

Unemployment Insurance in Brazil:
Unemployment Duration, Wages, and Sectoral Choice*

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This paper examines the impact of Brazil's new unemployment insurance program on job transitions. According to well known theories of search in developed economies, unemployment insurance provides unemployed workers with resources to conduct a prolonged job search and, in the end, to obtain a better job. In Brazil, wage equation estimates do not indicate that UI leads to higher paying jobs for those who collect versus those who do not collect. The improvement from UI may be reflected in non-pecuniary aspects of the sector of choice rather than in wages, though. Taking advantage of a law change in 1994 which increased the total value of unemployment benefits, the theory is tested by comparing post-unemployment sectoral allocation of individuals before and after the law change. Using a difference-in-differences methodology in the estimation of multinomial logit and competing risks proportional hazard models, the result suggests that the probability of formal sector attachment does not significantly increase for the group that is eligible for more benefits. Instead, the probability of attachment to the self-employment sector increases with unemployment insurance, thus supporting the theory that markets are well integrated and participation in the informal sector is not an inferior choice.

I. Introduction

Well known theories of search in developed countries' labor markets¹ assert that higher unemployment insurance (UI) payments decrease the price of leisure and raise the reservation wage for those who collect, resulting in longer duration of unemployment and better job matches than those who do not collect. This theory cannot be comfortably extended to search in developing countries for two reasons. First, although empirical studies show that UI does increase the duration of unemployment², they do not conclusively determine that UI leads to better job matches³. Second, measuring job quality by a single dimension is naïve since non-pecuniary aspects of the job also are arguments in the utility function. The multi-sectoral labor markets of Brazil will allow us to address both issues.

Brazil implemented its first universal unemployment insurance program in 1986. Ten years later, the program has transferred more than US\$11 billion to aid over 28 million unemployed people in their job search⁴, but no empirical evidence has shown whether or not its existence does affect labor supply decisions or increase the probability of securing a better quality job. We will test whether or not more UI leads to 1) higher post-unemployment wages, 2) a higher probability of attachment to a particular sector, and 3) longer unemployment duration. This paper begins by sketching institutional. A sample of males and females of working age who left a job, spent at least one month unemployed, and found a new job in the year of the survey is drawn from household data sets collected in 1992, 1993, 1995, 1996, and 1997. Taking advantage of the 1994 law which changed the maximum level of UI benefits an individual may collect, a difference-in-differences approach is employed in the traditional post-unemployment wage equation estimation,

¹ For classic theoretical papers, see Mortensen (1977), Burtless (1986).

² For example, see Holen (1977), Hamermesh (1977), Meyer (1990).

³ Several find that the provision of higher UI payments leads to higher post-unemployment wages (Burgess and Kingston (1977), Barron and Mellow (1979)) but others do not find any effect (Classen (1977), Woodbury (1987)). Even the positive results are questionable since the data used in some of the studies bias the results (See Welch (1977)).

thereby not taking into account non-pecuniary returns from the job. To include the non-wage effects of each sector, the empirical analysis is repeated to estimate the probability of exit into various sectors by using a difference-in-differences approach in a discrete dependent variable model, a duration model, and a competing risks proportional hazards model. The results show an increased probability of self-employment for men but no change in wages, which may support the theory that labor markets are well integrated and that UI provides credit constrained men the necessary capital/collateral to obtain loans or start their own firms.

II. Institutional Details

2.1 Unemployment Insurance in Brazil⁵

Brazil's unemployment insurance program was created as part of the Cruzado Plan in May of 1986 to provide resources to individuals who were involuntarily separated from their previous jobs and needed resources to conduct a job search. Eligibility for UI requires: 1) involuntary separation from the last job, 2) no other form of income, and 3) employment in a formal sector job for the six months preceding application for UI. Notably, these requirements omit a large portion of the labor force that is either employed in the informal sector or is self-employed. New labor market entrants and seasonal workers are also omitted (Law #7998/90).

A person who leaves a job and wishes to collect UI receives a form from the employer detailing the time employed with the firm and earnings received in the three months immediately prior to dismissal. The individual takes or mails the form to a federally designated collection center (the local employment office or federal savings bank) where it is passed to a national clearinghouse to be reviewed for proof of eligibility. The individual is notified of acceptance or

⁴ Calculated from statistics provided by the Ministry of Labor.

⁵ Appendix 1 gives a more detailed program description and outlines stylized facts.

rejection, the value of benefits⁶, and the maximum number of months of benefits he/she may receive, which are a function of the time the individual spent in the formal sector. The worker collects the monthly payment at a federal bank or employment office upon presentation of proof of eligibility (Ministerio de Trabalho 1996).

The change in the number of benefits before and after a 1994 is the basis of our statistical analysis. In 1992 and 1993, only those who had collected a wage in a formal sector job for at least six months prior to losing their job were eligible for UI. If they had participated in the formal sector for 6-14 months in the past 24 months, they were eligible for up to three months of UI payments. However, anyone who had worked in the formal sector for more than 15 months of the past 24 was eligible for four months of benefits. The application for benefits had to be made within 120 days of losing the formal sector job, so hypothetically, someone who was in the *informal* sector for less than 120 days, but in a formal sector job before that, could receive benefits.

Law #8900/94, passed in 1994, did not change the days within which the individual must apply, but it did change the number of monthly benefits for which the person was eligible. An individual who spent 6-11 months of the past 36 months in a formal sector job was eligible for three payments. Working 12-23 month provided a maximum of four payments and working more than 24 months of the past 36 in the formal sector permitted up to five payments.

2.2 *The State of the Labor Market*

⁶ The value of each monthly payment is a function of the average of wages paid in the last three months of employment. Assume that the average wage in the three months prior to dismissal, $w_{\mu} \in (0, \infty)$, and assume that p and q are thresholds that separate the wage categories where $p < q$. If $w_{\mu} \in (0, p)$, a monthly UI payment that maximizes [minimum wage, $0.8 * w_{\mu}$] is received. For $w_{\mu} \in (p, q)$, the monthly UI payment is $(0.8 * p + (w_{\mu} - p) * 0.5)$ and the high earners with $w_{\mu} \in (q, \infty)$ receive twice the minimum wage. During the period of high inflation, the values of p and q were indexed to the CPI such that p ranged from 1.7 to 3.73 times the minimum wages while q ranged from 2.83 to 6.72. The real value of the minimum wage also varied within this period, as it was not indexed, so the real value of UI benefits

To make inter-period comparisons of the job choice of potential UI collectors, we need to ascertain that the labor market was sufficiently similar before (1992 and 1993) and after (1995, 1996, 1997) the law change. The defeat of hyperinflation in 1994, a new development strategy to open the Brazilian economy to international competition in 1990, and a privatization program profoundly affected the economy from 1992-1997⁷. Despite these changes, Table 1 shows that labor market activity among the three years was similar. The unemployment rate in urban areas was lower in 1995 than 1992, but, as Amadeo and Pero (1996) point out, a better indicator of labor market conditions are given by changes in the *quality* of jobs, measured by sectoral participation and real wages.

First considering sectoral attachment, the proportion of the wage labor force without a work card increased by 1.5 percentage points over the period and self-employed increased by less than 1 percentage point⁸. Furthermore, the real monthly minimum wage increased between 1992 and 1995 from R\$86.31 to R\$97.14. Since the value of UI payments is bounded from above and below by multiples of the minimum wage, we can conclude that the real value of UI checks was higher in 1995. The mean real earnings of all sectors also increased over the period, probably due to the control of inflation which both prevented the deterioration of the real wage and increased the demand for labor in 1994.

In conclusion, although the economy was different in the 1992 and 1993 period as compared to the 1995/6/7 period, the changes in the labor market were economy-wide and thus can be controlled for. Evidence does not emerge that the positive effects of the economic

widely fluctuated. Since 1994, the values of p , q , and the minimum wage have been stable and the real value of benefits has been maintained above those in the 1992/1993 period.

⁷ The economic difficulties in the 1990's were the residuals of economic mismanagement in an era of re-emerging democratization and worldwide economic shocks beginning in the early 1970s. See *The Brazilian Economy* (1995) by Werner Baer for an excellent review of the economy over this period.

⁸ These results are from the PME (Monthly Employment Survey). Similar estimates with the PNAD (National Household Survey) data sets used in this paper suggests that informal wage employment increased by less than 1 percentage point and self-employment increased by a little more than 1 percentage point.

restructuring would affect some individuals in our sample differently than others.

2.3 *Sectoral Identification in Brazil*

For lack of a better indicator, most of the literature defines informal sector workers as those individuals who own or work in firms with six workers or less. The identification is less ambiguous in Brazil since all workers are entitled to a formal work contract/card (*carteira*) that lists the federally mandated labor laws by which all employers must abide. Upon hiring a worker, the employer must sign and date on the employee's work card, thereby formally contracting the individual. Failure to sign the work card may lead to fines, legal suits, and exclusion from government contracts. Those workers who have signed work cards are identified as the formally employed and those without are the informally employed. The latter group can be further broken down into wage employees, unpaid, self-employed (no paid employees in the firm), and employers (at least one paid employee in the firm) who are not professionals.

Based on the national household data sets used in this paper, the workers in each sector in Brazil can be characterized. Approximately 44% of working males (who are not in agriculture) are formal sector workers. The informal sector, therefore, constitutes 56% of workers, broken down as 20% informal wage laborers, nearly 27% self-employed, over 6% employers and 2% unpaid workers. Employers, the unpaid, and women will not be included in our analysis since the sample size is too small. Of the remaining three groups, the average formal sector worker has 6.8 years of education, is 32.6 years old, has worked for 13.6 years and has spent 4.8 years in the current job. The informal wage worker is less educated (5.1 years of education), younger (28 years), has shorter tenure in the current job (2.9 years) but approximately the same amount of work experience (12.9 years). The self-employed are much older than the other two groups (37.6 years old), and have longer tenures in their current position (7.9 years) but are similar to the informal

wage earners in education (5.5 years) and experience (12.6 years). Of the individuals who are currently formally employed, left a job in the year of the survey, and were formally employed in their previous job (a rough proxy for eligibility for UI), 47% collected UI. Over 46% of the informal wage employees who exited unemployment in the past year collected UI while 57% of the currently self-employed collected UI benefits. Table 2 outlines other characteristics of each sector.

III. Data and Estimation Strategy

3.1 Data

The sample is a pool of the 1992, 1993, 1995, 1996, and 1997 National Household Surveys (PNAD) collected annually by the Brazilian National Statistical Institute⁹. Each data set has over 360,000 observations that are selected by region, municipality, and household. In this study, only men and women of working age (14-65) who left a non-agricultural job, spent at least one month unemployed, and found a new job in the formal, informal wage, or self-employment sector in the year of the survey are considered, thus reducing the pooled sample size to 15960 men and 9241¹⁰.

Although the PNAD has few questions on unemployment insurance, it is the only suitable data set to consider the issue of UI and transitions since other available data sets either are limited to a few cities (PME, DIESSE) or do not contain information on UI. If they do contain this information, they are sparse in demographic variables or only have information on transitions into formal wage employment (CAGED, RAIS). The variables used in the regressions are the group and interactive term described in Table 3 and control variables for personal characteristics (X_i), labor demand, and search inputs as defined in Appendix 2.

⁹ In 1991, the census was taken instead of this survey and there was no survey in 1994.

3.2 *Estimation Strategy*

To identify the effects of a change in potential UI duration on post-unemployment wages and sector, we compare the transitional patterns of the newly re-employed before and after the 1994 law change. Changes could occur for two reasons. First, economy-wide shocks may cause different search results across the year for both the group affected by the law change (treatment groups) and that not affected by the law change (control group). Second, the law change itself could affect the search process and outcomes so only those in the treatment group change their behavior. Since we are only interested in the latter effect, we need to control for any systematic shocks to the labor-market between the two periods. This may be done using a “difference-in-differences” approach (Gruber 1994) where we take the difference in the behavior before and after the law change for a treatment group and subtract from it the difference in the behavior before and after the law change of a group which could not be affected by the law change.¹¹ This method uses changes in the control group’s behavior to capture general labor market trends under the assumption that there are no shocks, besides the law change, that affect the treatment group but not the control group between the two periods.

3.2 *Treatment and Control Groups*

Due to the parameters of the 1994 UI law, three treatment groups are used. Each group is defined by the previous sector of participation and the amount of time that a participant was employed in his last job. Figure 1 identifies the potential maximum duration of benefits for each treatment group before and after the law change and Table 3 summarizes the group characteristics. The first treatment group (denoted by INF0-4) consists of those who were

¹⁰ The sample consists of 23.18% of the observations from 1992, 32.42% from 1993, and 35.4% from 1995.

¹¹ This methodology requires the (strong) assumption that any changes in the labor market identically affect the control and treatment group outcomes of interest.

employed in the informal sector for less than four months. Although informal employment in the previous job precludes the individual from UI, the individual does have 120 days after being dismissed to apply for UI. Hypothetically, someone who has been working in the informal sector for less than 120 days may still apply for UI for being fired from a penultimate job in the formal sector in which they spent at least six months. If there is a change in the behavior of this group it should be small, since many in the group will not be eligible for any UI benefits.

Second, those who were in their previous formal sector job for 6-23 months comprise a treatment group (denoted by FORM6-23). Since the potential number of payments is based on *all* formal sector participation over the past two (1992/3 sample) or three (1995/6/7 sample) years we cannot calculate each individual's exact duration of benefits. We can only identify that this group was eligible for 3-4 payments in 1992/1993 and 3-5 payments in 1995/1996/1997. However, we can assume that a larger portion of this group will be eligible for four payments in 1995/6/7 than were eligible in 1992/3 since the period to accumulate work experience was longer in 1995/6/7 than 1992/3 and because the group with 12-14 months tenure would have received three payments in 1992/3 but four payments in the later period¹². It is not possible to isolate only those who the law change will affect so this treatment effect will also be diluted.

The last treatment group (denoted by FORM24+) are those who were in a formal sector job for 24 months or more. In 1992/3, these people were eligible for four months of payments and in 1995/6/7 they were eligible for five months. In this case there is no ambiguity about the application of the law change.

There are two potential control groups: formal for up to six months (FORM0-5) or informal for more than four months (INF4+). Those who were employed in the formal sector for

¹² Using data on the time spent in the formal sector in just the *last* job does suggest that the sub-samples are not distributed the same. Instead, 7.4% of the 1992/3 observations spent 12-14 months in their last job were eligible for up to three payments while 8.9% of the 1995 sample had tenures of 12-14 months and were eligible for four.

less than five months before being dismissed comprise the group FORM0-5. Both before and after the law change, collection of UI required at least six months in a formal sector job prior to being fired, so these individuals were not eligible for any UI. They should not be affected by the new law. The second potential control group are those individuals who were in an informal sector job for more than four months. Because application for benefits is limited to 120 days after losing the last formal sector job, even if these individuals spent time in the formal sector in the past 36 months, they would surpass the time limitation for application in either period.

The best control group is one in which economy-wide changes will affect the outcome variable of interest by the same amount as it changes the outcome variable for the treatment group. Since the treatment group that we are most interested in (FORM24+) is comprised of individuals who entered unemployment from the formal sector, FORM0-5 may be the better control group since the differencing of the economy-wide effects will be relatively clean.

However, Tables 4a and 4b show that FORM0-5 individuals are younger and less likely to be household heads. Thus, if the economy-wide changes do not affect heads and mid-aged workers the same as younger, household dependents, FORM0-5 may not be an appropriate control group.

The group INF4+ does consist of older household heads, but they may not be an ideal control group for two reasons. First, since they were in the informal sector, the changes in the economy are likely to have affected their labor market status differently than those in the formal sector treatment group FORM24+. Secondly, this group tends to be less educated and in northern regions of the country. Both of these may imply that the differencing exercise will not purge the treatment group of the economy-wide effects, so the effect of UI will be over-estimated.

Although neither group is ideal, we will focus on the results from the control group FORM0-4. The age and headship issue is likely to be less distortionary than the informal sector and regional differences between INF4 and FORM24+. The results from the INF4+ group are

available from the author.

3.4 *Summary statistics by treatment group*

Tables 4a and 4b give summary statistics for the entire sample, the control group and each treatment group in each period. Mean values of the continuous variables in Table 4a show that the groups are very similar between the years. The only notable difference is a marginally more educated and experienced sample in 1995/6/7 than in 1992/3 (significant at the 10% level), which is probably due to a sampling error rather than an increase in human capital over the two year period. Table 4b compares the categorical variables. There are some notable differences between the groups in 1992/3 and 1995/6/7. First, increased global competition that resulted in a restructuring of jobs may explain why the percentage of the sample participating in the industrial sector fell between 1992/3 and 1995/6/7 for all groups while the percentage in the service sector increased. A second difference is that the individuals in the 1995/6/7 sample have a higher probability, compared to those in the 1992/3 sample, of being married or in a common law union. Perhaps the economic euphoria of 1994 led to unions that were previously delayed due to economic uncertainty. Finally, a higher percentage of the 1992/3 sample is from the North than in the 1995/6/7 sample. There is not a reason to expect high migration to the Southeast during the two year period, so this may be an indication that there was some bias in sample collection.

IV. Empirical Results: Wages

Starting with the standard measure of the quality of the post-unemployment job we consider post-unemployment wages, thereby ignoring the influence of non-pecuniary aspects. Due to a different currency in each of the three of the five years of the data set and high inflation in 1992 and 1993, hourly wages were converted to 1997 *reais* using the monthly inflation rate

from the International Monetary Fund's *International Financial Statistics*.

4.1 *Difference- in-Differences Table*

Table 5 gives difference-in-differences estimates of the log of hourly wages of men and women when not controlling for personal characteristics. The first two columns show the log of hourly wages in 1992/3 and 1995/6/7, respectively. Column three is the difference in wages, *within* group p and column 4 is the difference-in-differences, namely the difference between column 3 for the control group and column 3 for the group p . Real wages increase substantially between 1992/3 and 1995/6/7 for the control group. Such a change is theoretically due to economy-wide changes so we should expect this increase for all other groups plus increase by even more for those groups that are eligible for more UI in 1995 (FORMAL23 and FORMAL24).

For men, the only group with a significant change in earnings is the group that spent 24 or more months in the formal sector in their last job (FORM24+) while for women, log real wages increased in both FORM6-23 and FORM24+. For the two informal sector groups, real wages increased relative to the earlier period, but actually fell, when adjusting for economy-wide changes that are captured by the change in FORM0-5's wages. Thus, the provision of additional UI does seem to increase the value of post-unemployment wages.

4.2 *Regression Results: OLS*

Table 5 does not control for variation in the demographic makeup of the groups. The success of the formal sector treatment groups could be due many other factors that varied by group across the periods, so a regression model is necessary to account for variation in the individuals:

$$\ln(\text{real hourly wage}) = \alpha + \beta_1 X_i + \beta_2 \text{year}_i + \beta_3 (\text{INF}4_{+i}) + \beta_4 (\text{INF}0-4_i)$$

$$\begin{aligned}
& +\beta_5(\text{FORM6-23}_i) + \beta_6(\text{FORM24}_i) + \beta_7(\text{year}_i * \text{INF4}_i) \\
& + \beta_8(\text{year}_i * \text{INF4}_i) + \beta_9(\text{year}_i * \text{FORM6-23}_i) + \beta_{10}(\text{year}_i * \text{FORM24}_i) \\
& + \beta_{11}\lambda + \varepsilon_j
\end{aligned}$$

where the index i identifies the individual, X is a vector of observable characteristics, and λ is the inverse Mills ratio that is included in the specification that controls for selection bias.¹³ The control group in 1992/3 serves as the omitted group. The “year” variable is 1 if the individual was from the 1995/6/7 sample and 0 otherwise.¹⁴ Likewise, the treatment group variable is 1 if the individual was in that treatment group and zero otherwise. Its coefficient measures the differences between the control groups and treatment group in 1992/3.¹⁵ The coefficients on the interaction terms are the difference-in-differences estimates. For example, for treatment group FORM6-23, the difference in the treatment groups between the years is given by $[(\alpha + \beta_1 X_i + \beta_2 + \beta_5 + \beta_9) - (\alpha + \beta_1 X_i + \beta_5)] = (\beta_2 + \beta_9)$ and between the control group and treatment group in 1992/3 is β_2 so the difference-in-differences is given by β_9 . If the change in UI duration increased the post-unemployment wage, we should find that $\beta_9 > 0$ and $\beta_{10} > 0$.

Difference-in-difference coefficient estimates (the interactive terms) are given in Table 6. Two specifications are presented: an augmented Mincer earnings equation and a Heckman corrected earnings equation. The rho was not significant for the male sample, but was significantly negative for the female sample. Among men, wages for the INF0-4 group increased while among women, the increase was observed in both (formerly) informal sector treatment groups. These changes cannot be due to unemployment insurance, though, since the informal

¹³ The selectivity is among those who became unemployed in the past year but have not become re-employed. Thus, the bias of being in the labor force and becoming unemployed is not controlled in these regressions. This important bias emerges, for example, in the insignificant coefficient estimates of children for women’s selection equation.

¹⁴ Since the equation for the control group in 1995 is $(\alpha + \beta_1 X_i + \beta_2)$ and the equation for the control group in 1992/3 is $(\alpha + \beta_1 X_i)$ then the difference in the control groups between the periods ($\text{control}_{1995} - \text{control}_{1992/3}$) is given by β_2 , the coefficient that measures the time effects for all groups.

sector groups were likely not eligible for benefits. Instead, it may simply reflect the high growth rate in informal sector wages over the period. Among those who became unemployed out of the formal sector, regardless of tenure, there is not a significant difference in wages between the two periods for men or women, indicated by insignificant coefficients estimates for all the interactive terms. Thus, the differences observed in Table 5 were due to changes in other characteristics in the treatment group, so we cannot conclude that increased UI payments increase post-unemployment wages.

The other variables in Table 6 show that even though wages did increase across periods and those who became unemployed from the informal sector had higher earnings than their counterparts in the earlier period, they still earned less than those with short tenure in a formal sector job, but there is no difference between individuals with various tenure levels who left the formal sector. Other variables are as expected where both men and women with more education and experience earn higher wages, as do whites and family or household heads. The selection equation reveals that those with other family income or more wealth are less likely to work.

V. Empirical Results: Transitions

The quality of a job is not completely characterized by the wage, though. Multiple sectors with distinct sector-specific characteristics allow us to include non-wage benefits (e_{ij}) in the valuation of a job (x_{ij}) rather than solely depending on wages (w_j) to measure job quality. Since we cannot explicitly measure e_{ij} , we assume that individuals maximize over to their subjective valuation of x_{ij} and reveal their preferences by attaching themselves to a sector j .

There are competing theories regarding the quality of jobs in the different sectors. Traditional theories argue that informal sector jobs are of lesser quality than protected formal

¹⁵ For example, the expression for the treatment group FORMAL5 in 1992/3 is given by $(\alpha + \beta_1 X_i + \beta_4)$ and for the

sector jobs, but newer theories hypothesize that the labor market is well integrated and the informal sector, particularly the self-employment¹⁶, may be preferable since it allows individuals the flexibility to select their optimal level of earnings, benefits, and labor protections. We will not select one of these theories but instead interpret the outcomes from both points of view

There are three hypotheses. First, we would expect that those who entered unemployment from the informal sector will have equal probabilities of exit into any of the states between 1992/1993 and 1995/6/7 since no change in potential duration of UI for this group occurred. Second, due to the difference in the duration of the previous job tenure distribution between 1992/3 and 1995/6/7 and the increased period to “accumulate” formal sector experience in 1995/6/7, the segmentation hypothesis predicts the probability of exit into formal sector jobs to be slightly higher for the 6-23 group (FORM6-23) while the integration hypothesis expects to find a slight increase in self-employment. Third, under the segmentation hypothesis we expect that those who were eligible for more benefits (those who were in their previous job in the formal sector for more than 24 months) to be more likely to exit into formal employment in 1995/6/7 than in 1992/1993. Conversely, under the integration hypothesis, there should be a higher probability of exit into self-employment for this group.

5.1 *Difference-in-Differences Tables*

Table 7 gives the difference-in-difference estimates for each treatment group for each sector of exit j for men and women.¹⁷ Each cell in a year column is the percent of the control or treatment group p which took a job in the sector j in the given year. The difference column (3) is the change in group p 's exit to sector j between the two periods. For each treatment group, the

control group in 1992/3 by $(\alpha + \beta_1 X_i)$. The difference in the treatment and control groups in 1992/3 is then β_4 .

¹⁶ See deSoto (1988), Turnham and Erocal (1990), Maloney (1997).

difference-in-difference cell (4) for each type of exit is given by $(\text{difference}_{\text{treatment}} - \text{difference}_{\text{control}})_{\text{exit type } j}$. Between 1992/3 and 1995/6/7, the both men and women in the control group (those who entered unemployment after short tenures in the formal sector) increased their probability of exiting unemployment into the formal sector. Women's probability of taking a new job in the informal wage sector fell while their likelihood of entry to self-employment increased. Men showed the opposite pattern.

Under the segmentation hypothesis, we expect the treatment groups to pick up this economy-wide transition as well as additional movement into the formal sector due to the increase in UI payments. For men, the two treatment groups with longer previous job tenure in the formal sector (FORM6-23, FORM24) actually show declines in the probability of finding another formal sector job. And when corrected for the economy-wide changes, as measured by the difference in the control group between 1992/3 and 1995/6/7, the probability of transition into the formal sector is negative for both men and women, i.e. their attachment to the formal sector did not increase as much as the economy (control group) permitted. Thus, under the segmentation hypothesis, Table 7 suggests that the provision of additional UI does not improve the quality of post-unemployment jobs.

On the other hand, if we believe that the informal sector, or particularly the self-employment sector, is an optimal place to be, Table 7 suggests that UI does meet its intended goal for men, but not women. The last row shows that exit to the self-employment sector is more likely for men who were eligible for higher unemployment spells while the corrected probability for the other sectors fell.

5.2 *No duration dependence: multinomial logit*

¹⁷ The sample size in INFO-5 in female self-employment are small. Since this is the base group, the results may not be

The allocation of labor among sectors *without* taking into account the duration of unemployment is first analyzed by a multinomial logit model to identify the likelihood of moving into informal wage employment or self-employment over formal sector employment¹⁸. As the model requires, we assume that exit into any employment state is independent from the existence of other states.

The difference-in-differences coefficients are given in Table 8. As hypothesized, there is not a significant change in behavior between 1992/3 and 1995/6/7 for men and women with previous informal employment of less than four months, although men who spent a short period in informal work before becoming unemployment do show a slightly higher probability of self-employment over formal sector work upon re-employment. Men with 6-23 months in a previous formal sector job (FORM6-23) show a similar propensity after the law change. Finally, for treatment group 4, the propensity for self-employment rather than formal wage work is higher in the latter period for men, but the difference is not significant for women. Thus, men who are more eligible for UI in the latter period are also more likely to enter the self-employment rather than the formal sector relative to the earlier years. This may suggest that the additional UI provides capital needed for initial investments in a small business or it may simply reflect that the self-employment sector is an employer of last resort after long spells of leisure.

The estimates for the control variables are also listed in Table 8. The coefficients on the main effects (group dummies) show that men and women who did not have formal sector jobs in their previous employment are most likely to become re-employed in the informal wage sector (men) and the self-employment sector (women), relative to men and women who were short term

robust.

¹⁸ Assume that the indirect utility function for participation in each sector be composed of two parts: a nonstochastic component, which is a linear combination of the variables described in the theory, and a stochastic component which is unobservable. Assuming that the error terms are iid and follow a Weibull distribution, the difference between the error terms for competing states of exit follow a logistic distribution.

in the formal sector. Furthermore, for those who held formal sector jobs, the probability of exit to self-employment is consistently higher than the probability of exit to informal wage employment.

The control variables follow the expected patterns. Older, whiter, and more educated men and women are more likely to be in the formal sector while older and wealthier men and women tend to be in self-employment. The presence of children and household labor responsibilities is correlated with a higher propensity for self-employment over either type of wage work for women. The availability of UI collection sites is correlated with non-informal sector jobs. This correlation is stronger for men than for women.

VI. Duration dependence

A third primary question behind the effects of unemployment insurance on labor supply is whether or not the provision of additional UI allows the unemployed individual to buy leisure rather than search for a job, i.e. if it discourages search thereby creating an incentive for prolonged periods of non-work. The Brazilian system is particularly susceptible to this perverse outcome since there are not any job search requirements for the collection of UI. The individual's only criteria for collection of a benefit is proof that he or she is not holding a formal sector job by presenting the *carteira* to obtain an additional payment. Therefore, the individual may (and casual interviews suggest that they do) engage in informal sector work, which, by definition will not alter the work card, or may hold a second work card. We test the hypothesis that unemployment duration is higher for the treatment group FORM24+ in the later period.

6.1 Duration Model

To test whether or not the additional month of UI lead to longer unemployment duration, a Cox proportional hazard model is used to estimate the exit (hazard) rate from unemployment. The

difference-in-difference hazard ratios are given in Table 9. They show that for both men and women, the exit rate does not change between the periods for any treatment group, when only controlling for sector of exit or controlling for sector of exit and demographic characteristics. Furthermore, a higher availability of UI collection centers does not lead to longer or shorter unemployment spells either.

The main effects dummies show that any men who leave the informal sector and women who leave short spells in the informal sector, have longer unemployment spells than do short-tenure formal sector workers even though none of these groups are not eligible for UI. Men and women who left longer tenure formal sector jobs and women who left longer tenure informal sector jobs, on the other hand, have shorter unemployment durations than former formal sector employees with short tenures. The differential among formerly formal sector workers disappears when controlling for demographic characteristics, though.

6.2 *Competing Risks Model*

The multinomial logit approach is a static analysis since it does not include the impact of duration of unemployment on the transition decision. On the other hand, duration analysis identifies the probability of transition out of the current state, conditional on being in that state for a specific period of time. Combining these approaches, a Kaplan-Meier plot suggests that the probability of exit is decreasing over time and that exit rates differ by state of re-employment, so we need to include both time and the state of exit in the analysis through a competing risks hazard model (Edin 1989, Groot 1990, Narendranathan 1990, Hunt 1995, Thomas 1996).

Incorporating the state of exit (from unemployment) into a duration model requires a hazard function $\lambda(t)$ for each state j of m states of exit where the rate of exit into state j at time t is given by

$$\lambda_j(t) = \Pr[t \leq T < t + \Delta t; J = j | T \geq t] / \Delta t \quad (1)$$

where T is the time at which the spell ends. The sum of the hazard for each type of exit: $\lambda_i = \sum_{j=1}^m \lambda_j(t_i)$ and the survivor function for individual i is given by

$$S(t_i) = \exp\left(-\sum_{j=1}^m \int_0^{t_i} \mathbf{I}_j(u) du\right) \quad (2)$$

where the survivor function for all exits is $S(t_i) = \prod_{j=1}^m S_j$. The loglikelihood is

$$\log L = \sum_{j=1}^m \sum_{i=1}^n \left(c_{ji} \left(\ln \mathbf{I}_j(t_i) X_i' \mathbf{b} \right) - \int_0^{t_i} \mathbf{I}_j(u) du \right) \quad (3)$$

where c_{ji} is an indicator variable that equals 1 if the individual has not exited unemployment into sector j and 0 if he has exited into any sector except sector j . This model again requires that the probability of exit into each j state is independent of exit into any other state k . Furthermore, although the competing risk model allows for censoring, none of the spells are censored in this case since the data do not include incomplete unemployment spells. In essence, though, an exit into any sector except j is considered a “censored” spell since if sector $j+1$ did not exist, the individual eventually would have exited into sector j .

This model is preferred to a multinomial logit not only because it includes time spent in the current state, but also because it allows the functional form of the exit to remain flexible. In a multinomial logit, a fully parametric log-Weibull distribution of exits is assumed, but in the competing risks model, a semi-parametric estimation is possible. The Cox proportional hazard model is commonly used as it allows many different function specifications and does not require specification of the baseline hazard (λ_0) since λ_0 drops out leaving a partially specified model to estimate. The omission of the information contained in λ_0 will only cause a small loss in efficiency, rather than the biased estimates that would emerge from a misspecified model (Kalbfleisch and Prentice 1980).

6.3 *Competing Risks Regression Results*

Table 10 shows the hazard ratios for the exit from unemployment into a particular sector. Among men, the difference-in-difference variables were significant for exit to the formal sector and to the self-employed sector. For the former, only those who were short tenure in the informal sector had differential unemployment durations in the latter period. Their unemployment spells actually fell. However, since few of them could have collected UI, the change in duration is likely due to other factors. However, men who exited to the self-employment sector who were previously in long tenure formal wage jobs, had shorter unemployment spells in the later period. Therefore, on average, the unemployment duration decreases for men who were eligible for higher unemployment and entered the self-employment sector, but the Kaplan-Meier tables do show a slightly higher exit at 6 months among the self-employed in the later period than in the earlier, indicating that perhaps the additional month of UI, though it does not increase the average duration of unemployment, it does cause the right tail to be compressed.

Although an additional month of UI benefits may not seem like a significant addition to capital constrained entrepreneurs, calculations of the value of capital stock from a Mexican data set on small firm owners shows otherwise. Small-firm owners who were in business for four months or less and did not offer transportation services reported median capital values equivalent to US\$171, less than the maximum monthly UI payment. The median capital values of entrepreneurs who had been in business for one year or less were valued at US\$342. Thus, an additional UI payment can greatly contribute to start-up capital or expansions in the beginning of a firm's life.

Women, on the other hand, show increased unemployment rates if they had longer tenures in the formal sector and the exited unemployment to enter the formal sector. Thus, women who

intend to re-enter the formal sector appear to either be buying leisure or have a harder time becoming re-employed in the later period, relative to women who had short tenures in the formal sector. When controlling for other characteristics, particularly education, the differential for both groups disappears.

Considering the coefficients for the within group estimates, unemployment duration decreased for all individuals who entered the informal wage sector, regardless of previous sector or tenure. However, duration increased among those who were short tenure in the informal sector in their previous jobs and formal or self-employed (except for women) upon re-employment. Among all other groups, though, for both men and women, unemployment duration fell for entry into these sectors.

The behavior of the other explanatory variables is very similar between the two methodologies. Older workers with more education are more likely to exit unemployment to the formal or self-employment sectors, and their unemployment durations are shorter. Wealthier individuals are more likely to go into the self-employment sector and have shorter durations.

VI. Conclusion

Under the segmentation hypothesis, the provision of additional UI does not result in better job matches since exit into formal sector jobs do not increase as potential UI payments rose. This may not be so discouraging if those who collect higher UI payments earn very high wages despite selecting employment in the informal sector. However, the wage equation suggests that post-unemployment wages do not differ before and after the law change. Thus, the net change is the same wages but in an inferior sector.

The results do support the integration hypothesis, though, since the estimates reveal that the increase in UI leads to increased participation in the self-employment sector for those with

longer recent experience in the formal sector. Although the self-employment sector is traditionally considered an inferior sector (Hart 1972), recent work suggests that it may be *preferred* to the formal sector, both due to a potential for higher wages and the high value of non-pecuniary aspects related to the job (Maloney 1997, Cunningham and Maloney 1997). Perhaps, in a market where credit is very constrained for small firms, UI provides a means of start-up capital. An additional month of UI benefits may allow those who are capital constrained to set-up firms they otherwise would not be able to. However, this result seems to only hold for men, since women's behavior does not change as UI benefits increase.

The results of this study are suggestive but should not be interpreted as conclusive for several reasons. First, the law change which is examined is a very small change. It increased the potential collection period by one month for some individuals. Other economic factors which were not detected in a review of the labor market may bias the results. Secondly, since we do not have information on the exact level of collection each individual is eligible for, a rough approximation to eligibility was made. More exact figures would allow us to better to identify the effects of increases in UI. The Labor Ministry continues to experiment with the UI program and other data sets that carefully track UI payments are available, so the opportunity for the study of future natural experiments may more decisively answer the question of whether or not higher levels of UI improve the distribution of labor and thus the welfare of Brazil's workers.

TABLE 1: General labor market characteristics

	1992	1993	1995
<i>Unemployment (%)</i>			
unemployment	5.89	5.28	4.72
male unemployment	5.71	5.12	4.59
<i>Productivity(index=100 in 1991)</i>			
productivity by worker	104.13	114.17	125.53
<i>Sectoral allocation (%)</i>			
informal wage employment	22.35	23.03	23.91
self-employed	20.99	21.01	21.85
<i>Wages (monthly in reais Dec 1995)</i>			
mean wage with a card	471.18	520.76	521.46
mean wage informal wage	307.31	334.62	391.64
mean earnings self-employed	304.34	341.86	454.9
mean earnings employer	1111.57	1311.35	1803.36
real minimum wage	86.31	94.57	97.14

from Mercado de Trabalho: Conjuntura e Análise No. 3 1997.

Statistics derived from the PME data set.

TABLE 2: Characteristics by sector

	formal	informal wage	self-employed
<i>continuous variables (mean years)</i>			
education	6.8	5.1	5.5
age	32.6	28.0	37.6
work experience	13.6	12.9	12.6
current tenure	4.8	2.9	7.9
<i>categorical variables Pr(characteristic/sector)</i>			
collected UI	47%	46%	57%
household head	67%	44%	77%
dependent child	25%	45%	17%
married	51%	28%	54%
unmarried ¹	33%	55%	24%
white	58%	44%	53%
black	6%	6%	5%
mixed	36%	49%	42%
union	32%	37%	8%
production	48%	43%	30%
commerce	17%	18%	26%
services ²	23%	28%	30%
1 job only	97%	98%	95%

¹Consensual union marital arrangement omitted

²professional, public administration, and other omitted

FIGURE 1: maximum potential UI benefits

Time spent in <i>formal sector</i> in previous job and number of potential payments				
tenure:	6 months	12 months	15 months	24 months
1992/3	0 payments	3 payments		4 payments
1995	0 payments	3 payments	4 payments	5 payments

TABLE 3: Control/treatment groups

Variable	group #	previous sector	tenure in last job (months)	eligible for UI
INFORMAL4	treatment 1	informal	1-4	maybe
FORMAL5	treatment 2	formal	1-5	no
FORMAL 23	treatment 3	formal	6-23	yes
FORMAL24	treatment 4	formal	24+	yes
control		informal	5+	no

TABLE 4a: mean values by sample and group, males

	1992/1993					1995/1996/1997				
	INF4	INF0-4	FORM6	FORM6-23	FORM24	INF4	INF0-4	FORM6	FORM6-23	FORM24
no school	0.133	0.123	0.088	0.092	0.069	0.155	0.150	0.140	0.091	0.114
prim1inc	0.211	0.226	0.159	0.129	0.112	0.234	0.232	0.301	0.182	0.187
prim1c	0.137	0.140	0.143	0.162	0.159	0.168	0.149	0.160	0.193	0.149
prim2inc	0.296	0.333	0.263	0.278	0.275	0.212	0.291	0.252	0.284	0.298
prim2c	0.076	0.069	0.132	0.108	0.121	0.075	0.057	0.069	0.095	0.091
secinc	0.063	0.054	0.075	0.082	0.068	0.047	0.059	0.032	0.076	0.056
secc	0.061	0.035	0.098	0.111	0.126	0.080	0.040	0.029	0.055	0.078
univinc	0.014	0.016	0.024	0.020	0.024	0.011	0.009	0.011	0.015	0.012
univc	0.008	0.002	0.010	0.014	0.041	0.020	0.009	0.000	0.007	0.014
black	0.061	0.081	0.067	0.093	0.067	0.056	0.067	0.049	0.055	0.083
mulatto	0.501	0.558	0.415	0.412	0.389	0.512	0.489	0.570	0.498	0.435
partner	0.751	0.706	0.791	0.810	0.888	0.807	0.780	0.756	0.804	0.808
household head	0.418	0.307	0.450	0.568	0.698	0.624	0.438	0.350	0.520	0.615
family head	0.473	0.380	0.507	0.622	0.745	0.683	0.477	0.395	0.589	0.671
north	0.088	0.097	0.071	0.048	0.050	0.104	0.099	0.103	0.047	0.064
ne	0.267	0.326	0.212	0.225	0.176	0.372	0.292	0.321	0.265	0.212
se	0.355	0.311	0.401	0.415	0.444	0.269	0.322	0.350	0.393	0.400
south	0.146	0.107	0.240	0.215	0.243	0.137	0.138	0.103	0.222	0.234
co	0.144	0.159	0.075	0.096	0.087	0.118	0.149	0.123	0.073	0.090
retired	0.013	0.012	0.014	0.009	0.033	0.022	0.012	0.003	0.000	0.006
in school	0.146	0.188	0.114	0.097	0.058	0.080	0.120	0.178	0.087	0.071
landowner	0.595	0.642	0.644	0.616	0.652	0.659	0.567	0.642	0.571	0.570
homeowner	0.782	0.834	0.810	0.817	0.817	0.841	0.785	0.860	0.785	0.783
rooms per capita	1.215	1.163	1.344	1.314	1.411	1.337	1.142	1.106	1.166	1.209
housework	0.477	0.518	0.523	0.537	0.505	0.515	0.416	0.427	0.422	0.482
other hh labor income	407.265	434.755	489.368	407.449	431.403	290.288	285.485	283.205	272.461	274.960

other household non-labor income	80.120	81.660	111.648	94.034	90.710	85.534	58.181	62.755	60.302	61.375
household receives ss benefits	0.365	0.366	0.442	0.407	0.393	0.255	0.349	0.338	0.396	0.395
unemployment duration	2.900	6.262	5.186	2.785	2.826	3.405	2.879	6.278	5.140	2.769
previous tenure	1.749	0.254	0.314	0.853	5.152	3.577	1.824	0.254	0.330	0.900
real hourly wage	1.465	1.263	1.595	1.811	2.533	1.854	1.088	0.791	1.218	1.299

TABLE 4b: mean values by sample and group, females

	1992/1993					1995/1996/1997				
	INF4	INF0-4	FORM6	FORM6-23	FORM24	INF4	INF0-4	FORM6	FORM6-23	FORM24
no school	0.091	0.091	0.031	0.042	0.024	0.119	0.114	0.129	0.047	0.060
prim1inc	0.182	0.185	0.066	0.083	0.081	0.160	0.229	0.223	0.068	0.095
prim1c	0.150	0.122	0.075	0.108	0.112	0.119	0.193	0.172	0.142	0.143
prim2inc	0.310	0.355	0.348	0.266	0.198	0.250	0.266	0.318	0.338	0.274
prim2c	0.070	0.063	0.070	0.100	0.120	0.074	0.074	0.074	0.061	0.104
secinc	0.081	0.086	0.141	0.156	0.103	0.045	0.051	0.029	0.101	0.113
secc	0.084	0.065	0.198	0.175	0.210	0.139	0.053	0.032	0.128	0.140
univinc	0.017	0.019	0.053	0.040	0.081	0.033	0.011	0.014	0.074	0.036
univc	0.012	0.009	0.018	0.023	0.061	0.053	0.006	0.003	0.034	0.024
black	0.060	0.072	0.057	0.057	0.059	0.033	0.070	0.080	0.068	0.066
mulatto	0.497	0.535	0.295	0.331	0.301	0.463	0.501	0.527	0.297	0.280
partner	0.613	0.639	0.684	0.611	0.689	0.691	0.610	0.650	0.682	0.619
household head	0.428	0.365	0.405	0.481	0.575	0.701	0.417	0.395	0.439	0.491
family head	0.537	0.475	0.520	0.592	0.685	0.762	0.544	0.496	0.547	0.589
north	0.081	0.091	0.026	0.025	0.024	0.082	0.097	0.095	0.054	0.042
ne	0.268	0.293	0.159	0.130	0.171	0.352	0.267	0.269	0.142	0.131
se	0.342	0.355	0.432	0.454	0.457	0.266	0.344	0.341	0.372	0.387
south	0.150	0.106	0.308	0.293	0.269	0.184	0.122	0.152	0.318	0.342
co	0.159	0.154	0.075	0.098	0.078	0.115	0.170	0.143	0.115	0.098

retired	0.022	0.022	0.022	0.020	0.034	0.045	0.019	0.026	0.027	0.027
in school	0.190	0.266	0.211	0.143	0.110	0.111	0.139	0.169	0.230	0.125
landowner	0.598	0.617	0.621	0.566	0.660	0.615	0.574	0.579	0.574	0.583
homeowner	0.774	0.794	0.780	0.729	0.785	0.794	0.770	0.782	0.750	0.783
rooms per capita	1.222	1.140	1.353	1.458	1.648	1.501	1.200	1.101	1.326	1.438
housework	0.915	0.894	0.894	0.918	0.910	0.934	0.872	0.885	0.885	0.917
other hh labor income	500.517	440.636	812.487	663.958	682.908	569.527	417.684	388.009	418.661	483.525
other household non-labor income	122.841	96.865	191.324	124.330	130.618	125.440	69.070	60.841	104.342	95.900
household receives ss benefits	0.435	0.384	0.568	0.511	0.533	0.291	0.427	0.410	0.527	0.518
unemployment duration	3.000	6.181	5.201	2.855	3.105	3.411	2.951	6.430	5.566	2.808
previous tenure	1.339	0.258	0.315	0.906	4.461	3.555	1.314	0.248	0.310	0.889
real hourly wage	1.113	1.033	1.794	1.672	2.146	1.914	0.719	0.647	1.314	1.188

TABLE 5: Difference-in-differences of ln(hourly wage)

	Men				Women			
	1992/3 (1)	1995-7 (2)	difference (3)	diff-in-diff (4)	1992/3 (1)	1995-7 (2)	difference (3)	diff-in-diff (4)
control	-0.02 (0.67) [263]	0.25 (0.66) [466]	0.27 (0.94)	---	-0.029 (0.75) [143]	0.2 (0.72) [221]	0.23 (1.04)	---
INF4+	-0.26 (0.8) [959]	0.097 (0.72) [1461]	0.36 (1.07)	-0.09*	-0.69 (0.89) [771]	-0.19 (0.72) [1266]	0.5 (1.15)	-0.27*
INF0-4	-0.47 (0.77) [328]	-0.05 (0.74) [551]	0.42 (1.07)	-0.15*	-0.83 (0.96) [338]	-0.26 (0.73) [557]	0.57 (1.2)	-0.34*
FORM6-23	0.042 (0.73) [924]	0.25 (0.68) [1246]	0.2 (0.99)	-1.621	-0.076 (0.69) [322]	0.28 (0.67) [581]	0.36 (0.96)	0.13*
FORM24+	0.21 (0.83) [562]	0.61 (0.79) [836]	0.39 (1.15)	0.12*	0.091 (0.72) [214]	0.46 (0.73) [390]	0.37 (1.02)	0.14*

* significantly different from 0 at the 20% level.

Standard errors are in parentheses and sample sizes are in brackets.

(3) = (2) - (1) and (4) = (3)_{control} - (3)_{group j}

TABLE 6: Estimates from the wage equation (ln(hourly wage))

	men			women		
	ols	corrected	selection	ols	corrected	selection
Control variables						
1995/6/7 dummy	0.221	0.256	---	0.188	0.194	---
	4.599	5.236		2.859	2.886	
INF4	-0.032	-0.027	---	-0.282	-0.277	---
	-0.790	-0.666		-5.217	-5.017	
INF0	-0.141	-0.150	---	-0.372	-0.374	---
	-2.764	-2.886		-6.012	-5.928	
FORM6-23	0.061	0.067	---	-0.024	-0.016	---
	1.501	1.640		-0.426	-0.283	
FORM24+	0.110	0.123	---	0.001	0.019	---
	2.683	2.946		0.018	0.331	
yr*INF4	0.074	0.059	---	0.206	0.199	---
	1.450	1.135		2.995	2.841	
yr*INF0	0.153	0.141	---	0.300	0.294	---
	2.373	2.155		3.822	3.667	
yr*FORM6-23	0.044	0.023	---	0.078	0.080	---
	0.848	0.447		1.083	1.088	
yr*FORM24+	0.063	0.048	---	0.118	0.117	---
	1.212	0.902		1.628	1.575	
collection center	0.001	0.001	---	0.001	0.001	---
	9.831	10.251		5.965	5.760	
demographics						
age	0.049	0.040	0.050	0.037	0.027	0.001
	14.839	12.259	4.984	8.645	6.325	0.040
age^2	-0.001	0.000	-0.001	0.000	0.000	0.000
	-12.804	-9.419	-5.524	-7.204	-4.422	-0.324
prim1inc	0.113	0.125	0.022	0.020	0.013	0.043
	5.625	6.128	0.362	0.688	0.438	0.420
prim1c	0.184	0.209	0.053	0.124	0.127	0.020
	8.857	9.908	0.799	4.189	4.209	0.193
prim2inc	0.261	0.300	0.167	0.199	0.213	0.009
	13.263	15.051	2.671	7.194	7.489	0.092
prim2c	0.410	0.469	0.172	0.316	0.338	-0.221
	17.517	19.801	2.185	9.506	9.971	-2.006
secinc	0.458	0.555	0.280	0.452	0.527	-0.160
	16.818	20.590	3.135	13.060	15.243	-1.348
secc	0.665	0.776	0.419	0.632	0.672	-0.134
	27.634	32.241	4.762	19.684	20.743	-1.234
univinc	1.000	1.220	0.395	0.952	1.107	-0.291
	25.021	31.262	2.677	21.211	24.668	-2.017
unive	1.549	1.795	0.718	1.371	1.496	0.143
	36.410	42.807	3.395	27.345	29.869	0.729
black	-0.164	-0.190	---	-0.083	-0.093	---
	-7.933	-9.030		-3.013	-3.311	

mulatto	-0.088	-0.111	---	-0.076	-0.095	---
	-7.547	-9.409		-4.913	-6.057	
household structure						
partner	0.013	---	-0.276	-0.076	---	-0.700
	0.886		-5.488	-5.235		-11.031
# adults in home	0.002	---	-0.040	-0.014	---	-0.026
	0.551		-3.429	-3.130		-1.603
# children in home	0.000	---	-0.018	-0.004	---	0.024
	0.043		-1.104	-0.615		0.995
household head	---	0.069	---	---	0.138	---
		2.475			5.567	
family head	0.242	0.119	0.400	0.188	0.054	-0.147
	14.079	4.215	7.001	9.866	2.175	-2.026
region						
north	0.050	0.016	-0.200	-0.038	-0.046	-0.267
	1.799	0.577	-2.949	-1.004	-1.201	-2.793
ne	-0.162	-0.185	-0.237	-0.337	-0.334	-0.324
	-8.491	-9.479	-5.254	-13.169	-12.724	-5.076
south	-0.008	-0.022	-0.120	-0.005	-0.004	-0.185
	-0.568	-1.489	-2.461	-0.248	-0.215	-2.818
co	0.062	0.066	-0.057	0.097	0.107	-0.061
	2.700	2.818	-0.968	3.308	3.560	-0.755
time use						
retpen	0.537	---	0.047	0.622	---	0.604
	11.708		0.289	14.857		2.856
insch	0.010	---	-0.100	0.087	---	-0.050
	0.511		-1.775	3.988		-0.628
housework	-0.073	-0.067	-0.275	-0.013	-0.008	-0.377
	-6.941	-6.324	-7.849	-0.581	-0.360	-3.602
wealth and income						
ownland	0.058	---	-0.149	0.007	---	-0.093
	4.237		-3.204	0.365		-1.376
ownhome	-0.137	---	-0.166	-0.050	---	-0.004
	-8.536		-2.570	-2.338		-0.046
roompc	0.078	---	-0.094	0.033	---	-0.071
	9.567		-3.479	3.251		-2.081
other hh labor income	0.000	---	0.000	0.000	---	0.000
	13.948		-3.506	8.764		-2.859
other hh non-labor income	0.000	---	0.000	0.000	---	0.000
	3.276		0.084	3.178		2.959
hh receives social security	0.015	---	0.180	0.069	---	0.602
	1.291		4.642	4.928		11.288
self-employed	0.002	0.004	---	0.090	0.084	---
	0.139	0.272		3.503	3.193	
employee without carteira	-0.182	-0.189	---	-0.233	-0.238	---
	-15.566	-15.916		-14.837	-14.875	
constant	-1.332	-1.140	1.570	-1.026	-0.892	2.924

	-17.789	-16.004	8.325	-10.328	-9.499	9.880
rho	---		0.130	---		-0.376
			1.959			-5.512

TABLE 7: Difference-in-differences for formal sector (proportions)

EXIT UNEMPLOYMENT TO THE FORMAL SECTOR								
	MEN				WOMEN			
	pre-year	post-year	difference	diff-in-diff	pre-year	post-year	difference	diff-in-diff
Control	0.4797 [30]	0.5283 [252]	0.0486	---	0.4662 [69]	0.5374 [122]	0.0712	---
INF4	0.2479 [41]	0.2639 [94]	0.016	-0.0326*	0.1425 [112]	0.1876 [243]	0.0451	-0.0261
INF0	0.1378 [7]	0.2134 [21]	0.0756	0.027	0.0917 [32]	0.1244 [72]	0.0327	0.0327
FORM6-23	0.5417 [07]	0.5338 [79]	-0.0079	-0.0564*	0.4896 [164]	0.4925 [294]	0.0029	-0.0683*
FORM24	0.5238 [97]	0.5164 [42]	-0.0074	-0.056*	0.5434 [119]	0.5468 [222]	0.0034	-0.0678*
EXIT UNEMPLOYMENT TO THE INFORMAL WAGE SECTOR								
	MEN				WOMEN			
	pre-year	post-year	difference	diff-in-diff	pre-year	post-year	difference	diff-in-diff
Control	0.321 [87]	0.3438 [164]	0.0228	---	0.4527 [67]	0.3744 [85]	-0.0783	---
INF4	0.6193 [602]	0.5975 [892]	0.0218	-0.001	0.7799 [613]	0.7337 [950]	-0.0462	0.0321
INF0	0.7079 [242]	0.6896 [391]	0.0183	-0.0045	0.8281 [289]	0.7824 [453]	-0.0457	0.0326
FORM6-23	0.313 [293]	0.3318 [422]	0.0188	-0.004	0.3851 [129]	0.4037 [241]	0.0186	0.0969*
FORM24	0.2857 [162]	0.2757 [236]	-0.01	-0.0328*	0.3607 [79]	0.3325 [135]	-0.028	0.0501*
EXIT UNEMPLOYMENT TO THE SELF-EMPLOYMENT SECTOR								
	MEN				WOMEN			
	pre-year	post-year	difference	diff-in-diff	pre-year	post-year	difference	diff-in-diff
Control	0.1734 [47]	0.1132 [54]	-0.0602	---	0.0676 [10]	0.0793 [18]	0.0117	-0.0241
INF4	0.1163 [113]	0.1179 [176]	0.0016	-0.0586*	0.0687 [54]	0.0633 [82]	-0.0054	-0.0171

INFO	0.1173 [40]	0.0864 [49]	-0.0309	-0.0911*	0.0745 [26]	0.0725 [42]	-0.002	-0.0137
FORM6-23	0.1325 [124]	0.1258 [160]	0.0067	0.0669*	0.1045 [35]	0.0921 [55]	-0.012	-0.0241
FORM24	0.157 [89]	0.1881 [161]	0.0311	0.0913*	0.0776 [17]	0.1133 [46]	0.036	0.024

** significantly different from 0 at the 10% level. * significantly different from 0 at the 20% level.

Standard errors are in parentheses and sample sizes are in brackets.

(3) = (2) - (1) and (4) = (3)_{control} - (3)_{group}

TABLE 8: Estimates from logit and multinomial logit

Exit from unemployment : informal	MALES			FEMALES		
	se	informal	informal	informal	se	informal
Base category formal	formal	se	formal	formal	formal	se
Control variables						
1995/6/7 dummy	0.945	0.611	1.546	0.898	1.018	0.882
	-0.334	-2.153	1.810	-0.476	0.041	-0.285
INF4	4.974	2.097	2.372	5.711	4.448	1.284
	7.821	2.716	3.446	6.860	3.398	0.607
INF0	2.525	1.296	1.948	3.152	2.453	1.285
	6.331	1.383	3.448	6.052	2.462	0.689
FORM6-23	0.771	0.720	1.071	0.711	1.085	0.656
	-1.775	-1.783	0.351	-1.746	0.218	-1.120
FORM24+	0.851	0.984	0.864	0.835	1.287	0.649
	-1.073	-0.085	-0.740	-0.900	0.674	-1.142
yr*INF4	1.015	1.551	0.654	0.931	0.681	1.367
	0.083	1.764	-1.649	-0.296	-0.838	0.679
yr*INF0	0.714	0.796	0.897	0.879	0.735	1.196
	-1.338	-0.638	-0.324	-0.404	-0.560	0.344
yr*FORM6-23	1.254	1.576	0.796	1.278	1.019	1.254
	1.228	1.845	-0.877	0.979	0.039	0.475
yr*FORM24+	1.182	1.737	0.680	1.216	1.017	1.196
	0.881	2.245	-1.475	0.765	0.036	0.374
collection center	0.999	1.000	0.999	0.999	1.000	0.999
	-3.502	-0.736	-1.843	-3.053	-0.462	-1.382
demographics						
age	0.898	1.021	0.880	0.898	1.025	0.877
	-8.298	1.187	-7.519	-5.946	0.828	-4.750
age^2	1.001	1.000	1.001	1.001	1.000	1.001
	7.878	-0.242	6.395	5.246	-0.030	3.608
prim1inc	1.021	1.368	0.746	1.021	1.166	0.875
	0.263	2.981	-2.897	0.158	0.745	-0.720
prim1c	0.842	1.124	0.749	0.775	0.985	0.786
	-2.167	1.084	-2.725	-2.007	-0.072	-1.277
prim2inc	0.793	1.276	0.621	0.693	1.150	0.602
	-3.096	2.371	-4.718	-3.057	0.721	-2.855
prim2c	0.611	1.088	0.562	0.483	1.176	0.411
	-5.441	0.716	-4.814	-5.244	0.753	-4.406
secinc	0.502	0.893	0.562	0.419	1.324	0.316
	-6.637	-0.782	-3.872	-6.113	1.217	-5.268
secc	0.457	0.978	0.467	0.288	0.805	0.358
	-8.166	-0.188	-6.040	-9.198	-1.008	-5.032
univinc	0.498	1.164	0.427	0.348	0.539	0.645
	-4.287	0.772	-3.988	-5.868	-1.830	-1.303
univc	0.366	0.420	0.872	0.251	1.103	0.228
	-5.228	-3.690	-0.514	-6.187	0.335	-4.772

black	1.024	0.798	1.283	1.253	0.789	1.588
	0.302	-2.059	2.237	2.006	-1.181	2.409
mulatto	1.033	0.943	1.095	1.049	0.849	1.235
	0.714	-0.991	1.510	0.765	-1.580	2.118
household structure						
partner	0.887	0.857	1.034	1.005	1.351	0.744
	-2.106	-1.895	0.418	0.087	2.964	-3.009
# adults in home	1.034	1.014	1.019	1.040	0.919	1.132
	2.259	0.731	0.955	2.132	-2.607	3.967
# children in home	1.053	1.062	0.991	1.069	1.090	0.981
	2.490	2.238	-0.328	2.257	1.814	-0.435
family head	0.793	1.301	0.610	0.980	2.006	0.488
	-3.535	2.925	-5.471	-0.265	4.934	-5.176
region						
north	1.191	1.676	0.711	1.086	1.679	0.647
	1.599	3.691	-2.448	0.514	2.028	-1.805
ne	1.078	1.384	0.779	1.259	2.112	0.596
	1.004	3.308	-2.499	2.139	4.324	-3.112
south	0.813	1.059	0.767	0.734	0.717	1.024
	-3.629	0.798	-3.456	-4.214	-2.703	0.192
co	1.133	0.975	1.162	1.132	1.217	0.930
	1.418	-0.206	1.221	1.017	0.960	-0.370
time use						
retpen	1.370	1.453	0.943	1.295	1.203	1.077
	1.627	1.738	-0.274	1.526	0.765	0.323
insch	0.998	0.635	1.572	0.895	0.761	1.176
	-0.026	-3.649	3.661	-1.242	-1.532	0.931
housework	1.028	1.071	0.960	1.325	1.825	0.726
	0.685	1.302	-0.759	3.096	3.015	-1.614
wealth and income						
ownland	0.882	1.218	0.724	0.912	1.124	0.812
	-2.425	2.814	-4.581	-1.214	0.946	-1.761
ownhome	1.094	1.028	1.064	0.989	1.008	0.981
	1.464	0.333	0.732	-0.128	0.055	-0.138
roompc	1.031	1.112	0.927	0.953	1.101	0.866
	0.905	2.618	-1.830	-1.116	1.654	-2.477
other hh labor income	1.000	1.000	1.000	1.000	1.000	1.000
	-0.493	2.369	-2.670	0.169	-0.862	0.934
other hh non-labor income	1.000	1.000	1.000	1.000	1.000	1.000
	0.446	0.233	0.106	-1.136	0.468	-1.115
hh receives social security	0.646	0.601	1.075	0.689	0.745	0.925
	-9.515	-8.304	1.130	-6.586	-3.119	-0.848

* relative risk ratios, z values below each rrr estimate.

TABLE 9: Hazard Model

	MEN		WOMEN	
Control Variables				
1995/6/7 dummy	0.967	0.969	1.154	1.142
	-0.464	-0.420	1.407	1.273
INF4	0.756	0.782	0.790	0.797
	-3.637	-3.124	-2.466	-2.314
INF0	2.563	2.589	2.930	2.920
	15.259	15.011	12.732	12.418
FORM6-23	2.586	2.532	3.129	3.103
	15.353	14.648	12.874	12.542
FORM24+	2.770	2.668	3.158	3.084
	16.195	15.183	12.756	12.214
yr*INF4	1.019	1.011	0.826	0.955
	0.246	0.112	-1.800	-0.368
yr*INF0	1.021	1.014	0.931	0.846
	0.213	0.180	-0.592	-1.528
yr*FORM6-23	1.028	1.021	0.840	0.855
	0.352	0.265	-1.566	-1.367
yr*FORM24+	1.056	1.051	0.854	0.881
	0.685	0.615	-1.386	-1.085
collection center	1.000	1.000	1.000	1.000
	0.222	-0.977	-0.015	-1.203
demographics				
age		1.009		1.008
		1.721		1.157
age^2		1.000		1.000
		-1.753		-0.512
prim1inc		1.039		0.925
		1.175		-1.645
prim1c		1.073		1.011
		2.096		0.228
prim2inc		1.084		0.948
		2.552		-1.165
prim2c		1.123		0.981
		3.054		-0.342
secinc		1.127		0.935
		2.740		-1.186
secc		1.118		0.992
		2.845		-0.151
univinc		1.211		0.994
		2.904		-0.077
unive		1.126		1.017
		1.653		0.195
black		0.991		0.969
		-0.270		-0.691
mulatto		0.970		0.962

	-1.633	-1.534
household structure		
partner	1.000	0.928
	-0.008	-2.932
# adults in home	0.996	1.000
	-0.616	-0.035
# children in home	1.010	1.013
	1.145	1.165
household head	1.028	1.014
	0.582	0.305
family head	1.043	0.958
	0.923	-1.020
region		
north	0.953	0.908
	-1.069	-1.554
ne	0.965	0.942
	-1.132	-1.390
south	1.011	0.972
	0.467	-0.907
co	1.010	0.944
	0.259	-1.177
time use		
retpen	0.883	0.924
	-1.646	-1.146
insch	1.006	1.067
	0.196	1.805
housework	0.957	0.974
	-2.593	-0.702
wealth and income		
ownland	1.011	1.024
	0.486	0.788
ownhome	0.993	1.001
	-0.283	0.015
roompc	1.027	1.004
	1.964	0.250
other hh labor income	1.000	1.000
	1.835	0.807
other hh non-labor income	1.000	1.000
	-1.224	-0.390
hh receives social security	0.990	1.002
	-0.511	0.107

* hazard rates reported, z-values below the estimated hazards.

TABLE 10: Estimates from the Competing Risk Models

	Exit to Formal Sector				Exit to Informal Wage				Exit to self-employment			
	MEN		WOMEN		MEN		WOMEN		MEN		WOMEN	
Control Variables												
1995/6/7 dummy	1.025	1.062	1.230	1.183	1.013	0.998	1.045	1.047	0.677	0.661	1.224	1.000
	0.237	0.568	1.435	1.135	0.102	-0.015	0.282	0.284	-2.020	-2.084	0.533	0.038
INF4	0.239	0.290	0.181	0.233	1.549	1.317	1.394	1.178	0.490	0.616	0.835	0.994
	-8.974	-7.601	-8.406	-7.026	3.696	2.288	2.483	1.204	-3.338	-2.246	-0.506	-0.016
INF0	1.381	1.530	1.023	1.240	4.775	4.250	5.140	4.416	1.831	1.979	2.777	3.179
	3.458	4.394	0.171	1.600	14.791	13.499	13.115	11.749	3.865	4.286	3.209	3.454
FORM6-23	2.761	2.755	3.150	3.127	2.461	2.392	2.633	2.585	2.108	1.942	3.710	3.588
	11.464	11.028	9.018	8.746	8.194	7.842	7.081	6.869	4.784	4.204	3.991	3.708
FORM24+	2.678	2.576	3.156	2.833	2.373	2.441	2.547	2.712	2.969	2.415	4.438	3.751
	10.880	10.057	8.883	7.817	7.636	7.774	6.662	7.015	6.999	5.582	4.531	3.838
yr*INF4	1.006	1.364	0.959	1.138	0.949	0.971	0.852	1.021	1.459	1.056	0.734	0.853
	0.055	1.588	-0.261	0.511	-0.397	-0.197	-0.992	0.119	1.813	0.183	-0.778	-0.334
yr*INF0	1.506	0.965	1.136	0.964	0.919	0.992	0.980	0.899	1.174	1.445	0.804	0.678
	2.149	-0.298	0.517	-0.224	-0.566	-0.057	-0.118	-0.645	0.562	1.716	-0.486	-0.930
yr*FORM6-23	0.934	0.889	0.767	0.783	1.059	1.098	0.949	0.982	1.376	1.389	0.828	0.798
	-0.623	-1.035	-1.685	-1.516	0.415	0.664	-0.300	-0.099	1.528	1.534	-0.462	-0.524
yr*FORM24+	0.973	0.921	0.756	0.812	1.021	1.069	0.969	0.992	1.584	1.578	0.922	0.855
	-0.244	-0.704	-1.747	-1.265	0.148	0.462	-0.178	-0.042	2.222	2.147	-0.198	-0.365
collection center	1.001	1.000	1.001	1.000	0.999	0.999	0.999	0.999	0.999	1.000	1.000	1.204
	7.387	1.200	6.681	1.405	-5.854	-2.969	-4.781	-2.930	-2.812	-0.015	-1.141	0.464
demographics												
age		1.057		1.058		0.970		0.988		1.078		1.083
		6.047		4.185		-3.782		-1.335		5.110		3.124
age^2		0.999		0.999		1.000		1.000		0.999		0.999
		-6.133		-3.540		3.295		1.581		-4.286		-2.090
primlinc		0.992		0.930		0.979		0.906		1.325		1.027
		-0.139		-0.679		-0.452		-1.746		3.242		0.152

prim1c	1.151	1.241	0.974	0.936	1.268	1.161
	2.519	2.111	-0.521	-1.105	2.625	0.857
prim2inc	1.178	1.208	0.946	0.847	1.469	1.393
	3.085	1.957	-1.209	-2.983	4.472	2.016
prim2c	1.353	1.480	0.841	0.730	1.477	1.694
	5.016	3.689	-2.827	-4.313	3.926	2.888
secinc	1.493	1.478	0.801	0.666	1.332	2.003
	5.947	3.638	-3.132	-5.290	2.288	3.518
secc	1.480	1.872	0.687	0.575	1.467	1.550
	6.428	6.165	-5.448	-7.320	3.746	2.363
univinc	1.558	1.761	0.798	0.622	1.734	0.964
	4.597	4.605	-1.847	-4.058	3.310	-0.119
unive	1.702	1.868	0.620	0.425	0.723	1.999
	5.514	4.685	-3.027	-5.164	-1.544	2.744
black	1.030	0.925	1.048	1.055	0.819	0.705
	0.566	-0.936	0.899	0.908	-2.113	-1.969
mulatto	0.970	0.973	0.999	0.983	0.918	0.817
	-1.014	-0.603	-0.023	-0.508	-1.700	-2.224
household structure						
partner	1.073	0.895	0.947	0.911	0.896	1.114
	1.790	-2.550	-1.529	-2.777	-1.566	1.154
# adults in home	0.978	0.983	1.006	1.008	1.001	0.930
	-2.131	-1.204	0.587	0.781	0.060	-2.244
# children in home	0.969	0.956	1.018	1.024	1.040	1.052
	-2.199	-1.990	1.424	1.633	1.798	1.251
household head	1.001	0.967	0.957	0.941	1.287	1.381
	0.019	-0.411	-0.598	-0.993	1.939	1.872
family head	1.119	0.967	0.951	0.913	1.188	1.543
	1.562	-0.442	-0.707	-1.667	1.326	2.477
region						
north	0.810	0.802	0.956	0.866	1.336	1.293

	-2.789	-1.858	-0.658	-1.799	2.509	1.170
ne	0.876	0.758	0.951	0.923	1.220	1.547
	-2.645	-3.587	-1.016	-1.410	2.381	2.900
south	1.057	1.119	0.903	0.882	1.129	0.801
	1.589	2.339	-2.478	-2.768	1.951	-2.007
co	0.945	0.870	1.070	0.942	0.929	1.045
	-0.951	-1.585	1.198	-0.922	-0.703	0.242
time use						
retpen	0.705	0.826	0.896	0.993	0.975	0.914
	-2.628	-1.535	-0.874	-0.074	-0.154	-0.441
insch	1.063	1.163	1.027	1.032	0.667	
	1.202	2.378	0.594	0.693	-3.631	
housework	0.920	0.830	0.937	1.030	0.983	0.858
	-3.170	-3.083	-2.420	0.584	-0.385	-0.950
wealth and income						
ownland	1.016	1.050	0.898	0.991	1.237	1.194
	0.466	0.905	-3.211	-0.217	3.560	1.645
ownhome	0.937	1.003	1.046	0.983	0.959	1.026
	-1.615	0.054	1.109	-0.365	-0.583	0.207
roompc	0.979	0.991	1.025	0.971	1.097	1.102
	-0.961	-0.341	1.109	-1.149	2.793	1.964
other hh labor income	1.000	1.000	1.000	1.000	1.000	1.000
	-0.429	-0.631	0.104	1.384	2.499	-0.974
other hh non-labor income	1.000	1.000	1.000	1.000	1.000	1.000
	-0.482	1.123	-0.059	-1.439	0.053	1.416
hh receives social security	1.274	1.254	0.849	0.923	0.773	0.962
	8.294	5.688	-5.329	-2.569	-4.874	-0.464

* hazard rates reported, z-values below the estimated hazards.

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Appendix I:

Brazil's Unemployment Insurance Program: Background Information and Stylized Facts

AI. Introduction

Brazil's universal unemployment insurance (UI) program was created in 1986. In its twelve years of existence, it has distributed benefits to more than 40 million Brazilians in the form of over 150 million checks with an average value of 1.55 minimum wages per check but a total value in excess of US\$20 billion.¹⁹ The typical recipient is a male in his twenties with eight years of education who lives in the Southeast and earned 2-5 minimum wages before dismissal (Thomas).²⁰ This note will briefly describe the history of the program, its parameters, and its participants.

AII. A Brief History

Although unemployment insurance has legally existed in Brazil since 1946, it did not become universally accessible until 1990. The 1946 Constitution, under President Getulio Vargas who was a strong proponent of fascist Italy's socialist model, first proposed unemployment insurance. The generous government protections were more rhetoric than practice, though, as an implicit agreement among workers, firms, and government existed such that firms would guarantee worker's livelihood and governments would guarantee monopoly status to firms. Over the next twenty years, the program was virtually forgotten.

In 1964, the military took over the government and instituted changes to the labor code (CLT). With respect to UI, Law 4.923, Article 6 in 1965 and Law 58.155 in 1966 created the Fondo de Assistencia al Desempregado (FAD), generated by a 1% payroll tax and union contributions, to fund UI and outlined a form of UI that insured massive lay-offs where more than 50 workers lost their jobs due to firm closure (Machado 1994).

A major change to the CLT was made in 1966. Law 13.09.1966 created FGTS which was an indirect form of unemployment insurance where the individual insures her/himself. Upon hiring a worker, the firm is required to open a bank account in the worker's name.²¹ Each month, 8% of the worker's salary is deposited into the account. With FGTS, the government waived the payroll tax for FAD so the UI program disappeared (Azeredo).²²

In 1986, a universal unemployment insurance scheme was finally incorporated into law (Law # 2.284 Article 25) with the 1986 Cruzado Plan. There is not a consensus in the literature regarding the reasons behind the development of a modern UI scheme. One theory cites that increased

¹⁹ CAGED

²⁰ Joaquim von Amsberg requested that this source not be cited since it is still in the revision phase. I have taken the liberty here, just for your informational purposes (and because I have a pretty good idea about what to expect from the program and what does not seem accurate), but please do not pass this along to a general audience.

²¹ Technically, a worker was not required to maintain an FGTS account, but it became such common practice among firms that all workers had one.

²² Azeredo and Ramos (1995)

union activity in late 1979 led to popular demand for the worker's rights which had been guaranteed but never provided by the government. To address the populous, UI was implemented as a cheap, politically safe program. An alternative theory identifies growing public dissatisfaction not due to unfulfilled promises but rather due to urban population pressures, a new labor arrangement, and economic instability (Machado 1994). A third theory suggests that UI was not demanded by the populous but rather included in the Cruzado Plan as a trade-off for less labor-favorable clauses.

Decree-Law 2.284/86 formally instituted the unemployment insurance program and Decree 92.608, passed on April 30, 1986, outlined the operations of the program. Participation in the program was tentative in the beginning, due to the stringent criteria and the slow dissemination of information to potential participants. Only 17% of those who were eligible collected. Recognizing the fiscal limitations of the program and its susceptibility to economic fluctuations, the 1988 Constitution established the FAT (Worker Assistance Fund), a formal source of funding for UI.

In January of 1990, the laws for eligibility were relaxed and the value of the benefits were increased (Law No. 7.998). Casual interviews suggest that these changes were politically motivated such that politicians (relatively) costlessly remained popular amongst their constituents, but the formal rationale was that the government wished to 1) make the program more accessible to the working class and 2) considerably increase its value. Since less than 1.5% of the economically active population even requested benefits and benefit levels were below the minimum wage for a large number of workers, these motivations did have at least some legitimacy. This led to a 50% increase in applications and a 65% rise in beneficiaries. The program outlays increased 150% and the number of checks distributed to the unemployed doubled. The program has continued to grow throughout the 1990s, with the inclusion of fishermen (Dec. 20, 1991 Law #8.287), elimination of collection constraints (Dec. 28, 1991 Law # 8.352 dropped the condition that benefits could only be collected a maximum of four times in an 18 month period), and increase in potential payments (June 30, 1994 Law #8.900)

AIII. Program objective

The publicly distributed literature from the Labor Ministry (MTb) cites the objective of Brazil's UI program to:

“... provide benefits for a determined time and with a value established in accordance with the contributions made. In the case of unemployment insurance, the whole society is contributing so that workers receive benefits in periods of unemployment.”

The pamphlets further point out that:

“Unemployment insurance is not a salary. The workers, in the period in which he/she is receiving benefits, should look for new employment. The DRT and the SINE exist to help you. In these agencies, the worker can find information about his/her rights and can receive guidance in finding new work.”

Other sources²³ cite that the objectives of the program are four-fold: a) worker assistance to reduce the likelihood of other household members entering the labor force as a result of job separation, b) improvement of the quality of worker-job matches, c) provision of automatic macroeconomic stabilization, and d) distribution of the share of burden of unemployment to employers, but these seem to be the objectives of *any* unemployment insurance program, not necessarily Brazil's. Brazil's objectives seem to be more focused: a) aid workers when they receive an unexpected blow to income and b) put the responsibility for unemployment back on society, rather than being born solely by the worker.

AIV. Profile of collectors

Tables A1 and A2 profile individuals who collected, were eligible but did not collect, and were not eligible for UI in 1992. Those who were eligible for UI earned less, on average, than those who were not eligible, but their variance of earnings was greater (probably due to the large self-employment component of the ineligible). Furthermore, those who collect UI earned less prior to losing their jobs than did the eligible unemployed who chose not to collect.

Those who were eligible for UI were more likely to be male, in their twenties, white, household heads, who had, on average 8 years of education. Comparing collectors to eligible non-collectors, the non-collectors were younger, less educated, and more likely to be dependents rather than household heads.²⁴

AV. Funding

Originally, unemployment insurance was paid from general Treasury revenues. The 1988 Constitution identified PIS/PASEP as the source of funding for the program, but these monies also contributed to other labor market programs. In 1990, the FAT (Fundo de Amparo ao Trabalhador) was created, which was composed of a taxes on private (PIS) and public (PASEP) institutions, interest payments from state development bank (BNDES) loans, fines levied on firms that do not pay into PIS/PASEP, and firm contributions for worker turnover.²⁵ The tax rate is 0.65% of revenues in private firm²⁶, 1% of revenues in public firm and 1% of costs in non-profit firm are levied. FAT is also the source of funds for the 13th wage²⁷, and the (BNDES).

An advisory board to monitor the FAT, called the CODEFAT was also created in 1990. It is a seven person board made up of representatives from the Labor Ministry, unions, BNDES, Social Security administration, workers, and firm owners. Not only do they administer the fund, they have the power to extend benefits when a region is facing particularly extreme unemployment conditions.

²³ Chahad (1994), Freitas Barbosa (1995)

²⁴ Thomas (1999) supports these typologies as well.

²⁵ Although the latter fine (experience rating) is outlined in the Constitution, it has never been enforced.

²⁶ Private firms are very unhappy with this system since the tax is on revenues, not profits. Those high cost industries are, understandably, the most vocal this issue.

²⁷ The 13th wage is guaranteed to workers who earn on average, two or fewer minimum wages monthly. Prior to the 1988 Constitution, the bonus was given to individuals earning five or fewer minimum wages.

Since the creation of the FAT, it has been in surplus. Recently, there has been talk about dipping into the surplus to fund other labor programs. Although this may seem to be a viable short-term plan, the very ability of this program to deal with crisis (such as the 1995 shock or the 1998 recession) is due to the accumulation of surpluses when the economy is doing well.

AVI. Monitoring

When an individual applies for UI, he/she must present a formal statement from the employer that includes information about the worker and his/her earnings in the three months prior to dismissal. This information is sent to DATAMEC, a private firm that processes all Labor Ministry data. The submitted information is compared to a data base that tracks the formal sector employment of all workers (CAGED and RAIS). If the information on the application matches that in DATAMEC's files, the person is granted UI. Each month, when payments are due, DATAMEC must first give clearance before funds are distributed.

AVII. Coverage

A7.1 Participation

The Brazilian program is funded solely by the firms. Therefore, employees "participate" in the program if their firm pays into the program. By law, all firms are required to pay into the program, but only those that abide by federal laws (i.e. agree to sign their employees' *carteira de trabalho*) do participate, so only workers in formal firms are participants.

The first column of table A3 lists the proportion of program "participants" relative to the entire labor force. Approximately 44% of the labor force is in the formal sector, and therefore eligible for the program, but this has been decreasing over time.

Whether or not workers pay for participation via lower wages is difficult to assess due to the many benefits that formal sector workers receive. Undoubtedly, formal sector workers do pay for at least part of their benefits, but the additional burden, if any, imposed by unemployment insurance cannot be determined.

A7.2. Eligibility

When the program was created, the requirements to collect UI were that the unemployed individual:

- i) paid into the social security fund for 36 of the past 48 months where the last six months were made as a salaried employee (i.e. a job with a signed *carteira de trabalho*),
- ii) had a job with a signed *carteira* in the six months prior to dismissal,
- iii) had been unemployed for 60-120 days,
- iv) had not been a recipient of retirement pay, government pensions, or disability pay,
- v) had not received any type of unemployment support,
- vi) did not receive UI in the past 18 months, and
- vii) did not have sufficient income to support him/herself and the family.

These requirements were so restrictive that only 17% of the formal sector unemployed could apply. Thus, the criteria were relaxed in January 11, 1990. To collect UI, individuals were required to have

- i) worked in the formal sector or paid into the system (if she/she was self-employed) for 15 of the past 24 months,
- ii) been unemployed for 7-120 days,
- iii) worked as a salaried employee in the 6 months prior to dismissal, and
- iv) did not receive the maximum payments within the past 16 months (relaxed in 1991).

Although collection by formal sector workers increased to 50%, these criteria exclude new workers, informally employed (without a signed work card), self-employed, and seasonal workers from the program²⁸, indicating that only about 40% of the entire labor force is even eligible.

A7.3 Regional coverage

By law, UI coverage is nationwide. Firms in all states may pay into the system and there are collection centers in each state (Caixa Economica Federal, SINE, DRT). The number of collection centers and their locations may influence collection rates, though, since an individual must physically appear at a collection center to receive his/her payment. The number of collection centers by region is given in Table A4. The North has the fewest centers while the North and Northeast have a lower proportion of centers than their share of the national unemployed. The state of Acre (in the North) has only four collection centers while São Paulo has 313. It may be argued that SP has the most workers, as well, but it is more difficult for the few workers in Acre to even get to a center.

A7.4 Participants/beneficiaries

Statistics from the Labor Ministry show that the UI program has become quite widespread in Brazil since it began. Table A5 lists the number of workers who applied for UI, those who were accepted in the program and the percentage of applicants who became recipients. The program started very small (in May, so only half a year of unemployment can be covered in 1986) but grew rapidly. In 1990, eligibility requirements were relaxed, thus explaining the increase in claimants and benefits. By 1990, 43% of those who had been fired from formal sector jobs were covered. The eligibility requirements continued to be relaxed, leading to a further increase in claimants and recipients.

With respect to the whole labor force, Column 3 of Table A3 shows that approximately 13% of all unemployed collect UI. This proportion is declining over time, though.

A7.5 Targeting and self-selection

As the program is, there is some self-selection, since the benefits are somewhat regressive and confined to the range [1 minimum wage, 2 minimum wages]. Therefore, the poor, who may have earned around (or below) 1 minimum wage will have 100% replacement ratios while high earners

²⁸ This excludes fishermen who have special provisions.

will have very low replacement ratios. However, Thomas (1999) argues that the program is not well targeted since in certain regions, those who earn more than 5 minimum wages are most likely to collect benefits.

AVIII. Value of benefits

The value of each monthly payment (*parcela*) is a function of the average of wages paid in the last three months of employment. Assume that the average wage in the three months prior to dismissal, $w_{\mu} \in (0, \infty)$, and assume that p and q are thresholds that separate the wage categories where $p < q$. If $w_{\mu} \in (0, p)$, a monthly UI payment that maximizes [minimum wage, $0.8 * w_{\mu}$] is received.²⁹ For $w_{\mu} \in (p, q]$, the monthly UI payment is $(0.8 * p + (w_{\mu} - p) * 0.5)$ and the high earners with $w_{\mu} \in (q, \infty)$ receive twice the minimum wage. During the period of high inflation, the values of p and q were indexed to the CPI such that p ranged from 1.7 to 3.73 times the minimum wages while q ranged from 2.83 to 6.72. The real value of the minimum wage also varied within this period, as it was not indexed, so the real value of UI benefits widely fluctuated. Since 1994, the values of p , q , and the minimum wage have been stable and the real value of benefits has been maintained above those in the 1992/1993 period.

The value of benefits collected also increased monotonically over the past ten years. Table A6 (from the Labor Ministry's synthesis of UI statistical data) shows the number of checks distributed in each year, the total value of all checks, the average value of a representative check, in number of minimum wages (where the minimum wage is the official minimum wage for that particular year), and the average number of checks per claimant.

Over the life of the program, the average value of benefits has ranged from 1.15 to 1.83 minimum wages. However, given the randomness of a minimum wage, this does not give a very accurate picture of the purchasing power of the payment.

AIX. Duration of benefits

Benefit payments are made monthly. The number of monthly payments that an individual is eligible to receive is a function of the tenure in the formal sector. Between 1990-1994, only those who had collected a wage in a formal sector job for at least six months prior to losing their job were eligible for UI. If they had participated in the formal sector for 6-14 months in the past 24 months, they were eligible for up to three months of UI payments. However, anyone who had worked in the formal sector for more than 15 months of the past 24 was eligible for four months of benefits. The application for benefits had to be made within 120 days of losing the formal sector job, so hypothetically, someone who was in the *informal* sector for less than 120 days, but in a formal sector job before that, could receive benefits.

Law #8900/94, passed in 1994, did not change the days within which the individual must apply, but it did change the number of monthly benefits for which the person was eligible. An individual who spent 6-11 months of the past 36 months in a formal sector job was eligible for three payments.

²⁹ From May 1996 - Jan. 1990, value of a *parcela* ranged from 70% of the minimum wage (for those who earned from 0-1.4 minimum wages) to 1.5 times the minimum wage (for those who earned more than three minimum wages in their last job).

Working 12-23 month provided a maximum of four payments and working more than 24 months of the past 36 in the formal sector permitted up to five payments.

The value of each *parcela* is constant over the collection period. Thus, the value of the monthly payment is not designed to give the unemployed individual any incentives to become re-employed more quickly.

The value of the payments and the duration of collection is not contingent on job search, either. Thus, it may be argued that UI is simply a direct transfer from employers (via the government) to individuals who are not working, regardless of their unemployment (or even employment) status.

The duration of benefits is given in Table A6 for 1986-1995. On average, individuals collect between 3.5 and 4.5 months.

X. Unemployment and post-unemployment work

Table A7 shows the duration of unemployment of the collectors, eligible non-collectors, and ineligible for UI. Those who are not eligible have a bimodal distribution with a large group who have very short unemployment duration (probably the young) and another group whose unemployment persists (probably older, fired workers who have trouble becoming re-employed). Those who collect UI have longer durations of unemployment, but catch up to the other two groups in their sixth month of unemployment, when benefits expire.

After unemployment, those who collected are less likely to enter re-enter the formal sector compared to those both those who were eligible and did not collect and were not eligible but left a job in the formal sector (Tables A8 and A9). Instead, they are more likely to enter self-employment.

XI. Tables

TABLE A1: Income of unemployed in the last job, by UI status*

income from last job (# of minimum wages)	collectors of UI	eligible non-collectors¹	ineligible²
0 - 0.5	0.65%	0.5%	5.4%
0.51 - 1	9.9	11.8	17.2
1.01 - 2	24.6	24.2	21.9
2.01 - 3	19.1	17.9	11.8
3.01 - 5	25.1	22.7	17.4
5.01-10	13.6	14.5	13.9
10-20	6.7	5.6	7.2
20+	0	2.8	5.2
mean value (in Cr\$)	24445.07	27318.80	32507.93
variance in (Cr\$)	26431.91	38203.67	62654.50
N	2422	15240	56033

¹ eligible non-collectors are those who meet all the requirements to collect (dismissed without just cause, held a formal sector job, employed for the required amount of time, and were unemployed in the previous 5 years) but chose not to collect UI

² ineligible are those who did not meet all the collection requirements. Includes those who did not work in the formal sector, those who do not have recent tenure in the labor market (new entrants, those who were out-of-the labor force, those who were unemployed for extended lengths of time), those who quit or were fired for a “just cause”, recipients of other types of income support, and/or those who have not been unemployed in the past 5 years.

* PNAD 1992

TABLE A2: Characteristics of each group*

	collectors of UI	eligible non-collectors	ineligible
age			
14-19	4.0%	9.1%	23.3%
20-29	38.0	42.5	22.5
30-34	14.0	15.1	10.1
35-39	15.8	11.3	9.5
40-49	16.6	12.2	15.3
50-59	5.6	6.8	11.1
60-64	1.2	1.8	4.3
65+	0.6	1.2	3.9
mean (in years)	33.3	31.84	34.04
standard deviation	10.16	11.47	15.46
education			
none	7.5%	9.5%	18.5%
1-4	10.0	32.5	36.3
5-8	56.3	32.0	24.9
9-11	21.9	18.9	13.3
completed	4.2	7.1	7.0
illiterate	7.4%	9.0%	18.4%
position in HH			
head	68.4%	61.2%	57.7%
spouse	0.6	0.7	0.5
son/daughter	24.0	30.1	35.3
other relative	6.2	6.9	5.6
unrelated	0.5	0.6	0.5
total migrant	60.8%	60.5%	50.4%
migrate as adult (>14)	42.0	41.7	32.5
race			
white	50.0%	54.6%	49.6%
black	5.7	5.7	5.0
mixed	44.1	39.3	44.9
yellow	0.02	0.4	0.5
urban	91.3%	97.8%	74.6%

* PNAD 1992

TABLE A3: participation, as a % of the labor force*

	Program Participants (% formal)	Unemployed	Beneficiaries (as % of unemployed)
1992	44.19%	6.42%	13.7%
1993	42.78%	6.19%	12.17%
1994	--- ¹	--- ¹	--- ¹
1995	41.13%	5.95%	13.29%
1996	41.19%	6.76%	12.4%
1997	39.55%	8.33%	11.76%

* PNAD

¹ There was not a PNAD in 1994**TABLE A4: Collection centers (CEF, DRT, SINE) by region**

Region	# collection centers	Distribution of benefits	Distribution of unemployed
North	100	3.7%	6%
Northeast	403	16.9%	28%
Southeast	683	55.11%	47%
South	517	17.51%	13%
Central-West	188	6.78%	6%
Total	1891	100	100

* June 1998, CAGED statistics

TABLE 5: claimants and recipients of UI benefits

year	requested	received	percent
1986	204,324	150,741	73.78%
1987	999,967	734,260	73.43%
1988	1,322,432	1,045,534	79.06%
1989	1,912,185	1,620,543	84.75%
1990	3,099,910	2,806,820	90.55%
1991	3,724,840	3,498,235	93.92%
1992	4,015,225	3,895,157	97.01%
1993	3,825,547	3,756,365	98.19%
1994	4,091,318	4,029,718	98.49%
1995	4,789,198	4,735,148	98.87%
1996	4,395,977	4,359,092	99.16%
1997	4,425,296	4,381,498	99.01%
1998	4,821,572	4,762,788	98.86%

* from CAGED

TABLE A6: value and distribution of checks*

year	number of checks	value of checks (US\$)	average value of checks (in minimum wage)	# checks per claimant
1986	244,123	16,006,745	--	1.62
1987	3,103,220	166,289,225	1.15	4.23
1988	4,200,087	198,676,074	1.22	4.02
1989	4,743,382	398,393,493	1.7	2.93
1990	9,243,381	1,236,731,294	1.75	3.29
1991	12,476,087	1,412,893,566	1.83	3.57
1992	13,858,069	1,440,626,233	1.69	3.56
1993	15,016,649	1,559,105,700	1.41	4.0
1994	15,115,459	1,846,798,526	1.55	3.75
1995	20,836,194	3,146,551,407	1.54	4.40
1996	19,593,192	3,289,269,149	1.56	--
1997	18,678,583	3,200,347,989	1.57	--
TOTAL	98,836,651	11,422,072,263		

* CAGED

TABLE A7: Duration of unemployment*

months	collectors of UI	eligible non- collectors	ineligibl e
0	27.3%	42.3%	49.4%
1	15.1	17.7	13.8
2	11.0	9.5	7.2
3	9.8	6.3	4
4	7.3	3.8	2.4
5	4.3	2.4	1.5
6	3.3	4.3	3.2
7	2.3	1.4	0.8
8	3.1	1.4	1.1
9	1.5	1.0	0.7
10	1.4	0.9	0.7
11	1.4	0.7	0.5
12	2.8	2.5	4.0
Mean months	0.34	0.27	.60
standard dev.	0.49	0.52	1.95
N	2457	15478	39366

* 1992 PNAD

TABLES A8: Transition matrices of eligible unemployed*

was formal	is formal	is informal	is s-e	is unpaid	is OLF	is unempl
collectors (N = 3145)	43.7%	14.2%	19.7%	0.5%	5.2%	16.6%
non-collectors (N = 18188)	54.2	14.7	15.5	0.7	7.3	7.6

* 1992 PNAD

TABLE A9: Transition matrices of ineligible unemployed*

Pr(current position | past position)

	is formal	is informal	is s-e	is unpaid	is OLF	is unempl	N
was formal	50.0%	16.7%	16.7%	0%	16.7%		6
was informal	25.6	47.9	13.8	2.5	10.1		13049
was s-e	25.8	22.7	37.7	0.7	13.1		4687
was unpaid	11.6	26.6	50.8	11.2			6600
was OLF	29.0	15.4	25.9	4.5	21.3	3.8	50219
N	19908	16831	19912	3349	14569		74575

* 1992 PNAD

Appendix 2: Control Variables

A. Demographics

1. *age*
2. *age*²: age squared
3. *prim1inc*: dummy=1 if highest level of education was incomplete primary level 1 (1-3 years)
4. *prim1c*: dummy=1 if highest level of education was completed primary level 1 (4 years)
5. *prim2inc*: dummy=1 if highest level of education was incomplete primary level 2 (5-7 years)
6. *prim2c*: dummy=1 if highest level of education was completed primary level 2 (8 years)
7. *secinc*: dummy=1 if highest level of education was incomplete secondary school (9-10 years)
8. *secc*: dummy=1 if highest level of education was completed secondary school (11 years)
9. *univinc*: dummy=1 if highest level of education was incomplete university (11-14 years)
10. *univc*: dummy=1 if highest level of education was completed college or more (15+ years)
11. *mixed*: dummy =1 if self-categorized as mixed race or indian
12. *black*: dummy =1 if self-categorized as black
13. *partner*: dummy =1 if the individual has a conjugal partner in the household
14. *hh head*: dummy =1 if self-categorized as the household head
15. *family head*: dummy=1 if self-categorized as the head of a family in the household

B. Labor market indicators

regional dummies =1 if

North: northern region including the states of Para, Amapa, Tocantins, Amazonia, Roraima, Rondonia, Acre

NE: northeastern region including the states of Bahia, Sergipe, Alagoas, Pernambuco, Paraiba, RG do Norte, Ceara, Piaui, Maranhão

S: southern region including the states of Parana, Santa Catarina, RG do Sul

CW: central western region including the Federal District and the states of Goias, Mato Grosso, Mato Grosso do Sul

The omitted category is the Southeast (the states of Rio de Janeiro, Espirito Santo, Minas Gerais, São Paulo), the most industrialized area, and one of the wealthiest in Brazil.

C. Search resources (non-labor market time and income)

1. *house*: dummy=1 if spend time in household work
2. *student*: dummy=1 if a student
3. *retired*: dummy=1 if retired from last job
4. *depend*: number of dependent children under age 10 in the household
5. *other household Y*: monthly earnings of other household members (in US\$)
6. *non-labor Y*: value of income from pensions, retirement pay, other financial instruments, rents received by the family (in US\$)
7. *adults in household*: number of potential labor force participants in the household
8. *own land*: dummy=1 if full ownership or in the process of purchasing the land on which the home is located
9. *collection centers*: count variable of number of UI collection centers in the state

E. Current labor market status

1. *now informal*: dummy =1 if current job is in the informal wage sector
2. *now s-e*: dummy=1 if current job is in the self-employment sector.

