firm size measures, respectively, had no social security coverage. In subsequent econometric work on sector transitions (*Gong & van Soest*, 2002) the job type measure is preferred.<sup>5</sup> These findings suggest that there is varying correspondence between alternative ways of measuring informality. It would, therefore, be surprising if econometric analyses of the allocation of workers between sectors or sector earnings differentials were robust to the choice of measure.

Finally, recent work by *Pisani and Pagán* (2003), *Pisani and Pagán* (2004b) examines two alternative measures of informality for Nicaragua: informality defined by employer size (5 or



less employees) and by social security registration. The informal sector in Nicaragua is large, accounting for up to 85% of the workforce, depending on measure. Measured by social security registration the informal sector appears to have grown fast during the 1990s: male informality rises from 73% to 85% during 1993–98 and female from 67% to 79%. However on the basis of employer size the authors observe a sharply falling trend. This suggests that while the size of employers has been rising, workers in larger organisations are increasingly failing to register for social protection, and shows that different measures may behave very differently as a result of different underlying social and economic processes.

### 3. INFORMALITY IN BRAZIL

Many commentators express a belief that the informal sector in Brazil is large and growing, despite trade liberalization and successful macroeconomic stabilization over the last 15 years. For example, *Carneiro (1997)* reports that, although in the late 1980s the Brazilian economy appeared to stagnate, unemployment rates remained low and total employment (formal and informal) continued expanding. In 1988, prior to trade liberalization and at a time of chronic price instability, the Brazilian statistical agency (IBGE) estimated that 13% of GDP was generated in the informal or unregistered economy. Within the service economy this proportion was estimated as high as 30%, suggesting that this overall official estimate may well have been overly conservative (*Carneiro, 1997*).

The achievement of macroeconomic stability in Brazil that followed the adoption of the Plano Real in 1994 might have removed some of the pressure for economic activity to migrate into the informal sector. On the other hand, trade liberalization in the early 1990s increased competitive pressures in the tradeable sectors of the economy. But recent research finds little or no relationship in Brazil between trade liberalization and informal employment, defined according to labor contract status (*Goldberg & Pavcnik, 2003*). Furthermore, constitutional reform in 1988 may have simultaneously decreased flexibility in the formal labor market (*De Barros & Corseuil, 2001*). So the emerging pattern of development in the informal sector may be complex.

Regulation of the labor market in Brazil can be traced back to the enactment of the Labor Code of 1943. This mandates official registration of all the contracts of employment through the requirement of employers to provide a signed labor card (“carteira de trabalho assinada”). The card contains a statement of the terms of employment to all employees. Registration of a labor contract confers a legal entitlement to a range of contract terms including a maximum working week (currently 44 h), paid vacations, maternity leave, due notice of dismissal (proportional to seniority),<sup>6</sup> a minimum overtime premium and an entitlement to compensation in the event of a non-justified dismissal. Dismissal compensation is paid from the Fundo de Garantia por Tempo de Serviço (FGTS) accumulated by every worker with a signed labor card. The employer contributes an amount equivalent to 8% of the employee’s current monthly wage, in effect as a labor tax. The employee receives a penalty of 40% of the employer’s cumulative contribution in the event of dismissal without just cause. This penalty was increased from 10% by the 1988 Constitution. As *De Barros and Corseuil (2001)* note the effect of the change was to reduce the length of tenure needed to accumulate a compensation amount equal to one month’s salary from at least 10 years to only two and a half years. At face value this would appear to amount to a substantial increase in

employer firing costs, although in practice it creates the potential for collusion between employers and employees to register voluntary quits as dismissals. This is because contributions to the FGTS are held in a separate fund and are sunk cost to the employer, who has nothing to lose in helping the employee gain access to his or her accumulated FGTS contributions.<sup>7</sup> Thus, it creates an incentive to quit on the part of employees. *De Barros and Corseuil (2001)* and *Camargo (2002)* cite evidence in support of this. In short, there may be a strong disincentive for employers to register contracts, but, once registered, employers and employees face incentives which increase turnover.

Social protection beyond dismissal compensation in Brazil is provided through individual employee membership of a social security fund or “institute” (Instituto de Previdência). Protected workers pay monthly contributions on a graduated scale up to a ceiling of 11%, with employers contributing a further 20% of payroll. Membership of an institute provides defined benefit pension provision (up to an upper ceiling), permanent disability benefits and life insurance (survivor) benefits. Workers without social security institute membership qualify for a meagre flat rate old age pension equal to the minimum wage.

Our investigation of informality draws on detailed information contained since 1992 within the Brazilian household surveys (Pesquisa Nacional por Amostragem de Domicílios, PNAD). The PNADs are a series of nationally representative household surveys conducted more or less annually since 1971, using a consistent methodology by the Instituto Brasileiro de Geografia e Estatística (IBGE). The survey forms the main official Brazilian research instrument for the analysis of socio-economic variation and trends. Each survey is re-sampled, with no panel element. All members of each household over ten years in age are asked separate detailed questions concerning their labor market activity during one week in September. The sample size has risen progressively from 94,171 resident households in 1992 to 139,157 in 2004. The present paper draws from these households the sample of employed individuals between the ages of 18 and 65. While other official sources, principally the Brazilian monthly employment survey, provide higher frequency observation on trends in informality, detailed information required to address alternative definitions of informality are not so readily available within them.

From 1992, the consistent questionnaire structure adopted by the survey allows separate identification of contract registration (labor card) and social protection across an individual’s main and supplementary jobs, alongside detailed information on the type of employment and the size and activity of the business. Surveys were conducted annually with the exception of 1994 (because of austerity associated with the introduction of the Plano Real) and 2000 (the year of the decennial census).

*Table 1* reports summary information on economic activity in main employment for all workers aged between 18 and 65 computed from the PNADs between 1992–2004. All descriptive analysis makes use of individual sample weights provided by IBGE. In any year, just over half of the economically active is engaged in paid employment. This proportion seems quite stable although there is some evidence of an upturn in the proportion toward the end of the period. However the proportion of public sector workers, by definition with registered contracts, falls from 27.4% in 1992 to 22.7% in 2004. The next largest group are the self-employed (own-account workers), comprising almost of quarter of the economically active. A further four percent are entrepreneurs employing others. There is some slight evidence that employers as a proportion

Table 1. *Employment Status—18–65 year olds*

Employment status—main occupation%	1992	1993	1995	1996	1997	1998	1999	2001	2002	2003	2004
Employees (of which public sector)	52.6 (27.4)	52.8 (28.3)	51.4 (26.9)	53.2 (26.2)	52.2 (25.5)	52.7 (25.5)	51.7 (25.5)	54.1 (23.4)	54.1 (23.3)	54.1 (23.1)	54.6 (22.7)
Self-employed sole traders	23.2	23.2	24.1	23.6	23.9	24.1	24.1	22.9	22.7	22.7	22.3
Self-employed employers	4.1	3.9	4.3	4.0	4.4	4.4	4.3	4.4	4.4	4.3	4.3
Domestic workers	6.2	6.4	7.1	7.1	7.4	7.1	7.5	7.8	7.8	7.8	7.8
Non-remunerated workers	6.5	6.6	6.3	5.9	5.8	5.6	6.1	5.0	5.1	4.9	5.0
Subsistence agricultural	4.4	4.3	4.1	3.7	3.8	3.6	3.7	3.2	3.3	3.4	3.2
Temporary workers	3.1	2.9	2.7	2.5	2.6	2.5	2.5	2.6	2.6	2.8	2.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sample size	114,927	116,620	124,286	121,242	127,957	126,990	131,783	144,008	149,460	149,877	159,849
% of sample reporting multiple job holding	5.0	5.4	5.6	4.9	5.3	5.5	5.3	5.0	5.3	5.3	5.1

Source: Authors' computations from PNAD, population weights.

have risen over the period, but no discernable trend in the proportion of the self-employed. A further 1.1% of the overall total, in 1992, are individuals whose main status is as an employee, but have self-employed or employer status in the second activity. This figure rises to 1.9% in 2004. Thus in 1992, 28.4% of economically active adults could be regarded as engaged in some broad form of micro-entrepreneurial activity, either as main or secondary activity. This total remains virtually unchanged at 28.5% in 2004. So overall these data appear to offer little support for rising entrepreneurialism. Some workers may engage in informal or entrepreneurial activity as a secondary activity. The final row of the table details the proportion of the sample who report a secondary job. This proportion is low and stable at around 5%. In any year just over one fifth of these are individuals with main work as an employee but with a secondary activity in self-employment.

The fastest growing group as a proportion of the total is domestic workers, rising from 6.2% in 1992 to 7.8% from 2001 onwards. This is an employment group traditionally associated with informality, although as we shall see there should be no automatic presumption that domestic workers are unregistered and unprotected. Increasing employment of domestic staff may reflect rising standards of living in Brazil, particularly amongst upper and middle earners. The data allow the identification of three further categories of employment, each of which may be regarded as informal: non-remunerated employment (typically in a family business), subsistence agricultural workers and temporary workers. As a proportion of the total each of these is small. For each there is evidence of a downward trend.

In order to assess the possible size of the informal sector we adopt three different measures to distinguish formality and informality:

A (contract status): a worker is classified as formal if they have a signed labor card in any employment. Through questionnaire routing the PNAD regards all public sector employees as having signed labor cards. Those who are self-employed or employers in their main job are classified as formal if they have a signed labor card from another paid second job.

B (social security status): a worker is classified as formal if they make contributions to a social security institute (federal, state, or municipal) in respect of any employment. The PNAD asks all workers regardless of economic status or sector if they make social security contributions.

C (formal sector activity): a worker is classified as employed in the formal sector if they are employed in an establishment of more than five employees. The self-employed and employers are defined as formal if their occupation is "creative and technical" or "administrative" (to capture "professional" activities). All domestic, non-remunerated, subsistence, and temporary workers are classified in the informal sector (since no information about employer size is available for these), along with all the self-employed and employers in occupations other than "creative and technical" and "administrative."

#### 4. VARIATION IN INFORMALITY IN BRAZIL

The objectives of the empirical analysis which follows fall into two. The first objective is to address the hypothesis that different empirical measures of informality are coincident. In other words, the aim is assess whether different measures are capturing the same group of workers. The second objective follows from the first and is to assess, using multiple regression

Table 2. *Alternative definitions of informality by main employment status*

%	1992	1993	1995	1996	1997	1998	1999	2001	2002	2003	2004
<i>All economically active</i>											
A. No signed labor card	56.7	56.0	57.5	56.7	57.3	56.4	57.8	56.0	56.4	55.8	55.4
B. No SS Institute member	50.7	51.4	51.8	51.7	51.7	51.8	52.1	50.4	51.0	49.9	49.9
C. Informal sector activity	49.1	48.9	50.7	50.0	50.6	50.0	49.0	49.3	49.9	50.0	50.7
<i>Employees</i>											
A. No signed labor card	21.1	21.2	21.8	23.2	22.9	22.8	23.8	24.0	24.7	23.7	23.6
B. No SS Institute member	24.3	25.6	25.1	27.8	26.3	25.2	25.7	25.2	25.6	24.5	24.4
C. Informal sector activity	12.9	12.8	14.5	15.6	15.5	15.5	15.6	16.6	16.5	16.6	15.9
<i>Self-employed sole traders</i>											
A. No signed labor card	99.2	97.2	99.1	99.2	99.2	97.7	98.7	99.3	99.3	99.3	99.3
B. No SS Institute member	79.0	79.1	80.9	79.7	81.1	83.0	87.1	84.3	85.3	84.3	84.9
C. Informal sector activity	95.5	95.2	94.7	94.4	94.3	94.0	93.8	93.0	94.7	94.3	94.7
<i>Employers</i>											
A. No signed labor card	98.4	97.9	97.5	97.1	97.6	97.6	97.4	97.8	97.7	97.9	97.6
B. No SS Institute member	32.6	33.0	32.3	32.8	35.4	37.3	38.2	40.0	42.6	39.4	40.9
C. Informal sector activity	0.0	0.0	7.7	7.6	10.7	9.3	11.4	11.4	15.6	15.7	15.5
<i>Domestic workers</i>											
A. No signed labor card	78.8	79.2	77.5	74.7	74.4	73.0	72.6	71.5	71.9	70.8	72.2
B. No SS Institute member	76.6	77.9	76.0	73.8	73.0	70.7	70.5	69.1	69.5	68.4	69.9
C. Informal sector activity	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<i>Non-remunerated workers</i>											
A. Signed labor card	99.9	99.2	99.8	99.8	99.9	99.3	99.5	99.7	99.9	99.7	99.9
B. No SS Institute member	97.7	97.1	97.8	97.1	97.0	97.3	97.4	96.9	97.6	97.4	97.2
C. Informal sector activity	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<i>Subsistence agricultural</i>											
A. No signed labor card	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
B. No SS Institute member	99.3	99.4	99.4	99.0	99.2	99.5	99.5	99.5	99.5	99.6	99.3
C. Informal sector activity	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<i>Temporary workers</i>											
A. No signed labor card	90.8	89.6	89.7	86.2	89.2	89.8	88.2	88.7	87.1	85.2	84.6
B. No SS Institute member	91.0	92.0	89.5	86.8	89.2	90.8	88.4	88.5	86.8	84.6	84.2
C. Informal sector activity	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' computations from PNAD, population weights.

analysis, whether different individual characteristics have a greater association with different measures of informality. If there is only partial coincidence between different measures, which groups are more likely to be informal under one definition compared to another?

Table 2 details the proportions of workers classified as informal under each measure according to economic status. Measure A provides the highest estimate of the rate of informality at between 55% and 58% of all workers; measure C the smallest at around 50%.<sup>8</sup> Once sub-divided by economic status, wider variation between the measures is apparent. Turning first to employees, informality is highest when measured by lack of social security protection. However, informality measured by employment sector shows the most rapid increase from 12.8% in 1993 to 16.6% in 2001 and 2003. This suggests the growing importance of the micro-entrepreneurial sector in Brazil.

For the self-employed, rates of informality are very high on all three measures. The table shows that a minority of between 15% and 20% of own-account workers do opt into social security protection. However, it is concerning to see that this proportion of unprotected self-employed has been rising steadily. For employers only those few with registered main jobs are classified as formal under measure A. So rates of informality defined by lack of a signed labor card are close to 100%. Only

one-third of employers had no social security protection in 1992, but as for the self-employed this proportion shows rapid growth, especially after 1997. Under measure C very few employers are classified as informal. In fact up to 1993 the occupational classification defines all employers as "creative and technical" or "administrative." From the late 1990s onwards the informal proportion starts to rise. The remaining four groups in Table 2 are all entirely classified as informal under measure C, in the absence of other information about the size of the employer. A significant minority of domestic workers and, to a lesser extent, temporary workers have registered contracts and/or make social security payments. For both groups the proportions which are defined as informal are falling. The proportion of domestic workers with a no signed labor card falls from 79% in 1992 to around 71–72% after 2000, and those with no social security coverage from 77% to 70%.

In summary, Table 2 reveals some very significant differences both between the different measures we have constructed, and between the experiences of different types of workers. For employees the level of informality is stable, despite the relative decline of public sector employment. For entrepreneurial groups (the self-employed and employers) informality, if defined by social security status, is increasing. However, if informality is measured by activity, it is falling amongst the self-employed. Informality amongst domestic

Table 3. *Correlations of informality measures*

	A: No signed labor card	B: No SS institute membership	C: Informal activity
<i>1992</i>			
A: No signed labor card	1		
B: No SS Institute membership	0.79	1	
C: Informal sector activity	0.68	0.60	1
<i>2004</i>			
A: No signed labor card	1		
B: No SS Institute membership	0.85	1	
C: Informal sector activity	0.65	0.61	1

Source: Authors' computations from PNAD, population weights.

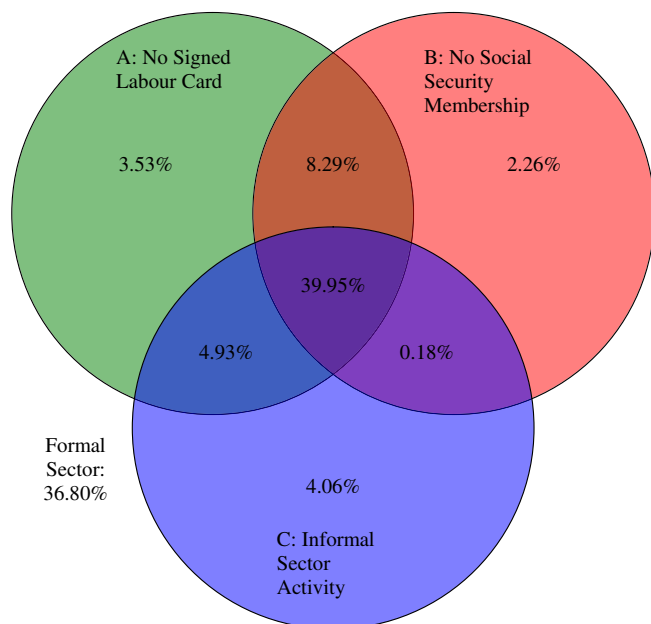


Figure 1. Coincidence of alternative definitions of informality, 1992. Note: The figure is a Venn diagram showing the overall between the different operational measures of informality in terms of percentages of the workforce. So, for example, the percentage of workers classed as informal under measure A and under measure B, but not under measure C is 8.29% of the total. The total (36.8%) is not classified as informal under any of the three measures.

and temporary workers is also falling. It is clear from the table that there is an incomplete overlap between the different measures, and for some groups the overlap may be quite limited. In particular, the measures of informality based on contract and social security status (A and B) may distinguish very different groups of workers compared to the measure based on activity (measure C). Policy responses to address these differing trends may need to be designed very carefully. For example, it is desirable to improve rates of social security coverage (measure B), but these measures taken to achieve this should not risk discouraging entrepreneurial activity (measure C).

Table 3 reports pairwise correlation coefficients for the three measures. For reasons of space these are just reported for the start (1992) and end (2004) of the period of analysis.<sup>9</sup> Measures A and B have a correlation of around 0.8 suggesting a high, although far from complete, correspondence between the two measures. Measure C has a lower correlation with the other two measures, and particularly with social security status. Figures 1 and 2 explore this point further by providing

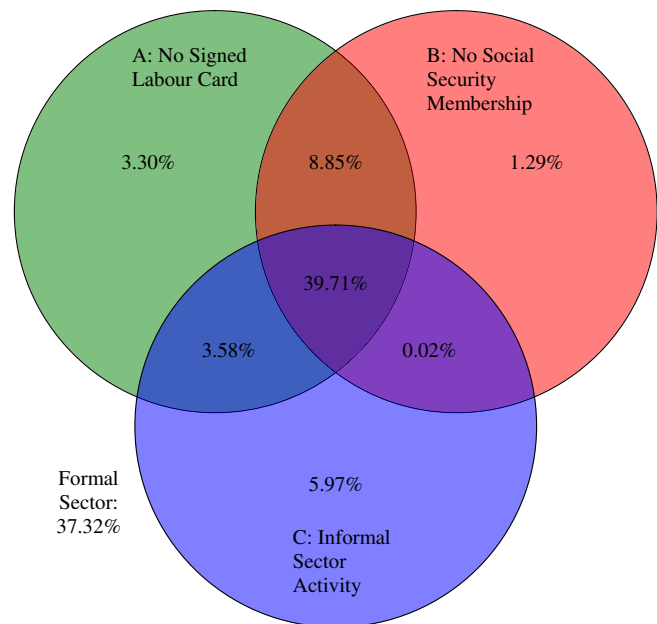


Figure 2. Coincidence of alternative definitions of informality, 2004. Note: See explanatory note to Figure 1.

Venn diagrams to show the correspondence of the three measures across the full sample of the economically active for 1992 and 2004. In both years just under 40% of the sample are classified as informal on all three measures. Around 37% of the sample in both years can be classified as formal on all three measures. A total of 13.4% of the sample in 1992 and 12.5% in 2004 can be classified as informal on any two of the three measures. In particular, there is a significant proportion of workers classified as informal on the basis of having no signed labor card and no social security coverage but who fall into the formal category under measure C. A total of 9.9% of the sample in 1992 and 10.5% in 2004 fall into one of the measures of informality but neither of the other two. The largest element of this group, particularly in 2004, is those who are classified as informal on the basis of activity but have a signed labor card and social protection. Domestic and temporary workers form a significant element of this group.

For reasons of space the analysis which follows is conducted for three years chosen as the start and end of the period, and a middle year, 1998, chosen for the analysis since it coincides with the end of the first Cardoso presidential term. By this time Brazil had completed a program of macroeconomic

Table 4. *Descriptive analysis by informality definition—gender*

%	1992	1998	2004
<i>Male</i>			
A: no signed labor card	55.5	56.6	55.4
B: no SS membership	47.1	50.0	48.7
C: informal sector activity	43.4	49.1	45.5
<i>Female</i>			
A: no signed labor card	58.5	56.1	55.4
B: no SS membership	56.1	53.0	51.5
C: informal sector activity	57.9	57.5	54.4
<i>t-Test for difference between women and men</i>			
A: no signed labor card	10.1**	−1.4	−0.7
B: no SS membership	28.8**	9.2**	9.3**
C: informal sector activity	50.2**	36.3**	36.2**

Source: Authors' computations from PNAD, population weights.

\*\* Denotes  $p < 0.01$ .

Table 5. *Descriptive analysis by informality definition—ethnicity*

%	1992	1998	2004
<i>White</i>			
A: No signed labor card	52.2	52.8	50.9
B: No SS membership	43.0	44.0	42.4
C: Informal activity	44.4	44.9	43.6
<i>Non-white</i>			
A: No signed labor card	62.3	60.9	60.5
B: No SS membership	60.3	60.3	58.3
C: Informal activity	55.1	56.5	55.7
<i>t-Test for difference between non-white and white</i>			
A: No signed labor card	30.6**	25.1**	37.4**
B: No SS membership	55.3**	54.0**	62.7**
C: Informal activity	33.7**	38.5**	47.4**

Source: Authors' computations from PNAD, population weights

\*\* Denotes  $p < 0.01$ .

stabilization and trade liberalization and achieved economic recovery (Bosch *et al.*, 2007). After 1998 Brazil entered a period of mild economic slowdown in response to crises in Asia and in Russia before returning to modest positive growth in 2002. Table 4 reveals the different positions of men and women for these three years. Across all three measures informality is falling amongst women. There is growth in informality for men during 1992–98, particularly for measure C. However, rates of informality fall back again, particularly after 2001. For women, the decline in informality is steepest for measure B. There is less of a trend in female informality classified by activity, particularly during 1992–98. Notice also that there is a difference in the orderings of the estimates for men and for women. Male informality is highest when measured by contract status (no signed labor card) and lowest when measured by activity. Female informality is also highest when measured by contract status but is lowest when measured by social security status. For all three measures, female informality has fallen. Brazil has had enjoyed some success in improving social security participation amongst women, but this has been partially at the expense of a worsening in the position of men. There has been a change in the composition of informal activity towards men, partially offset by women moving into formal activity, as well as a shift in the composition of those without registered contracts toward men. This last shift has been to such an extent

that by 2001 men are more likely than women not to have a registered contract. Again this points to complexity in the informal sector and suggests that policy needs to be designed very carefully.

Table 5 repeats the same analysis by ethnicity, separating samples for whites and non-whites. Although almost half of the Brazilian population report that they are of non-white ethnicity (including black, mixed race, Asians and Chinese, and indigenous groups) the table shows that non-whites are significantly more likely than whites to be informal. This holds across all three measures. However, there is substantial variation in the rates of informality across the three measures. Non-white informality is highest when measured by contract status, although the gap between white and non-white informality is highest when measured according to social security status.

It is clear from the preceding discussion that different measures of informality are capturing different groups of workers. Over 60% of the workforce can be classified as informal on the basis of at least one measure, but of these 20 percentage points are not classified as informal on all three measures. Simple tabulations by the important demographic indicators of gender and race reveal further different rates of informality across the measures, and show that different measures are capturing differing groups within the workforce.



## 5. MULTIVARIATE ANALYSIS OF FACTORS ASSOCIATED WITH INFORMALITY

Although we have been able to point to differences in the definitions of informality, we can say nothing so far about any conditional association between particular characteristics and each definition. Regression analysis is able to address a range of associations between different groups of workers and a greater propensity to be informal according to one measure rather than another. This section presents estimates of the marginal effects of different potential influences on the likelihood of informality obtained from probit regressions. The specification of each regression includes a range of variables to allow investigation of associations between different individual characteristics and the incidence of different measures of informality. These include individual demographic information, information on the geographical situation of the individual, information on the nature of the employment and information on the economic status of the remainder of the individual's family. An important caveat, however, is that

we cannot necessarily draw inference in cross-sectional regression about the direction of causality, and therefore, that the models presented should be treated as reduced form.

Included under the heading of demographic information are a quadratic function of the individual's age and binary indicators for gender and ethnicity (reference category: white male). Indicators of illiteracy and educational attainment are also included (reference category: education to elementary level).<sup>10</sup> Two aspects of geographical situation are included. The first is a set of broad regional indicators, defined so that the heavily urbanized and industrialized region of the South East is the reference category. Given that some previous research identifies informality with urbanisation, the second is a binary indicator for residence in an urban location. The urban indicator is a variable derived by the IBGE statistical agency from household address records and corresponds to residence in cities, towns, and the so-called isolated urban areas.

Two aspects of the nature of the individual's employment are included in the regression modeling. A binary indicator of unionization is included to capture a likely association

Table 6. *Probit Estimates of the Likelihood of Being Informal*

	1992			1998			2004		
	A: No signed card	B: No social security	C: Informal sector activity	A: No signed card	B: No social security	C: Informal sector activity	A: No signed card	B: No social security	C: Informal sector activity
Age	<i>-0.010</i>	<i>-0.028</i>	<i>-0.006</i>	<i>-0.012</i>	<i>-0.025</i>	<i>-0.006</i>	<i>-0.021</i>	<i>-0.030</i>	<i>-0.004</i>
Age squared	<i>0.0002</i>	<i>0.0003</i>	<i>0.0001</i>	<i>0.0002</i>	<i>0.0003</i>	<i>0.0001</i>	<i>0.0003</i>	<i>0.0004</i>	<i>0.0001</i>
Female	<i>-0.075</i>	<i>0.032</i>	<i>0.064</i>	<i>-0.082</i>	0.0005	<i>0.044</i>	<i>0.054</i>	<i>0.089</i>	<i>0.132</i>
<i>Ethnicity (reference: white)</i>									
Indigenous	0.031	0.039	0.065	0.041	<i>0.076</i>	-0.004	-0.038	-0.020	-0.054
Black	<i>-0.015</i>	<i>0.015</i>	0.008	<i>-0.018</i>	-0.002	0.005	<i>-0.019</i>	0.010	-0.001
Asian	<i>0.083</i>	-0.043	-0.027	<i>0.144</i>	<i>0.047</i>	0.023	<i>0.134</i>	<i>0.079</i>	<i>0.056</i>
Mixed	-0.004	<i>0.029</i>	-0.002	<i>-0.008</i>	<i>0.024</i>	0.005	0.005	<i>0.026</i>	0.005
Illiterate	<i>0.079</i>	<i>0.108</i>	<i>0.024</i>	<i>0.067</i>	<i>0.123</i>	<i>0.039</i>	<i>0.110</i>	<i>0.130</i>	0.067
<i>Schooling (reference: Kindergarten)</i>									
Primary (age 7–14)	<i>-0.027</i>	<i>-0.061</i>	<i>-0.043</i>	-0.0001	<i>-0.041</i>	<i>-0.035</i>	<i>0.026</i>	<i>-0.005</i>	<i>-0.016</i>
Secondary (age 14–17)	<i>-0.148</i>	<i>-0.146</i>	<i>-0.089</i>	<i>-0.125</i>	<i>-0.148</i>	<i>-0.097</i>	<i>-0.121</i>	<i>-0.155</i>	<i>-0.146</i>
College degree	<i>-0.125</i>	<i>-0.157</i>	<i>-0.136</i>	<i>-0.098</i>	<i>-0.159</i>	<i>-0.154</i>	<i>-0.187</i>	<i>-0.215</i>	<i>-0.207</i>
Postgraduate degree	<i>-0.163</i>	<i>-0.122</i>	<i>-0.215</i>	<i>-0.148</i>	<i>-0.164</i>	<i>-0.198</i>	<i>-0.246</i>	<i>-0.239</i>	<i>-0.209</i>
Urban resident	<i>-0.083</i>	<i>-0.133</i>	<i>-0.013</i>	<i>-0.009</i>	<i>-0.090</i>	0.0002	<i>-0.038</i>	<i>-0.065</i>	<i>-0.030</i>
Union member	<i>-0.323</i>	<i>-0.309</i>	<i>-0.225</i>	<i>-0.326</i>	<i>-0.331</i>	<i>-0.229</i>	<i>-0.342</i>	<i>-0.338</i>	<i>-0.253</i>
Spouse working with no labor card	<i>0.020</i>	<i>0.020</i>	0.002	-0.001	0.007	<i>-0.015</i>	<i>0.009</i>	0.003	-0.002
Family total with labor cards	<i>-0.024</i>	<i>-0.024</i>	<i>-0.006</i>	<i>-0.031</i>	<i>-0.031</i>	<i>-0.012</i>	<i>-0.030</i>	<i>-0.031</i>	<i>-0.016</i>
Family total self-employed	<i>0.210</i>	<i>0.102</i>	<i>0.166</i>	<i>0.221</i>	<i>0.128</i>	<i>0.177</i>	<i>0.190</i>	<i>0.121</i>	<i>0.164</i>
Family total number of children	<i>-0.019</i>	<i>-0.006</i>	<i>-0.018</i>	<i>-0.020</i>	<i>-0.008</i>	<i>-0.019</i>	<i>-0.017</i>	<i>-0.006</i>	<i>-0.017</i>
Family total number over 65	<i>-0.031</i>	<i>-0.009</i>	<i>-0.017</i>	<i>-0.034</i>	<i>-0.014</i>	<i>-0.023</i>	<i>-0.021</i>	<i>-0.011</i>	<i>-0.014</i>
Other family earnings per head	$-0.93 \times 10^{-9}$	$-0.81 \times 10^{-8}$	$0.14 \times 10^{-8}$	$0.44 \times 10^4$	$0.48 \times 10^{-5}$	$-0.84 \times 10^{-5}$	$0.13 \times 10^{-4}$	$0.13 \times 10^{-5}$	$-0.41 \times 10^{-6}$
Sample size		103,700			115,011			146,462	
Log likelihood	-50143.4	-51825.6	-44933.4	-58267.5	-60101.4	-51760.3	-76334.0	-77712.8	-73005.6
Pseudo R <sup>2</sup>	0.302	0.273	0.363	0.267	0.243	0.344	0.247	0.232	0.276

Note: Reported coefficients are marginal effects (which in the case of binary variables are for a discrete change in the variable). *Italic* denotes significance at <10%, **bold italic** at <5%. All equations also include occupational controls (7) and regional controls (4).

between collective representation and formality. Indicators of broad occupational grouping are also included in all models to assess the extent to which there may be certain occupational sectors, in which employment tends inherently to be less formal.<sup>11</sup> A number of indicators of the economic status of the rest of the family are included. The first is a binary indicator for the informal status of the individual's spouse, conditional on being married. For comparability spousal informality is defined throughout by measure A. Having a spouse without a registered contract may be associated with a greater incentive to acquire the protection of a formal sector job. On the other hand, informal workers may be simply more likely, as a result of a marriage matching process, to have informal sector spouses. For the same reasons, the total number of formal employees in the family (i.e., with signed labor cards) is included, as well as the total number of self-employed in the family. The presence of dependents within the family may also be associated with particular individual employment decisions or options. So the totals of elderly (i.e. aged 65 and over) and children in the family are included. Finally, other family earnings per head is included. This is an indicator of the extent to which the individual workers may rely on income generated elsewhere in the family as an alternative to social protection.

Table 6 reports estimated probit marginal effects for each measure for 1992, 1998, and 2004. Information on the statistical significance of individual coefficients is included. In general most of the covariates included in the regressions attract statistical significance although there is a considerable variation in the importance of particular associations, as indicated by the size of the marginal effects. The discussion will focus on a number of key results. Firstly, there is a difference in the size of the association between the different informality measures and being female. Being female is more strongly positively associated with informal sector activity than with the other two measures. Indeed, there is evidence in the 1990s that women are significantly less likely than men to have no signed labor card. Women particularly may be concentrated in smaller enterprises, or alternatively are more likely to choose to work in them. Precisely, why this is happening should be a matter for further detailed research.

A further important demographic finding is that there is no strong association between informality and ethnicity once control is made for other characteristics. The strong bivariate association shown in Table 5 may arise from generally lower levels of educational attainment, and in turn a stronger association with informality, amongst non-whites.<sup>12</sup> Table 6 also shows an association between informality and low levels of educational attainment. Illiteracy is most strongly positively associated with a lack of social security coverage, and least positively associated with informal sector activity. This suggests that improved educational attainment, notably basic skills, may provide workers with the ability to understand and engage with the social security system, particularly where systems, as in Brazil, entail a significant "opt-in" component. The results also show that higher levels of educational attainment, for example, college degrees, are more strongly negatively associated with measure C. Highly educated workers are more likely to be in larger establishments, particularly in the public sector.

Turning to the influence of geography, the table shows that the absence of social security protection is more strongly associated with urbanization than with the other indicators. Urban workers may be less likely to have social protection because denser urban markets offer more opportunity to insure oneself against income risk. It is noticeable that there is a much weaker association between urbanization and informal sector activity. Informality is relatively more closely associated with

micro-enterprise (measure C) than with unprotected employment (measures A and B) in urban areas. Unionization is also more strongly negatively associated with measures A and B. Unions may play a beneficial role, in that, where they are able to represent workers, their presence is associated with a reduced incidence of unprotected employment.

A final set of findings in Table 6 concerns the association between different measures of informality and economic activity elsewhere in the family. Informality among other family members is associated with a lower likelihood of an individual worker being informal. This is particularly so for measures A and B but less so for measure C. This may indicate some differences in the way informality is framed within households. Micro-entrepreneurial employment may be viewed more positively by some, such that if other family members are working in the informal sector there is less discouragement on an individual worker also to be informal. However, where other family members do not have social or labor contract protection, there may be a greater discouragement effect. Increased self-employment in the family is associated with a greater likelihood that a particular worker will be informal. The increased likelihood is greatest for those working without a signed labor card. This may indicate that within families where self-employment is common there is a stronger acceptance of employment "flexibility." The presence of greater numbers of dependents in the family, both children and the elderly are associated with a significantly lower likelihood of informality. Again there is a variation in the strength of the marginal effect across the three definitions, with stronger effects found for the absence of signed contract and for informal sector activity. The results suggest that workers are encouraged to seek regulated employment or employment in a larger organization if they have dependents who rely on them to provide a secure source of income. The slightly smaller marginal effect in the case of definition B may indicate that future income protection in the form of pension provision may be a less pressing concern for workers with dependents to provide for in the present.

## 6. CONCLUSIONS

There is limited consensus in the academic literature on how to operationalize the definition of labor market informality in developing economies, although labor statisticians have now begun to address this issue in a robust manner. In many cases, researchers' choice of measurement is determined by the availability of data. There has been only limited discussion in the literature on whether this matters. We conclude in this paper that it does. Using data from Brazilian household surveys we have constructed three measures of informality, which attempt to reflect the various alternatives used in the literature. Informality is measured by employment contract status, by social security protection and, in a manner which is often adopted in previous research, by the nature of the employment and the characteristics of the employer. These three measures are far from observationally equivalent. Around 63% of all the economically active in Brazil are informal according to at least one of the three definitions, but only 40% are informal according to all three definitions. An operational measure of the scale of economic informality ought therefore to encompass a range of conceptual approaches to defining the informal sector, encapsulating both characteristics of the job and the enterprise in which the job is held (Husmanns, 2004). There is a closer correspondence between informality defined by not having a registered employment contract and not contributing to a social security scheme. However substantial numbers of workers are classified

as informal if the measure used is based on the nature of the employment and the employer, even though they may have registered contracts and/or may contribute toward social security. Future research on the informal sector needs to pay more careful attention to recent debate on how to define and measure informality. Recent work by the ILO and International Conference of Labor Statisticians on the problems of definition and measurement is to be welcomed. However, the outcomes of this work must be taken forward into the design of data collection, either by national statistical agencies or in the work of individual researchers who choose to collect their own primary data.

Measures based on the sectoral characteristics of the employment are in empirical terms arbitrary since they rely on an *ad hoc* categorization of employers on the basis of size and sector. Yet they may be conceptually well founded since they define informality on the basis of the characteristics of the employer, that is, employment which is in the informal sector. They correspond most closely with the notion that informality is related to the degree of entrepreneurial dynamism in a developing economy. There is no *a priori* reason for believing that such employment activity should of necessity be unregistered and unprotected, and should therefore be regarded as “inferior.” In practice much, but not all, of it is.

Beyond the strong conclusion that different measures of informality only partially overlap and may be subject to different trends, a number of detailed findings have emerged. Firstly it is clear that, in the Brazilian context, the experience of men and women is different. Informality in terms of employment in the entrepreneurial sector is rising amongst men; whereas there is evidence of an encouraging trend away from informality measured by the absence of social security amongst women. However, regression analysis suggests that women have a relatively greater likelihood of being in the informal sector because they work in a small business. The paper has also reported a strong association between informality and poor

educational attainment. In particular, policies to improve literacy may assist in improving social security membership in particular, while having a lesser impact on reducing entrepreneurial employment. Union membership may have a similarly beneficial role to play. Finally, there is considerable evidence that informality measured by lack of social and legal protection is associated with the extent to which the household is able to “self-insure” against income risk, and not exposed to risks associated with having to care for dependents. Social security systems need to be designed specifically to support the self-employed, and avoid being perceived by micro-entrepreneurs as irrelevant or inefficient.

Policy makers need to be clear to which sub-groups of the informal sector particular policies are directed. The design of policies to promote entrepreneurial dynamism in the economy needs to consider the possibility of unintended consequences which may worsen social or legal protection for significant sub-groups of workers. On the other hand, policies designed to improve the levels of social and legal protection may inadvertently have adverse impacts on entrepreneurial activity. For this reason, it is important to consider wider, encompassing measures of the informal economy. However, there is no inherent reason why the growth of employment in the small business sector need imply reduced levels of social security protection. Policies to improve the perceived connections between the individual costs and benefits of social security scheme membership need not, if designed carefully, undermine the dynamics of the entrepreneurial sector. Economic informality remains a hugely significant phenomenon in many developing and newly industrialized economies, and Brazil is one of the most important such examples. As this paper shows, the informal sector does not lend itself to precise measurement, and although its overall size may be relatively stable, its changing composition, particularly if measured in an encompassing manner, is subject to complex and varying factors.

## NOTES

1. For further discussion on modeling and testing for segmentation see Heckman and Sedlacek (1985) and Magnac (1991).

2. Loayza *et al.* (2005) argue that a heavier regulatory burden, particularly in product and labor markets, reduces growth, and induces informality. They conclude, however, that these effects can be mitigated as the overall institutional framework improves.

3. Hussmanns (2004) provides details of sample questions which might be included within such surveys to provide improved information on informality.

4. Informal workers are defined as all non-professional self-employed plus all other employees of firms with under five employees (four in the case of El Salvador).

5. Gong *et al.* (2000) report alternative results based on the firm-size definition in an appendix, but these are omitted from the version of this work subsequently published as Gong and van Soest (2002). The two sets of results are described in the later paper as “qualitatively similar”. No results are reported for a definition based on social security coverage.

6. Prior to the adoption of the 1988 Constitution dismissal notice was fixed at one month. Subsequently, it is a minimum of one month rising proportionately with accumulated tenure with the employer. This change is one of the main reasons why Barros and Corseuil (2001) argue that labor market inflexibility may have increased in Brazil.

7. For further discussion, see Gonzaga (2003) who explores the “fake lay-off” problem in future detail, as well as observing that poor Government management of the FGTS during the time of high Brazilian inflation led to negative real rates of return on the fund, further incentivising workers to engineer access to accumulated contributions.

8. The finding of no over trend contrasts with recent research by Bosch, Goni, and Maloney (2007) who report fast growth in the size of the Brazilian informal sector, defined as the self-employed plus employees without a signed labor card, using monthly employment survey data. This growth appears to take place over the period 1990–98, and is similar to the experience in other Latin American economies. The absence of a strong trend for Brazil, as reported here, is observed by Gasparini and Tornarolli (2007) using the same annual household survey (PNAD) data. As part of a comprehensive assessment of data on trends across Latin America they report that the Brazilian informal sector has grown only slightly over the period since the early 1990s. They find some differences across different demographic groups, for example rising informality amongst younger workers, women and the less educated.

9. No significant deviations from the patterns shown in Table 3 are in fact apparent for any of the intervening years.

10. The structure of the PNAD questionnaire assumes that those who are illiterate must not have received any formal schooling.

11. Coefficient estimates for occupational grouping are omitted for space reasons but are available on request.
12. Sub-sample regressions for males and females and for whites and non-whites separately were conducted but are not reported for reasons of

space. They are available on request. Sub-sample regressions by ethnic group show that there is a generally stronger association between lower education levels and informality for non-whites. In general, there are few other important differences between males and female and between whites and non-whites.

## REFERENCES

- Bosch, M., Goni, E., Maloney, W. (2007). *The determinants of rising informality in Brazil: evidence from gross worker flows*. Policy Research Working Paper, No. 4375, The World Bank.
- Camargo, J. M. (2002). Fake contracts: Justice and labor contracts in Brazil. In *World Bank* (2002).
- Carneiro, F. G. (1997). The changing informal labour market in Brazil: Cyclical versus excessive intervention. *LABOUR: Review of Labour Economics and Industrial Relations*, 11(1), 3–22.
- Cohen, B., & House, W. J. (1996). Labor market choices, earnings and informal networks in Khartoum, Sudan. *Economic Development and Cultural Change*, 44(3), 589–618.
- Cunningham, W. V., & Maloney, W. F. (2001). Heterogeneity among Mexico's microenterprises: An application of factor and cluster analysis. *Economic Development and Cultural Change*, 50(1), 131–156.
- De Barros, R. P., & Corseuil, C. H. (2001). *The impact of regulations on Brazilian labor market performance*. Research Network Working Paper No. R-427, Inter-American Development Bank.
- Duval-Hernandez, R. (2006). *Informality, segmentation and earnings in urban Mexico*. Unpublished paper. Center for US-Mexican Studies, University of California, San Diego.
- Fields, G. S. (1975). Rural-urban migration, urban unemployment and underemployment, and job search activity in LDC's. *Journal of Development Economics*, 2, 165–187.
- Fields, G. S. (1990). Labour market modelling and the urban informal sector: Theory and evidence. In D. Turnham, B. Salomé, & A. Schwartz (Eds.), *The informal sector revisited*. Paris: OECD.
- Funkhouser, E. (1996). The urban informal sector in Central America: Household survey evidence. *World Development*, 24(11), 1737–1751.
- Galli, R., & Kucera, D. (2004). Labor standards and informal employment in Latin America. *World Development*, 32(5), 809–828.
- Gasparini, L., & Tornarolli, L. (2007). *Labor informality in Latin America and the Caribbean: Pattern and trends from household survey microdata*. Working Paper No. 10, CEDLAS, Universidad Nacional de La Plata.
- Gërghani, K. (2004). The informal sector in developed and less developed countries: a literature survey. *Public Choice*, 120(3–4), 267–300.
- Goldberg, P. K., & Pavcnik, N. (2003). The response of the informal sector to trade liberalization. *Journal of Development Economics*, 72(2), 463–496.
- Gong, X., van Soest, A., & Villagomez, E. (2000). *Mobility in the urban labor market: A panel data analysis for Mexico*. CentER Discussion Paper, No. 46, Tilburg University.
- Gong, X., & van Soest, A. (2002). Wage differentials and mobility in the urban labour market: A panel data analysis for Mexico. *Labour Economics*, 9, 513–529.
- Gonzaga, G. (2003). *Labor turnover and labor legislation in Brazil*. Discussion Paper No. 475, Department of Economics, Pontificia Universidade Católica do Rio de Janeiro (PUC-Rio), August.
- Hart, K. (1972). *Employment, income and inequality: A strategy for increasing productive employment in Kenya*. Geneva: ILO.
- Heckman, J., & Sedlacek, G. (1985). Heterogeneity, aggregation and market wage functions: An empirical model of self-selection in the labor market. *Journal of Political Economy*, 93, 1077–1125.
- Husmanns, R. (2004). *Measuring the informal economy: From employment in the informal sector to informal employment*. Working Paper No. 53, Policy Integration Department, Bureau of Statistics, ILO, Geneva.
- International Conference of Labor Statisticians (2003). In *Report of the 17th Conference*, Geneva: ILO.
- International Labor Office (2000). Resolution concerning statistics of employment in the informal sector, adopted by the Fifteenth International Conference of Labor Statisticians (January 1993). In *Current International Recommendations on Labor Statistics* (2000 Ed.). Geneva: International Labor Office.
- Livingstone, I. (1991). A reassessment of Kenya's rural and urban informal sector. *World Development*, 19(6), 651–670.
- Loayza, N., Oviedo, A.M., & Servén, L., (2005). *The impact of regulation on growth and informality: cross-country evidence*. Policy Research Working Paper No. 3623, The World Bank, Washington, DC.
- Magnac, Th. (1991). Segmented or competitive labor markets. *Econometrica*, 59(1), 165–187.
- Maloney, W. F. (1999). Does informality imply segmentation in urban labor markets? Evidence from sectoral transitions in Mexico. *World Bank Economic Review*, 13(2), 275–302.
- Maloney, W. F. (2004). Informality revisited. *World Development*, 32(7), 1159–1178.
- Marcoullier, D., Ruiz de Casilla, V., & Woodruff, C. (1997). Formal measures of the informal-sector wage gap in Mexico, El Salvador, and Peru. *Economic Development and Cultural Change*, 45(2), 367–392.
- Mazumdar, D. (1976). The urban informal sector. *World Development*, 4(8), 655–679.
- Merrick, T. W. (1976). Employment and earnings in the informal sector in Brazil: the case of Belo Horizonte. *Journal of Developing Areas*, 10(3), 337–353.
- Perry, G. E., Maloney, W. F., Arias, O. S., Fajnzylber, P., Mason, A. D., & Saavedra-Chanduvi, J. (2007). *Informality: Exit and exclusion*. Washington DC: The World Bank.
- Pisani, M. J., & Pagán, J. A. (2003). Sectoral queuing in a transitional economy: the case of Nicaragua in the 1990s. *LABOUR: Review of Labour Economics and Industrial Relations*, 17(4), 571–597.
- Pisani, M. J., & Pagán, J. A. (2004a). Self-employment in the era of the New Economic Model in Latin America: A case study from Nicaragua. *Entrepreneurship and Regional Development*, 16, 335–350.
- Pisani, M. J., & Pagán, J. A. (2004b). Sectoral selection and informality: A Nicaraguan case study. *Review of Development Economics*, 8(4), 541–556.
- Portes, A., Blitzner, S., & Curtis, J. (1986). The urban informal sector in Uruguay: Its internal structure, characteristics, and effects. *World Development*, 14(6), 727–741.
- Pradhan, M., & van Soest, A. (1995). Formal and informal sector employment in urban areas of Bolivia. *Labour Economics*, 2, 275–297.
- Pradhan, M., & van Soest, A. (1997). Household labor supply in urban areas of Bolivia. *Review of Economics and Statistics*, 79(2), 300–310.
- Saavedra, J., & Chong, A. (1999). Structural reform, institutions and earnings: Evidence from the formal and informal sectors in urban Peru. *Journal of Development Studies*, 35(4), :95–116.
- World Bank (2002). *Brazil: The Jobs Report*. Washington, DC, Report No. 24408-BR.