E C O N O M I C S B U L L E T I N

Different times, different commitments, but the same old practices: failure of the efficiency wage model for socially devoted firms

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Abstract

After the stabilization plan of 1994, and trade liberalization, the Brazilian inflation rate dropped from two figures monthly to a single one annually. Several large capitalization firms began adhering to the Annual Social Audit disclosures, a series of internal and external indicators mostly related to employees' well-being and community. In this paper, we tested the Efficiency Wage Model, shirking version, as per Manchin Manning (1992) and applied by Kitazawa Ohta (2002). We observed 84 firms who were members of the Annual Social Audit network from 1997 to 2005. We find that (i) our studied firms are not paying salaries above market level, as indicated by the efficiency wage model, and (ii) the results suggest the use of the bargain model of repetitive negotiation between employers and employees.

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1. Introduction

During the first half of the 1990s, Brazil experienced dramatic changes at the macro and micro levels. Inflation rate dropped from two digits annually—often monthly—to a single digit. Trade liberalization increased Brazilian exports and imports, causing substantial changes in level of industry competitiveness; privatization of key sectors also increased industry productivity (Arbach et al, 2004). Wages, previously legally indexed to inflation, became freely negotiable. Additionally, around this time, several firms joined the Annual Social Audit disclosure network. This involved a set of internal and external indicators, ranging from financials indicators to environmental and labor programs. Within this new competitive environment, would firms set wages above market level to increase productivity? This paper's objective is to test this hypothesis by observing 84 large capitalization firms during a nine-year window from 1997 to 2005. This period came right after several economic reforms were successfully implemented. All firms in our study freely adopted the Annual Social Audit.

The next section briefly reviews some efficiency wage models. It also describes the data and the regression model used. Section III shows the major results with respective comments, including study limitations. Finally, section IV provides concluding remarks regarding the fact that results fail to support the efficiency wage model.

2. Model and Data

Efficiency wage models state that wages above the market equilibrium results in higher work effort, increased productivity and, consequently, higher profits. The benefits of paying higher wages come about in different ways, depending on the model type. For instance, higher wages may proportionate better diets, decrease the costs associate with firing/hiring workers (turnover) and decrease costs of monitoring the work effort. This last one, or the ***shirking*** version, is the one provided by Shapiro & Stiglitz (1984). It is sometimes also referred to as the *classical* version.

A modified version, with dynamic panel data, was developed by Machin & Manning (1992). This version has been applied in different countries; for instance, Kitazawa & Ohta (2002) applied it for the Japanese industry. To the extent of our knowledge, an identical model has not previously been applied to Brazil. Arbache et al (2004) and Esteves (2006) specifically addressed the Brazilian case; both studies, rich on data, adopted alternative models. Our study differs in applying a dynamic panel data approach to test the shirking version of the model; it also is restricted to those firms who adhere to the Annual Social Audit system of disclosures.

The data was collected from 84 large capitalization firms that made public their Annual Social Audit statements (www.balancosocial.org.br). Annual Social Audit statements are published yearly and contain information on a firm's "social commitments" to its employees and community. The information ranges from financial statements to environmental issues. Specifically, the company discloses data on employee composition indicators—for instance,

percentage of females and blacks in management positions—and data on "the exercise of corporate citizenship"—for instance, employees' profit-sharing programs.

The following variables were collected from the Annual Social Audit statements: net revenues (gross earnings less taxes, interest expenses, deductions and income taxes); operating results (lies between gross revenues and profits before income tax); gross payroll (total sum of wages, gratifications, commissions and bonuses, 13th wage, holiday pay and compulsory social benefit payments, i.e., INSS, FGTS and social contribution); and number of employees. Total tangible fixed assets were collected either from the Reuters database™ or directly from the firms' website balance sheets.

The period available ranged from 1997 to 2005, i.e., nine years. Existing literature has documented the problems associated with running micro-panel data (Baltagi, 2005); the number of years are limited, and such limitations might affect the asymptotic arguments and the Hausman test itself. Cobb-Douglas production functions are particularly sensitive to a small number of periods. Only taking into account the first differences, to eliminate unobserved firm-specific effects, result in weak instruments (Blundell & Bond, 1998). The Cobb-Douglas estimate model is based on the Machin and Manning (1992) approach as follows:

$y_{it} = \alpha k_{it} + \beta l_{it} + \gamma e_{it} + \varepsilon_{it}$, (1)

where *Y* is the log of net revenues (a proxy for output), k is the log of capital stock, l is the log of employment, e is the effort level, and ε is a combination of time-specific effect, firm-specific effect, and the disturbance: *i* and *t* stands for firm *i* at the date *t*.

The effort model is defined as:

$e_{it} = \psi_1 E_t(e_{i,t+1}) + \psi_2 \omega_{it} + \psi_3 E_t(\omega_{i,t+1}) + \eta_i + \mu_t + E_t(\mu_{t+1})$ (2)

where ω is wage and ū is utility level; again, e is effort and *i* and *t* stands for firm *i* at the date *t.*

Equation (3) is the result after rearranging both equations (Kitazawa & Ohta, 2002):

$y_{it} = \beta_{y1} y_{i,t+1} + \beta_{l0} l_{it} + \beta_{l1} l_{i,t+1} + \beta_{k0} k_{it} + \beta_{k1} k_{i,t+1} + \beta_{w0} \omega_{1t} + \beta_{w1} \omega_{i,t+1} + f_i + g_i + \varepsilon_{it}$ (3)

with $\beta_{l1} = -\beta_{y1}\beta_{l0}$ and $\beta_{k1} = -\beta_{y1}\beta_{k0}$

where f_i is the firm-specific effect, g_i is the time-specific effect, and ε_{it} is the disturbance.

3. Estimation Results

Equation (3) is our estimated equation. The GMM estimation, to correct the bias, is based on Arellano & Bond (1991). Table I below shows the results:

Table I: Estimation Results for firms who disclosure their Annual Social Audits

Variable	Coefficient(Estimated)	t-statistic (Probability)
y_{it+1}	β_{y1} (0.110)	5.630 (0.000)***
k_{it}	β_{k0} (0.097)	4.265 (0.000)***
k_{it+1}	β_{k1} (-1.020)	-134.39 (0.000)***
l_{it}	β_{l0} (0.005)	2.643 (0.009)***
l_{it+1}	β_{l1} (0.002)	2.544 (0.011)**
ω_{1t}	β_{w0} (0.005)	2.135(0.033)**
ω_{it+1}	B_{w1} (-0.007)	-2.487 (0.013)**
J- Statistic, (Instrumental rank)	21.87 (39)	
Sargan P value	0.643	
LM1/LM2	0.479/0.594	
Wald test (P value)	30.534 (0.000)	

Note: 84 firms and T= 9. The model is estimated in first differences to eliminate firm-specific effects: Arellano & Bond (1991). Instruments are dated t-2. J-Statistics is a general version of the Sargan test, a test of over-identifying restrictions. Sargan statistics follows a $\chi^{(p-k)}$ distribution, where *k* is the number of estimated coefficients and *p* is the instrument rank. LM1/LM2 is the Lagrange Multiplier test for first and second order serial correlation. Wald tested the restrictions. *** significance at 1%, ** significance at 5%, * significance at 10%.

The model was tested for first and second order auto-correlation; probability values of the Lagrange Multiplier do not indicate a serial correlation problem. From the Eviews™ generated J-Statistic, the probability value for the Sargan test was calculated[1]. Similarly, the probability value for the Sargan test (0.643) for over-identifying restrictions is clearly above the limit. Finally, the Wald statistics are for testing the join significance of the restrictions $\beta_{y1}= 0$ & $\beta_{w1}= 0$.

The signals of the parameters predicted by the dynamic shirking version of the efficiency wage model are $\beta_{y1}> 0$ & $\beta_{w0,}$ $\beta_{w1} > 0$. This suggests that the opportunity cost associated with a job loss due to future salary increase plays an important role during an employee's calculations. Nonetheless, the estimated model has $\beta_{y1}> 0$ & $\beta_{w0} > 0$, but $\beta_{w1} < 0$, consistent with the bargaining model predictions as stated by Machin & Manning (1992, 298). The bargaining model implies continuing negotiation between employer and employee, considering that both are uncertain of each other's optimal point. Theory suggests that the bargain model is more common among higher-paid workers (Strand, 2003); nevertheless, Pereau & Sanz (2006) suggests a positive interaction between the bargain and efficiency wage models.

[1] For the relationship between J-Statistic and Sargan test, see Murray (2006).

Despite the profound changes in the Brazilian economy after the mid-nineties—changes that brought inflation down from double figures monthly to a single one annually and opened up the economy to international competition—our estimated model does not support the hypothesis that large capitalization firms implemented a system of wages above market level to increase worker productivity, as suggested by the efficiency wage model. This is particularly appealing for our sample, which is composed of large firms with the explicit commitment of spontaneously disclosing their Annual Social Audits. The Annual Social Audits include several indicators regarding employee well-being, sometimes called corporate citizenship.

4. Conclusion

This study decided to study the efficiency wage model, dynamic shirking version, based on two assumptions that would increase the feasibility of this model in the Brazilian economy. The first assumption took into account the drastic change in the overall economy's performance after successful implementation of a stabilization plan. After several years of economic turmoil, the Brazilian economy began experiencing price stability and increasing international competition. Would these new macroeconomic factors induce firms to pay wages above market level to increase labor productivity? The second assumption was that those firms willing to publicly adhere to the Annual Social Audit disclosures, including policies regarding so-called internal corporate citizenship—for instance, profit-sharing program, health benefits, and so on—would have a higher likelihood of adopting the efficiency wage model. Our result suggests that the answers to these questions are negative.

Our results fail to support the efficiency wage model, dynamic shirking version, but corroborate the bargaining model that implies successive negotiations between a firm and its employees. Due to the study's limitations, its results should be assessed with caution. There are different wage theories, and within those theories, different ways of modeling them—for instance, Faria (2000, 2005) and Pereau & Sanz (2006). Splitting a large number of firms by sector might eventually be influential on the outcomes—as seen, for instance, in Arbach et al (2004) and Esteves (2006). In conclusion, while an ultimate accounting of the wage-setting remains to be seen, this study suggests that firms adopting the Annual Social Audit, at least on this dimension, are not paying wages above market level.

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