Vocational Training, occupational requirements and labor earnings in Brazil

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Abstract

This paper estimates the consequences of mismatches between workers' attainment of vocational training and the requirement of this type of course in their occupations in Brazil. Combining data from the 2007 PNAD and the 2010 Brazilian Classification of Occupations, an indicator of required training can be imputed to each employed individual according to his or her occupation. Thus, based on the attainment of vocational training, workers in the sample can be classified as adequately matched, overqualified or underqualified. Estimates indicate that the lack of the required qualification seems to have negative consequences on labor earnings, and that workers with training earn more than those who did not complete a course of this type even in occupations where training is not need.

Keywords: vocational training; occupation; requirement; earnings.

1. Introduction

The mismatch between workers' education and the educational requirements of their jobs seems to have important consequences on labor market outcomes. Empirical evidence usually indicates that the estimated returns to years of surplus schooling are usually lower than that associated with required years of schooling. Also, individuals with fewer years of schooling than the level needed in their occupations are normally penalized relative to those adequately matched in similar occupations (see Leuven and Oosterbeek, 2013 for a survey). Although studies in the economic literature have been usually focus on the education-occupation mismatch in terms of years of formal schooling[1], incompatibilities between the skills taken by workers and those required by their jobs can be also verified for vocational education.

Betcherman, Olivas & Dar (2004) review a number of studies about the effectiveness of vocational training and suggest that these programs seem to improve labor market outcomes in Latin America. Although vocational training could be a way of increasing workers' skills and productivity in the labor market, the mismatch between workers' qualification and requirements of their occupations may change the way labor earnings is associated with the attainment of vocational training. The aim of this paper is to investigate whether surplus and deficit training are related to labor earnings in Brazil.

Empirical evidence shows that the mismatch between attained and required training is quite intense in Brazil. More than 80% of the Brazilian workers did not do a vocational training program. Among these workers without training, however, almost one-third are employed in occupations that require a vocational training. Considering workers with vocational training, data reveal that more than half of them have an occupation where training in not needed. Thus, based on requirements and attainments of vocational training, almost two-thirds of the Brazilian workers are not adequately matched. Around one-quarter of the individuals did not complete a training program but have an occupation that requires a course of this type, whereas 10% have more qualification than required.

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[1] A number of studies analyze another type of mismatch related to comparisons between occupation and field of study for workers with tertiary education (Robst, 2007; and Nordin et al., 2010).

The empirical analysis combines data from the 2007 PNAD, the Brazilian Household Survey, and the 2010 Brazilian Classification of Occupations (Classificação Brasileira de Ocupações, (2010)) – hereafter CBO – from the Brazilian Ministry of Labor. The CBO provides information about education (formal and vocational) needed to perform each occupation. In this way, an indicator of required training can be imputed to each employed individual in the PNAD, according to his or her occupation. Comparing required qualification with individuals' attainment of vocational training, workers in the sample can be classified as adequately matched, overqualified or underqualified.

Estimates show that individuals who completed a vocational training and are employed in occupations that do not require this level of qualification earn more than those without vocational training in similar occupations. However, workers in the former group earn less than those who completed a training program in occupations that require a course of this type. Empirical evidence also indicates that workers without vocational training in occupations that requited this level of qualification have lower labor earnings than individuals with vocation training in similar occupations. In addition, estimates show that individuals without training in occupation where a course of this type is needed earn more than those who also did not complete a training program but have occupations that do not required training.

This paper is organized as follows. Section 2 briefly presents vocational education in Brazil. Section 3 describes the dataset used in the empirical analysis and Section 4 presents the approach adopted to estimate whether labor earnings are related to individuals' surplus or deficit of training. Section 5 reports the estimated results and Section 6 has the main conclusions of the paper.

2. Vocational education in Brazil

Vocational education is defined by the Brazilian Census Bureau (*Instituto Brasileiro de Geografia e Estatística* – IBGE) in the 2007 PNAD as an activity dedicated to providing skills for a specific occupation. This type of training usually has a low duration and could be provided by schools, churches, unions and NGOs, and other institutions. The programs focus on practical applications of skills, and a certification is granted upon completion of the course. The educational level required to attend vocational training is very heterogeneous and usually low on average. Bricklayer, cake decorator, chef, computer literacy, cook, hairdresser, language, makeup artist, manicurist, massage therapist, pedicurist, seamstress, secretary, surgical technologist courses, tour guide and waiter are examples of vocational programs.

Table 1 reports summary statistics separately for individuals who have completed a vocational training, and those who have attended but did not completed a course of this type. About 20% of the individuals have attended a program of this type before, and more than 90% of those who have attended vocational training completed the program. It can be shown that more than half of the programs are privately provided; and that national training institutes (SENAI, SENAC, SEBRAE, and others) and government programs represent 28% and 16% of the total in column (1). Table 1 also shows that almost all training programs require class attendance, and that two thirds of the training is done during the day. Computer literacy represents almost 30% of the courses for those who have completed a vocational education program before, while programs that focus on commerce and manufacturing activities account for 14.1% and 16.9%.

Table 1: Summary statistics about vocational education in Brazil

	Individuals who have completed a vocational training	Individuals who have attended but did not completed a vocational training
Instutite that provided the training (%)		
National training Institutes (SENAI, SENAC, SEBRAE, ...)	28.23	14.28
Government Programs	15.5	20.56
Private programs	51.56	60.68
Others	4.7	4.48
Required attendance at classes (%)*	98.02	89.71
Day Course (%)	65.23	65.75
Course type (%)		
Health and welfare services	8.32	7.32
Computer literacy	28.81	42.22
Construction techniques	2.81	2.39
Manufacturing activities	16.85	14.05
Hairdresser and beauty	6.63	6.67
Commerce activities	14.07	7.46
Others	22.51	19.89
Observations	32,976	3,003

Source: The 2007 PNAD.

3. Data

This paper uses data from the 2007 PNAD, a nationally representative survey conducted by the Brazilian Census Bureau (IBGE), and information from the CBO. The 2007 PNAD has information at the individual level regarding demographic and labor market variables, formal education, in addition to a supplement, which was applied to the whole sample, with information about vocational training.

The CBO offers detailed descriptions about 607 occupations defined at the 4-digit level, providing formal schooling and vocational education requirements to adequately perform each occupation. These requirements are based on evaluations by professional job analysts. Making use of that information, it is attributed the required education to each occupation defined in the 2007 PNAD. An individual who completed a vocational training in an occupation that does not require a course of this type is classified as overqualified, while those without training in occupations where it is necessary are considered underqualified. Individuals with the same qualification needed by their occupations are classified as adequately matched. The sample used in the empirical analysis includes around 110,000 individual aged 25 to 60 years, employed with positive labor earnings. Military officers are excluded from the sample because it is not possible to compute the required qualification in this case.

4. Empirical method

The empirical approach used here is similar to the one proposed by Duncan and Hoffman (1981) to estimate the effects of years of surplus and deficit schooling on labor earnings. Duncan and

Hoffman (1981) represent years of attained schooling (S) as: $S \equiv S_r + S_0 + S_u$, where S_r is the number of years of required schooling for the job, $S_0 = max(0, S - S_r)$ is the years of surplus schooling and $S_u = max(0, S_r - S)$ is the years of deficit schooling. Then, Duncan and Hoffman (1981) replace S in the Mincerian equation by the terms in the right side of the identity.

Following Duncan and Hoffman (1981), the vocational training indicator (T) can be decomposed into three terms: $T \equiv T_r + T_o + T_u$, where T_r is an indicator that the occupation requires training, $T_o = max(0, T - T_r)$ and $T_u = max(0, T_r - T)$. The term T_o is represented by a dummy indicating that the individual completed a training program but his or her occupation does not require this type of qualification, while T_u is a dummy indicating that the worker did complete a vocation training but it is needed in the occupation. Including these three terms in a Mincerian equation, workers' hourly labor earnings (w) can be represented as:

(1) $ln(w) = \beta_0 + \beta_1 T_r + \beta_2 T_o + \beta_3 T_u + X\gamma + u$

where X is a vector of individual characteristics (age, age squared, and dummies for schooling, gender, race and region of residence), and u is an error term.

5. Results

Before presenting estimates for equation (1), the first column of Table (2) reports the results based on a specification where vocational training is represented only by a dummy variable (T) instead of the three terms of the decomposition. According to column (1), hourly labor earnings are 8.6% higher for individuals who completed a vocational training.

Column (2) of Table 2 presents estimates for equation (1), which allows that different components of vocational training have different coefficients in the earnings equation. According to the results, requirement of training in the occupation has a coefficient equal to 0.132, while the indicator of surplus training has an estimated coefficient equal to 0.089. Estimates also show that the coefficient for deficit of training is equal to −0.065.

Thus, individuals with training in occupations that do not require a course of this type earn 8.9% more than adequately matched workers in occupations with the same requirement in terms of vocational training. However, it is possible to notice that those individuals with surplus training earn less than those with training in occupations requiring this kind of qualification. Findings in column (2) of Table 2 also indicate that individuals without training in occupations where a course of this type is needed earn 6.5% less than workers with vocational training in similar occupations. Individuals with deficit training seem to earn more than those who also did not complete a vocational training and have occupations where this kind of course is not required. However, labor earnings increase associated with vocational training requirement for individuals with deficit of training is only half of that estimated for those adequately matched in similar occupations.

Table 2: Vocational training and hourly labor earnings

	(1)	(2)
Vocational training	0.086	
	[14.49]***	
Occupation requires training		0.132
		[16.14]***
Surplus training		0.089
		[11.01]***
Deficit training		-0.065
		[7.68]***
Age	0.05	0.05
	[18.23]***	[18.15]***
Age squared	0.00	0.00
	[13.16]***	[13.07]***
Female	-0.281	-0.275
	[58.12]***	[56.22]***
Black	-0.153	-0.152
	[29.84]***	[29.80]***
Years of schooling: 8-10	0.317	0.311
	[46.79]***	[45.94]***
Years of schooling: 11-14	0.645	0.639
	[109.15]***	[107.61]***
Years of schooling: 15	1.534	1.542
	[178.44]***	[177.54]***
Constant	-0.148	-0.165
	[2.84]***	[3.18]***
Observations	111,188	111,188
R-squared	0.40	0.40

Regressions are estimated by OLS and include dummies for area of residence.

Robust t-statistics are presented in parentheses.

* Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level

6. Conclusions

This paper investigates the consequences of mismatches between workers' attainment of vocational training and requirement of this type of course in their occupations. About one quarter of the Brazilian workers did not complete a vocational training as required in their occupations. Empirical evidence presented in this paper suggests that this lack of the needed qualification may have negative consequences on labor earnings. Individuals without vocational training in occupations that require this type of qualification seem to earn less than those with training in similar occupations.

Additional evidence in favor of vocational training presented here is that workers with training earn more than those who did not complete a course of this type, even in occupations where training is not need, although the benefit seems to be larger in occupations that require training. In spite of the reward associated with the attainment of vocational training, only 20% of the Brazilian workers completed a program of this type.

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