Ex-Convicts Face Multiple Labor Market Punishments: Estimates of Peer-Group and Stigma Effects Using Equations of Returns to Schooling

Adolfo Sachsida
Catholic University of Brasília and
Institute of Applied Economic Research, Brasília, Brazil

Mario Jorge C. de Mendonça
Institute of Applied Economic Research, Brasília, Brazil

Abstract

We produced a data set from a survey of a population of convicts in probation. We combined this new data set with an official data set from the Brazilian government to study labor market discrimination faced by ex-convicts. We were interested in estimating two potential effects of discrimination, statistical (stigma) and behavioral (peer-group) effects. Our econometric results suggest that stigmatization leads to a 39% reduction in the wage earned by ex-convicts relative to the wage earned by non-convicts. They also suggest that the peer-group effect accounts for a reduction in the relative earnings of ex-convicts of 1.1% per year of study. In addition, we also show that ex-convicts earn 3.1% less per year of experience than non-convicts.

Keywords: Stigma Effect, Peer Effect, Crime Rate, Returns to Schooling, Wage Discrimination

JEL Classification: C31, J71, K49

Resumo

Este estudo tem como objetivo estimar os efeitos da discriminação estatística (efeito estigma) e comportamental (efeito grupo) no salário. Para isso combinamos dados oriundos de duas fontes distintas: dados da CEPEMA sobre indivíduos cumprindo pena em liberdade condicional com dados da PNAD. Os resultados mostraram que o efeito estigma leva a uma redução de 39% no salário para ex-presidiários em relação àqueles que não cumprem pena. No que se refere ao efeito grupo, os ex-detentos percebem um impacto negativo de 11% quando comparados com pessoas da PNAD. Observou-se ainda que ex-detentos recebem 3.1% a menos por ano de experiência em relação aos não detentos

Palavras-Chave: Efeito Estigma, Efeito Grupo, Taxa de Criminalidade, Retornos à Educação, Discriminação Salarial

Classificação JEL: C31, J71, K49

1. Introduction

Permanent and prolonged exposition always results in some degree of contamination.
Spock (Star Trek)

Since Becker's seminal work (1968), the literature on illegal behavior has grown very large. Recent developments in this literature include incarceration effects, the political economy of crime and criminal organizations and the effects of social interaction and family inheritance on crime (Glaeser e Sacerdote 1999). A common issue examined in this literature refers to the costs a potential criminal incurs upon initiation in a criminal activity. It has been postulated that potential criminals face the possibility of being stigmatized if they engage in criminal activities and are later caught and incarcerated. The stigma effects may be felt in terms of lower income streams earned by ex-convicts relative to non-convicts in the labor market. As illustrated by Imai e Krishna (2001), stigmatization is a particular type of statistical discrimination.[1] According to Glaeser e Sacerdote (1999), there is room in the literature for studies that measure the costs associated with stigma.

It appears that, in addition to statistical discrimination, there is another important type of negative externality to which ex-convicts are subject, which may further hinder their future earnings in the job market. Incarcerated individuals may acquire certain traits from their peers, perhaps as optimal survival strategies, which may affect their behavior and make them less susceptible to comply with norms and regulations governing employment in legal activities. To the extent that deviations from perfect compliance with employment norms may reduce an employee's productivity, the ex-incarcerated may be less productive than their non-convict counterparts. Indeed, it seems reasonable to postulate that the longer is the period of incarceration, the longer will be the period of exposition of the incarcerated to actions that may later be

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E-mail address: sachsida@pos.ucb.br
[1] According to Cain (1986) and Phelps (1972) statistical discrimination occurs because of an informational problem. As the employer does not know all the characteristics of the worker, he attributes to the employee the average characteristics belonging to the group to which the worker belongs. Thus, group characteristics will be attributed to that individual even though he does not possess them.

manifested in terms of disruptive behavior in the job market. We shall refer to this negative externality faced by the incarcerated as a "peer-group effect". [2]

To be more precise about the results derived from this study it must be said there are competing reasons why incarceration may affect the human capital variables in which individuals acquire certain trails from their peer is simply one of them. The jail-time by itself diminishes the productivity because a long inactivity depreciates the human capital. Then it must becomes clear that we can not isolate the different factors of why there might be negative effects on productivity from incarceration, but simply calling these competing reasons peer-group effects.

Controlling for the individuals' human capital, there are thus two effects that may cause a differential in wages between the groups of ex-incarcerated and non-convicts, stigma and peer-group effects. In this paper, we estimate the magnitudes of these two effects contrasting two population samples, one of ex-incarcerated and one of non-convicts. [3] The statistical discrimination is estimated combining the information derived from these two samples. In order to estimate the peer-group effect we use the mincerian equation related to returns on schooling to verify the behavior of the estimated coefficients link to human capital variables comparing the results derived both the samples of ex-convicts and individuals from PNAD. The idea is that time of incarceration affects negatively the human capital due to the reason we have already exposed in this section.

According to our results, the stigma effect is responsible for a reduction of 39% in the average wage of the ex-incarcerated population relative to the average wage earned by the non-convict population. As for the peer effect, our estimates suggest that the ex-incarcerated population earns on average 1.1% less per year of schooling than their average non-convict counterpart. In addition, the average ex-incarcerated individual earns 3.1% less per year of experience than his average non-convict counterpart. These measures should be understood as a kind of upper/lower bound for the effects of incarceration over wages. After all, the current *state of art* in the literature does not provide an effective way to disentangle the stigma and the peer-group effect.

This paper is organized as follows. In section 2, we present a brief literature review on illegal behavior and returns to schooling. Section 3 describes our dataset. Section 4 presents the methodology used to verify the occurrence of stigma and peer-group effects. Although we find that the ex-incarcerated population is on average less productive than the non-convict population, we will not be able to attribute such an effect solely to the peer-group effect. Differences in ability may also explain some of the differential in productivity.

[2] The Brazilian Legal System has special incarceration regime for graduate. For graduates, the Legal System allows them expend the time of incarceration in a private jail. In this case, the prisoner live the most of time isolated from the others convicts. It can be considered one strategy to mitigate the peer-effect.

[3] The ex-incarcerated population in this study comprises of individuals who were in probation.

Section 5 then attempts to disentangle ability and peer-group effects. Given some plausible assumptions, we are able to capture the peer-group effect. Section 6 concludes this study.

2. Review of the Literature

The importance of education for the accumulation of human capital is related to increasing the probability of success in the labor market on the part of individuals or to improve the possibilities for economic growth on the part of countries, is illustrated in several articles [Shultz (1972), Topel (1999) and Card (2001)]. The literature on returns to schooling began with the works of Becker (1975) and Mincer (1958, 1974). Since then, different types of methodology have been used to capture the returns from education [see, *e.g.*, Griliches (1977), Garen (1984), Lam e Schoeni (1993), Ashenfelter e Krueger (1994), Harmon e Walker (1995), Heckman et alii (2000), Bratsberg e Terrell (2002)].

Scholars frequently mention that education is a typical example of a positive externality. Besides the individual monetary gains produced by education, a number of other societal benefits are created. It is usually postulated that a more educated population can be expected to feature lower infant mortality rates, to lead to an increase in the educational level of the following generation and to a reduction of child prostitution, among other positive societal effects.

However, the theoretical relationship between education and crime is far from obvious. As an individual educational level rises, so do his opportunities in the legal labor market. But, concomitantly, as the educational level rises, the costs associated with initiation and success in criminal activities fall (Fajnzylber et alii 2000). Nevertheless, it is common to include educational level as an explanatory variable in empirical studies of crime [see, *e.g.*, Ehrlich (1975), Fajnzylber et alii (2000) and Imrohoroglu et alii (2000)].

Becker (1968) provided the literature on illegal behavior with a formal microeconomic model. The choice of an individual of whether or not to become a criminal is viewed as a rational decision, whereby the individual evaluates the benefits and costs of criminal activities relative to their legal counterparts. Since Becker's contribution, several scholars have studied different aspects of crime. Some notable empirical works are Ehrlich (1973, 1975), Witte e Witt (2001) and Lochner (2001). On the theory side, good examples are Davis (1988), Glaeser et alii (1996) and Glaeser e Sacerdote (1999). As these studies have helped us to better understand crime and its societal effects, we are now better equipped to elaborate public policies by which aim to reducing the occurrence of crime.

A recent branch of the literature focuses on the costs associated with criminal activities. When we account for the life-cycle hypothesis, it seems reasonable to postulate that ex-convicts face future punishments in the job market, manifested in terms of lower than average salaries or increased hardship in finding employment (Nagin e Waldfogel 1998). Using data on arrests from a

national longitudinal survey on youth and delinquency, Joseph (2002) found that an arrest record lowers annual earnings between 18 and 26 percent. Lochner e Moretti (2004) using Census, FBI and NLSY data estimate that by reducing crime in the population of high school graduates, society would save between 14 and 26 percent of the average private return from education.

3. The Data Base

According to the Brazilian Legal System, lawbreakers are subject to three types of punishment. First, the individual may be punished with a fine. This is very common in automobile traffic occurrences (excess of speed, parking in forbidden places, etc.). Second, the individual may be required to help other people or institutions by engaging in some community work. This type of punishment is commonly applied to light criminal offenses such as disrespecting an officer and drinking and driving. Third, the individual may be incarcerated. This type of punishment is applied to a broad range of offenses, and the period of incarceration is positively related to the severity of crime.

Conditional on good behavior, the incarcerated not convicted for certain types of serious crimes, such as kidnapping, rape and drug dealing, have some rights. If the period of incarceration is not greater than eight years, the individual is entitled to a "semi-open" [4] incarceration regime after he completes one third of his sentence. In this regime, the individual has the right of working outside the prison during the day, being incarcerated only at nights. Furthermore, after the individual serves two thirds of his sentence, he has access to the "open regime". In this regime, the individual may not only work outside prison but also to spend the nights in his own home. An ex-incarcerated individual in the open regime must appear in person and be interviewed every other month by an officer in the Center of Coordination of the Enactment of Alternative Measures (CEPEMA). This regime is thus similar to the regime of probation observed in the United States.

According to CEPEMA, in 2003, there were around 2,000 individuals in the open regime ("individuals on parole") in the state of Distrito Federal. However, we were not given any information about the type of crime committed by the individuals on parole. During June and July 2003, we personally interview 503 male individuals on parole. [5] The interviews were authorized by the Court of Justice of the Distrito Federal and Territories, and by the Tribunal of Criminal Sentences. The data were collected when the individuals on parole presented themselves to CEPEMA to be interviewed. The questions were

[4] If the individual's sentence is no longer than four years, he automatically enters in the open regime. If the sentence is greater than four but less than eight years, the individual is placed in the semi-open regime.

[5] Following the literature on returns to schooling, we do not use data about females. The idea is that females have additional considerations about fertility that generate some difficulties (Cameron e Heckman 2001).

elaborated following the methodology adopted by previous studies on returns to education. [6]

The sample used to represent non-convicts was obtained from annual data supplied by the National Research of Home Samples of 1996 (PNAD/1996), [7] which is a national survey undertaken by the Brazilian Institute of Geography and Statistics (IBGE). PNAD provides us with a representative sample of Brazilian households. With the exception of National Census years, the survey has been conducted since 1981. Each survey contains information, obtained from face-to-face interviews conducted in the third week of September of each year, on approximately 100,000 households. All members of a surveyed household over ten years in age are asked detailed questions concerning their labor market activities. Some of the questions asked in the survey enable us to estimate a mincerian equation. The PNAD data set is of high quality. It is the main dataset used by labor economists interested in the Brazilian labor market.

Following the literature on returns to education, we use a small group of explanatory variables. [8] Besides the endogenous variable, logarithm of wage (lw), we include the following explanatory variables: educational level (s), age, experience level [9] (exp), experience level squared (exp2), the mother's educational level (smother) and some dummy variables to account for whether or not the worker belongs to a union (union), whether or not he works in the formal sector (formal), and whether or not he is white (white). A dummy variable was also created for individual on parole (prisoner) that takes a value equal to one if the individual belongs to the sample of individuals on parole and equal to zero otherwise.

Again, following the literature on returns to education, we used some sample selections. First, we only considered men whose age profile ranged between 24 and 56 years of age. It is claimed that for this group, considerations about fertility, make their decisions concerning their level of education less complicated (Cameron e Heckman 2001). [10] Second, we only included non-students. [11] A third filter was used to exclude observations that do not have one or more pieces of information regarding our independent variables. This procedure appears in Heckman et alii (2000). [12] A fourth filter was used to prevent including people who:

(i) possess extremely high wages, which could bias the results; and

[6] In Appendix we present the questionnaire related to the questions.

[7] 1996 was the year chosen because this was when information concerning the education of the individual's mother is available.

[8] Willis e Rosen (1979) and Garen (1984) use a very similar set of variables.

[9] Experience=age−education−6.

[10] Bratsberg e Terrell (2002), Heckman et alii (2000), Soares e Gonzaga (1997) and Garen (1984), also restricted their sample to men only.

[11] Bratsberg e Terrell (2002), Heckman et alii (2000) and Garen (1984) also used this procedure.

[12] Garen (1984) estimates two regressions: the first, using incomplete observations and the second, using a sample that only considers the observations with all the information available.

(ii) were not working.

This last filtering implied that the sample was composed of individuals who received an hourly wage between R$ 1.00 (approximately US$ 0.30) and R$ 500.00 (approximately US$ 160).[13] A fifth filter was used to exclude workers employed in public administration and agriculture. This was done to prevent sample contamination from the cyclical dynamics present in these sectors of the Brazilian economy (Soares e Gonzaga 1997). Yet, a sixth filter was used to restrict our sample to the inhabitants of the Distrito Federal in order to be in accordance to the sample of individuals on parole. When we applied all these filters, the original PNAD sample was reduced to a set of 987 observations. The individual on parole' sample was reduced to a total of 415 observations.

In Table 1, we provide preliminary information regarding descriptive statistics for the variables used in this study. The data are grouped in three different ways. Column (1) gives us information about the individuals on parole. Statistics for the non-convict population are available in column (2). In column (3), we show the data for the full sample (PNAD + individuals on parole).

Table 1
Descriptive statistics*

Variable	Prisoners	PNAD	(Prisoners+PNAD)
	(1)	(2)	(3)
	Mean	Mean	Mean
Log of wage (Lw)	6.13 (0.74)	6.92 (0.96)	6.69 (0.97)
Years of schooling (s)	7.31 (2.81)	8.30 (4.68)	8.01 (4.24)
Age	29.26 (8.55)	36.23 (8.62)	34.44 (9.12)
Experience (Exp)	16.18 (9.16)	23.04 (9.64)	21.01 (10.00)
Union	0.19 (0.39)	0.30 (0.46)	0.27 (0.44)
Formal	0.22 (0.41)	0.37 (0.48)	0.32 (0.46)
Years of schooling of the mother (smother)	3.99 (3.47)	3.52 (3.10)	3.66 (3.22)
White	0.24 (0.42)	0.46 (0.49)	0.40 (0.49)
Number of observations	415	987	1402

*The values in parenthesis are the standard deviations of the variables

[13] Heckman et alii (2000) restrict their sample to people who receive an hourly wage between U$ 1.00 and U$ 100.00.

4. Initial Econometric Results

The main objective of this section is to study whether or not stigma and peer-group effects substantially affect an opener's wage. To study the nature of the discrimination faced by an opener in the job market, one should account for both the fact that the individual was incarcerated and the period of incarceration.

Ideally, one would use the following equation to estimate stigma and peer-group effects:

$$w_i = \ln W_i = \alpha + \gamma P_i + \phi T_i + \varphi hi + \beta S_i + \delta X_i + \epsilon i \qquad (1)$$

where P is a dummy for individual on parole, which attempts to capture statistical discrimination (stigma effect), T is the duration of incarceration (peer-group effect), W is the wage, h is the individual's ability (or intelligence), S is the individual's educational level, X is a set of characteristics that can influence the wage, we can also denominate X by control variables. The control variables usually appear in the literature are related to race, union, formal sector, etc. Finally ϵ represents the error term or disturbance. The expectation would be that $\gamma, \phi < 0$.

We have, however, to deviate from this ideal model because we do not have information concerning either duration of incarceration and ability. The information about jail-time is not accessible to the public and even the kind of is also not accessible. The main objective of the open regime is to reintegrate the individual to the society and the Brazilian Legal System considers that the knowledge of this information is more one source of discrimination, mainly in the labor market. We tried to obtain the time of incarceration directly from the individuals on parole but even them were not sure or did not want to answer about the jail-time correctly. One reason for that is related to the fact that they also recognize it as something that generates discrimination. Since we postulate that the longer the individual remains incarcerated, the longer the contagion exposure and hence the greater the likelihood he will develop behavior that hinders his productivity in the legal job market, it is therefore unfortunate that we do not have data about duration of incarceration. We will have to use some sophisticated econometric technique to attempt to capture the peer-group effect on the wage differential.

Based on the hypothesis that the distribution functions related to ability is the same for the two groups, individuals on parole and PNAD. As our premise is that an ex-incarcerated will on average be less productive than a comparable non-convict worker because variables linked to human capital of ex-convicts suffer from peer-effect derived from the jail-time. We appear to be in safe grounds when we claim that the noticeable effect is equivalent to the effect produced by a situation where the average ex-incarcerated has a lower ability than the average non-convict worker. The literature on returns

to schooling, however, tells us that measuring an individual's ability is rather difficult and tricky, since ability is highly correlated with years of schooling [see, *e.g.*, Griliches (1977), Willis e Rosen (1979), Garen (1984) and Card (2001)]. Hence, if we were to use OLS to estimate equation (1), we would obtain a biased coefficient for the variable years of schooling (s) because of the omitted variables, ability (h) and the incarceration duration (T).

We must utilize some econometric techniques to solve the omitted variable problem and subsequently estimate the magnitude of the peer-group effect. Our methodology for solving the omitted variable problem consists of two steps. First, we estimate a mincerian equation by OLS. Second, we use three stages least square (3SLS) as our econometric technique to solve the omitted variable problem in the mincerian equation. Finally, we compare the returns to schooling from both methods (β_{OLS} and β_{3SLS}). In order to verify the existence of peer-group effects we compare the estimated coefficients of variables linked to human capita, schooling and experience, between the convicts and non-convicts. The difference between these parameters should give us an idea of the magnitude of the combined ability and peer-group effects. The question we shall tackle in the next section is how to disentangle the peer-group effect from the ability effect.

Table 2 reports the results for pooled data estimated using OLS and 3SLS. Following the literature about discrimination in the labor market, we use a dummy variable to distinguish individuals on parole (prisoner) from non-convicts. The idea is that the coefficient of the dummy variable will capture the existence of discrimination against prisoners in the labor market. As can be verified, the coefficient of the variable "prisoner" is negative and statistically significant in both estimations. This means that, after controlling for human capital variables, the simple fact that the individual belongs to the group of ex-incarcerated implies that he faces a wage punishment. As such punishment does not depend on the individual's human capital stock; it represents an evidence of statistical discrimination or the magnitude of the stigma effect. Again, we must understand it just as an upper/lower bound of the effect of incarceration over wages. Remember that the *state of art* is not able to correctly separate the stigma effect from the peer-group effect.

Table 2 also inform us that the difference between $\beta_{OLS}(0.146)$ and $\beta_{3SLS}(0.167)$ is approximately 0.021, which implies in a difference in the returns to schooling of 2.1% per year of education. This difference is huge. If we were to suppose that 50% of this difference could be attributed to the peer-group effect, an average ex-incarcerated individual would earn 1% less per year of study than an average non-convict counterpart. In the next section, we study how much of the observed difference should be attributed to the peer-group effect.

Table 2
Equation for the logarithm of the monthly wage
(Pooled Data = PNAD + Prisoner)*

Variables	OLS	3SLS**
Dependent variable: *Lw*		
S	0.146	0.167
	(32.55)	(8.26)
Prisoner	-0.334	-0.396
	(-8.18)	(-6.85)
Exp	0.056	0.049
	(8.16)	(5.76)
Exp^2	-0.0006	-0.0005
	(-4.41)	(-3.43)
Formal	-0.221	-0.197
	(-6.29)	(-4.44)
Union	0.282	0.279
	(7.44)	(5.60)
White	0.216	0.144
	(6.29)	(2.61)
Constant	4.623	4.630
	(47.07)	(17.92)
R^2	0.537	0.551
DWH test	2.816	
	(0.093)	
Dependent variable: *S*		
Prisoner	-	-0.748
		(-3.23)
White	-	1.941
		(8.96)
Smother	-	0.407
		(12.62)
Constant	-	5.964
		(31.72)
R^2		0.172
Observations	1402	1402

*The values in parenthesis are the *t*-test of the variables.
**Endogenous Variables: *Lw* and *S*.

5. Disentangling Ability and Peer-Group Effects

This part of the article uses mincerian equation of wages to try to infer about the magnitude of the peer effect. Again, this section should be viewed just an idea of upper/lower bonds of the effect of incarceration over wages. For the best of our knowledge the literature is not able to provide a good methodology to separate the peer-group from the stigma effect.

To illustrate our point, let the mincerian equation be represented by the equation (2):

$$w_i = \ln W_i = \alpha + \beta S_i + \delta X_i + ui \tag{2}$$

where W is a measure of income, or wage, S is a measurement of education taking in number of years of study, X is a group of control variables that can influence income, and u is the random disturbance that represent all the forces which are not directly explicit in the model, but influence the individual's gains. Thus, the return to schooling is given by the parameter β, that represents the marginal variation of the income in relation to education. Nevertheless, Griliches (1977) points out, there are many specific points in (2) that should be questioned. One of them is the existence of the so-called "ability bias", that occurs from not incorporating a variable, $\tilde{S}$, which can translate the ability, or talent, of the individual (his intelligence, for example) due to measurement difficulties. It is presumed that ability is correlated with the person's education [Griliches (1977) and Garen (1984)].

The employment of the three stages least squares (3SLS) method is an alternative when it is presumed that a problem of measurement error exists, as described above. This method can still be used when it is believed there is a problem of an omitted variable, since this variable is correlated with the disturbance [Green (1993)]. To verify the existence of peer effect amongst convicts, we will assume that the peer effect is an omitted variable in the equation (2). Besides this, we have that the individual's ability (h_i) is also an omitted component of that equation. Thus, we have that:

$$w_i = \ln W_i = \alpha + \beta S_i + \delta X_i + \lambda 1hi + \lambda 2e_i + \epsilon i \tag{3}$$

In equation (3) the term representing the error of the equation (2) (u_i) was divided into two parts. The first (e_i) representing the peer effect, and the second (ϵ_i) that satisfies the classic hypotheses of the residue. So, (3) is the true equation that we must estimate. However, given the absence of data for e_i and h_i, we can only estimate the equation (2). To estimate (2) for the sample of individuals composed by non-prisoners, we will have that the estimator β, that represents the returns to education, will be biased only for the omission of the variable ability. The estimate of this same equation for the sample of prisoners will result in an estimator biased by the omission of both variables ability and peer effect.

According to the above paragraph, the estimate of β for both groups will be biased by the omission of the variable ability. But only the coefficient β from the prisoners' sample will also be biased by the omission of the variable peer effect. Supposing that the ability bias affects both groups in the same way, we have that the difference among the estimators should give a notion of the size of the peer effect. That is, to detect the existence of the peer effect, it is necessary to show that the human capital variables generate a lesser return to prisoners than to non-prisoners.

We will divide our sample in PNAD and Prisoners, and will estimate a mincerian equation for each one. In the first step we will use an OLS estimator. Supposing that the ability bias affect both samples in the same way, the differences between the coefficients of the human capital variables (s and exp) is the magnitude of the peer effect. In the second step, we will use a three stages least squares (3SLS) approach. The idea of the use of this methodology is to try to expurgate the ability bias. Again, the difference between the coefficients of the human capital variable will be a proxy for the peer effect.

Table 3 presents the estimated results for the equation of the logarithm of wages. Firstly, concerning to the general results derived from the estimated regressions they are in conforming to the literature on mincerian equation and others studies associated to Brazilian labor market [14] [(Sachsida et alii 2004); (Ueda e Hoffmann 2002)].

In order to verify the endogeneity of variable schooling associated to OLS regression the Durbin-Wu-Hauman test is done using the estimated results of equation (3) obtained by ordinary least squares (OLS) and an instrumental variable (IV). The null hypothesis states that an (OLS) estimator of the same equation would yield consistent estimates: that is, any endogeneity among the regressors would not have deleterious effects on OLS estimates. [15] A rejection of the null indicates that endogenous regressors' effects on the estimates are meaningful, and instrumental variable techniques are required. The results appear on the right side of Table 6. Based on the results there is an indication, mainly those derived from regression for prisoners, that the variable schooling is not weakly exogenous in mincerian equation. According to the econometric practice one can overcome the problem of endogeneity using the methods of 2SLS or 3SLS. Both these methodologies generate unbiased estimators but 3SLS is also an efficient estimator. Then we perform the 3SLS in order to estimate the mincerian equation free from ability bias.

Related to the main concern of this research four different results are presented. Columns (1) and (2) report the estimated results by OLS from

[14] To be honest one would expect to find a positive coefficient associated to variable formal, the dummy for formal sector. Related to the negative coefficient estimated for this variable, the authors would like to pose based on the others studies and our experience that this fact reflects a characteristic founded in the labor market of Distrito Federal and not a general characteristic of Brazilian labor market.

[15] Under the null, it is Chi-squared distributed with m degrees of freedom, where m is the number of regressors specified as endogenous in the original IV regression.

the samples of PNAD and Prisoners, respectively. Columns (3) and (4) report the same results, but using a 3SLS method. As can be noted, the difference between columns (1) and (2) for the variable schooling (experience) is 0.014 (0.032). This means that a prisoner receives a return to schooling (experience) 1.4% (3.2%) lesser than a non-prisoner by year of study (experience). Using the results reported in columns (3) and (4) we can verify that the returns to schooling (experience) for a prisoner is 1.1% (3.1%) lesser than that received by a non-prisoner per year of study (experience). According to the results showed in Table 3, there seems to be a penalty in both the returns to education and in the experience for the prisoners. According to the arguments presented previously, this is an indication of the occurrence of the peer effect. Thus, the peer effect for the prisoners can be seen as a reduction in the return of both education and experience. [16]

To be more precise about the results derived from Table 3 there are competing reasons why incarceration may affect the human capital variables. The jail-time by itself diminishes the productivity because a long inactivity depreciates the human capital. It must becomes clear that we can not isolate the different factors of why there might be negative effects on productivity from incarceration, but simply calling these reasons peer-group effects.

[16] Based on the information in Table 1, the mean of schooling for openers is about 7 years what is below the mean time to take the graduate degree. Then in accordance to Note 2, it is more likely that ex-convicts are contaminated by peer-group effect.

Table 3
Equation for the logarithm of the monthly wage*

Variável	OLS		3SLS**	
	PNAD	Prisoner	PNAD	Prisoner
	(1)	(2)	(3)	(4)
Dependent variable: Lw				
S	0.144	0.130	0.171	0.160
	(25.86)	(11.92)	(6.69)	(5.56)
Exp	0.055	0.023	0.055	0.024
	(5.21)	(2.20)	(4.67)	(2.13)
Exp^2	-0.0007	0.0003	-0.0007	0.0003
	(-3.68)	(1.63)	(-3.83)	(1.57)
Formal	-0.215	-0.123	-0.216	-0.113
	(-4.75)	(-1.69)	(-3.76)	(-1.56)
Union	0.222	0.427	0.233	0.423
	(4.71)	(5.40)	(4.00)	(4.96)
White	0.240	-0.033	0.162	-0.055
	(5.38)	(-0.51)	(2.25)	(-0.79)
Constant	4.817	4.623	4.628	4.392
	(33.12)	(31.49)	(13.30)	(15.38)
R^2	0.530	0.425	0.513	0.412
DWH test	3.245	2.482		
	(0.072)	(0.115)		
Dependent variable: S				
White	-	-	2.384	0.485
			(8.63)	(1.70)
Smother	-	-	0.421	0.368
			(9.50)	(10.46)
Constant	-	-	5.704	5.724
			(24.69)	(29.23)
R^2			0.165	0.216
Observations	987	415	987	415

*The values in parenthesis are the t-test of the variables.
**Endogenous Variables: Lw and S.

6. Final Comments

This is the first trial in country-regionplaceBrazil to measure discrimination for ex-convicts in labor market. This article built an unpublished dataset with the authorization of the Court of Justice of Distrito Federal and Territories, by means of direct interviews with convicts serving time outside prison. This study sought to verify the occurrence of both the stigma and the peer effects for convicts. The basic idea was that the existence of these two effects would imply a wage penalty for individuals who had once served time in prison.

In relation to the peer effect, the estimates from three stages least squares (3SLS) suggest that individuals who were once prisoners receive a return 1.1% lesser by year of education than the individuals who never served time in prison. Also, the prisoners receive a return 3.1% lesser by year of experience than individuals who never served time in prison. This fact seems to imply an occurrence of the peer effect. That is, the fact that an individual served time in prison, and lived with other convicts, suggests that he acquired some group characteristics, which decreased his productivity in the legal sector of the economy. In relation to the stigma effect, the 3SLS (OLS) estimation suggests that the prisoners receive a wage penalty of 39.6% (33.4%) in their wages. As mentioned before, since there is not an appropriate methodology to disentangle the stigma and the peer-group effect these measures should be understood as upper/lower bounds of the impact of incarceration over wages.

In a general way this work tried to contribute to the literature concerning to the costs of incurring in an illegal activity. The results suggest that besides the traditional costs of being arrested (time spent in prison, not receiving wages during that period, etc.), there are two additional cost associated to the prison life, the peer effect and the stigma effect. The peer effect implies that during the time in the prison, the prisoner receives influences from other prisoners and these influences will decrease his ability in the legal labor market. Furthermore, the stigma effect implies that the society will discriminate prisoners after they go out to the legal labor market. The convicts will confront this cost when they try to return to the legal labor market. The measurements of this type of cost are important because they have a direct impact on the returns that legal activity offers to the former convict. As this study suggests, the costs associated to both the peer and the stigma effect are high, and could imply in the loss of attractiveness of activities in the legal labor market for former convicts.

In order to be more precise about the results derived from this study it must be said there are competing reasons why incarceration may affect the human capital variables in which individuals acquire certain trails from their peer is simply one of them. The jail-time by itself diminishes the productivity because a long inactivity depreciates the human capital.

A suggestion for future researches would be the analysis of the implications of the results found in this article for the formulation of public policies. After

all, a public policy that would decrease the peer effects (or the stigma effect) would facilitate the prisoner's permanence in the legal labor market of the economy, and therefore help avoid the repetition of the same crimes. However, the decrease of the costs associated to the peer effects (or the stigma effect) implies that the cost of entering in the illegal activity would also be reduced. In this way, it would be interesting to know what would be the net effect, over the criminal activity, of a decrease in the costs associated to the return of the former convict to the legal labor market of the economy.

In fact, some suggestions for public policies can be obtained from this study. One of them is related to the fact that incarceration has effective negative effect on productive. If it derives from peer-group effect or the depreciation of the human capital is not important for practical reasons. The educative programs can be used to mitigate the depreciation of human capital. Jointly to it the allocation of the convicts in a prison must be done in order to separate the individual according to the degree of his potential danger. This procedure can mitigate the peer-group.

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Appendix

Questionaire

1) Years of Schooling: _____
2) Educational level: _____
3) Age: _____
4) Race: _____
5) Marital Status: _____
6) State which was born: _____
7) Do you have a job in the formal sector: _____
8) Are you unionized: _____
9) Do you have kids: _____
10) Years of Schooling of your mother: _____
11) Gender: _____
12) Monthly Wage: _____