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WHY ARE POSITIVE ATTITUDE AND WAGE CORRELATED? THE ROLE OF PRODUCTIVITY RE-EXAMINED

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Abstract

By extending Solow's input augmenting technological progress argument and Becker's human capital accumulation argument to a cross-sectional framework, the study claims that the recent evidence of a significant positive relationship between the worker's positive attitude and wage may be attributed partly to a positive correlation between attitude and productivity. To test this hypothesis, the study presents an econometric framework for obtaining an alternative measure of the worker's productivity, a variable hardly available in current labor market data sets. Using this new variable and following alternative econometric techniques, the study tests the proposed hypothesis, and demonstrates that positive attitude in fact affects productivity positively. This finding implicitly suggests that any program designed to improve the worker's attitude is likely to enhance his/her productivity and wage. Echoing suggestions of numerous earlier studies, the current study, with a view to improving the worker's over-all economic performance, recommends psychological training for fostering behavioral skills to supplement traditional schooling that promotes cognitive skills only.

Keywords: Positive Attitude; Productivity; wage; psychological Capital

JEL Classification: J24, Z1

1. Introduction

Recent studies on the effects of positive attitude on economic performance indicate that improvement in attitude has a significant positive effect on the worker's wage (Nollen and Gaertner, 1991; Goldsmith et. al., 1997; Groves, 2005; Waddell, 2006; Borghans et. al., 2008; Mohanty, 2009a, 2009b). In different contexts, several researchers also find the evidence that the worker's job performance is influenced positively by his/her personality traits, such as emotional stability, conscientiousness, extraversion, etc. (Barrick and Mount, 1991; Salgado, 1997; Nyhus and Pons, 2005). Directly or indirectly, all these studies agree that there exists a positive correlation between the worker's attitude and the wage he/she receives. This finding, although interesting, raises an important question, "Why does the employer, whose primary goal is to maximize profits, pays higher wages to workers with positive attitude?" Clearly, there must be

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some economic incentive behind this decision. In other words, attitude may in fact be related to some important economic variable that makes these workers more profitable to the firm than otherwise identical workers and consequently they are offered higher wages. The positive correlation between positive attitude and wage observed in the recent literature may thus result from a correlation between some unobserved economic variable directly associated with attitude and the worker's wage rate. The current study, following earlier studies in the literature, identifies such a variable and thus explains why a positive correlation may exist between the worker's wage and positive attitude.

In a powerful study, Bowles et al (2001) demonstrate that some of the personal characteristics mentioned in the above paragraph are in fact incentive enhancing, and consequently they motivate workers to work hard and produce more. Due to higher productivities, these workers receive higher wages under competitive equilibrium. Recently, Mohanty (2009a, footnote 4) has also demonstrated that increases in wages from improved attitude may be attributed partly to workers' increased productivities. The current study provides further support to this argument. It demonstrates that the worker's positive attitude has a direct effect on his/her productivity which in turn is known to have positive effects on his/her wage rate (Becker, 1993). The recent evidence of a positive correlation between positive attitude and wage therefore results indirectly from a positive relation between attitude and productivity.

Our above claim is based on two important arguments advanced earlier by Solow and Becker. First, extending Solow's (1957) theory of input augmenting technical progress and its numerous future extensions (May and Denny, 1979; Kahn and Lim, 1998), the current study claims that psychological progress on account of improvement in attitude enhances the quality of labor. As a result, the existing labor force becomes capable of producing a larger volume of output expected from a relatively larger labor force with the pre-psychological progress quality. Improvement in attitude may thus be treated as a labor augmenting psychological progress, similar to the input augmenting technical progress, which eventually leads to increased productivity. Second, extending the human capital theory of Becker (1964, 1993) and Mincer (1974), the current study claims that psychological training and value education by augmenting the worker's psychological capital endowments (Goldsmith et. al., 1997; Bowles et al, 2001; Mohanty, 2009a) in the form of positive attitude result in increased productivity, leading to higher wages. Both these arguments suggest that, all else held constant, an improvement in the worker's attitude leads to an increase in his/her wage indirectly through the increase in productivity. The recent evidence of a positive relationship between positive attitude and wage may therefore be attributed partly to this direct attitude-productivity relationship.

While testing the above hypothesis, the current study contributes to the literature in several ways. First, using the earlier theories of Solow and Becker, it provides an explanation of how attitude may be related to wage indirectly through productivity. Unlike earlier studies, which identify the worker's productivity with his/her wage rate (Becker, 1993; Bowles et al, 2001), the current study, for obvious reasons presented later in this section, distinguishes wage from productivity, and thus makes an attempt to explore a possible link between attitude and wage through productivity. It is important to note that a profit maximizing employer is not likely to pay a higher wage to a worker just because he/she has a better attitude unless this worker is more productive. The relation between attitude and wage therefore is not necessarily a direct one as envisaged by numerous earlier studies (Goldsmith et al, 1997; Waddell, 2006; Mohanty, 2009a,

2009b). Although no novelty is claimed with regard to the theoretical derivation of the results presented in the next section, connecting the missing link between attitude and wage through productivity is something that we claim to be relatively new in this study.[1]

Second, Solow (1957) and Becker (1993) focused respectively on the input augmenting technical progress and human capital development through on-the-job training. The current study, on the other hand, examines labor augmenting *psychological progress* and improvement of *psychological capital* through *behavioral training*. Although the theoretical procedures to model these concepts are the same, their implications in the real world are quite different. For example, the human capital endowment as examined by Becker is augmented through training in cognitive skills, whereas the psychological capital stock as demonstrated in the recent literature (Goldsmith et al, 1997; Bowles et al., 2001; Groves, 2005; Mohanty, 2009a) can be enhanced by training in behavioral skills only. Similarly, Solow's input augmenting technical progress is applicable to any input that can be improved through the advancement of technology, whereas labor augmenting psychological progress, which may result from behavioral training, can affect labor input only. The focus of the current study therefore is fundamentally different from that of Solow and Becker, and thus has different empirical implications. Despite the similarities in theoretical derivations, the current study clearly stands on its own as an independent study that makes a novel contribution to the literature on a relatively less researched topic, "labor augmenting psychological capital development." Although the study follows the traditional approach, it formulates and tests a new hypothesis which confirms for the first time in the literature that the recent observed positive relationship between attitude and wage may in fact result partly from a positive correlation between attitude and productivity.

Finally, to empirically test the relationship between attitude and productivity, the current study develops a new procedure to estimate the worker's unobserved productivity from observed variables. Note that information on the worker's productivity is hardly available in current labor market micro data sets, and consequently wage rate is traditionally used as an approximation for this unobserved variable (Becker, 1993; Bowles et al, 2001). Since this variable is not only important for the current study, but also useful in numerous other labor market analyses, any attempt to estimate this rare variable as an alternative to wage rate is clearly a significant contribution to the literature. Following the standard employment theory, the current study proposes a novel procedure to estimate the worker's productivity, and thus bridges an important gap in the literature.

It is important to note that measurement of productivity is not new in the literature. Recently, this topic has attracted the attention of numerous researchers who not only suggest different approaches to measure productivity, but also examine various factors that contribute to its growth (Bartelsman and Doms, 2000; Kumar and Russell, 2002).[2] Most of these studies, however, measure the average productivity using country level (Kumar and Russell, 2002) or firm level (Bartelsman and Doms, 2000) data, and consequently they focus primarily on the aggregative determinants, such as technological change, technological catch-up, capital accumulation, international exposure, regulatory environment, general quality of the labor force etc. The current study, on the other hand, focuses on the measurement of productivity at the individual level at a given point in time when all other factors including technology are held constant. Most past studies in the literature have approximated this variable by the worker's wage

rate. To our knowledge, this is the first study that empirically measures the worker's individual productivity differently from his/her wage rate.

A question may arise, "Given that wages are often used as a measure of workers' productivities, what is the necessity of developing a new measure?"[3] There are several reasons for this exercise. First, different compensation policies, for example, efficiency wage theory, implicitly assume that the marginal value product of a worker may be higher than the wage rate he/she receives at the current employment. To retain such a productive worker therefore the employer may have to pay an efficiency wage above the market wage even though it amounts to reducing the magnitude of the "surplus" that accrues from his/her employment. It is important to note that retaining a productive worker simply requires paying a wage higher than his/her market wage, and not necessarily a wage that is exactly equal to his/her true productivity. This possibility is even higher when the market is not perfectly competitive. There is no guarantee therefore that the efficiency wage can always eliminate the worker's surplus productivity completely. In such a situation, the wage he/she receives may still remain below his/her true productivity, and consequently any attempt to develop a more accurate alternative measure of productivity different from wage is a worthwhile exercise.

Second, it is important to note that the worker's total compensation package, which includes both pecuniary and non-pecuniary benefits, is determined by his/her productivity.[4] In fact, productivity acts as an upper bound for the total compensation package offered by a profit maximizing employer in any labor market. The observed wage rate, which constitutes only the pecuniary part of the total compensation, thus is an underestimate of the worker's true productivity. Development of an alternative measure of productivity above the pecuniary wage rate therefore is highly recommended.

The above arguments suggest that although the test of a positive relationship between positive attitude and productivity can be conducted to some extent by examining the relationship between attitude and wage rate, the traditional proxy for the worker's productivity (Mohanty, 2009a), a direct test based on the actual productivity variable is clearly superior to such an indirect test. In the absence of such a variable, however, any attempt to develop a new measure of productivity more accurate than the wage rate is undoubtedly a step in the right direction. The current study does exactly that. By following a novel approach, it develops an alternative measure of productivity which includes not only the worker's pecuniary wage rate, but also a residual term that may result from either the undistributed surplus over the efficiency wage or the non-pecuniary components of the total compensation package, or both. The primary contribution of this study thus lies in not only establishing an indirect link between positive attitude and wage through productivity, but also developing a new method to estimate the worker's unobserved productivity for the first time in the literature.

The study is organized as follows. The next section provides a rationale for the proposed hypothesis. Section 3 outlines the econometric procedure to test the hypothesis that positive attitude and productivity are positively correlated. This section also presents an empirical procedure to estimate workers' productivities necessary for this test. Section 4 presents the data from the National Longitudinal Survey of Youth (NLSY), and the proposed hypothesis is tested empirically in Section 5. Section 6 examines policy recommendations of this study, and the final section summarizes our findings.

2. Rationale for the Proposed Hypothesis

Extending the earlier literature, this section presents two arguments, labor augmenting psychological progress argument and psychological capital development argument, to demonstrate that positive attitude and wages are positively correlated because productivity, which is related to the wage rate, is positively correlated with positive attitude.

2.1. Labor Augmenting Psychological Progress Argument (Solow's Model)

Following Solow's (1957) theory of input-augmenting technical progress**,** we claim in this section that improvement in workers' attitude (psychological capital) by enhancing the quality of labor results in an augmented total output, expected generally from a larger labor force, and consequently the average labor productivity rises. Consider a standard neo-classical production function (*Q*) with two inputs, labor (*L*) and capital (*K*). In the absence of improvements in the worker's attitude (i.e., psychological progress), the production function during a given time period *t* is defined as follows:

$$Q_t = f(L_t, K_t), \quad \text{... (1)}$$

$$\frac{dQ_t}{dt} = \frac{\partial f}{\partial L_t}\frac{dL_t}{dt} + \frac{\partial f}{\partial K_t}\frac{dK_t}{dt}. \quad \text{... (2)}$$

Assume that improvement in workers' attitude on the average by a factor *a(t)* > 1 through some specific program (for example, value education) enhances the average quality of the labor by the same factor *a(t)*, leaving the quality and quantity of capital unchanged. In other words, with the capital stock (K_t) remaining the same, the same amount of output (Q_t) can be produced by L_t / *a(t)* units of labor, or with the existing labor force, which is equivalent to $a(t)L_t = L_t^*$, more output Q_t^* can be produced. In this framework, it can easily be shown that $[(dQ_t^*/dt) - (dQ_t/dt)] > 0$.

With the labor augmenting psychological progress just mentioned, the production function in equation (1) and the relevant derivative in equation (2) can be re-written respectively as follows:

$$Q_t^* = f(L_t^*, K_t) = f(a(t)L_t, K_t), \quad \text{... (3)}$$

$$\frac{dQ_t^*}{dt} = \frac{\partial f}{\partial L_t^*}\frac{dL_t^*}{dt} + \frac{\partial f}{\partial K_t}\frac{dK_t}{dt} = a(t)\frac{\partial f}{\partial L_t^*}\frac{dL_t}{dt} + \frac{\partial f}{\partial L_t^*}L_t\frac{da(t)}{dt} + \frac{\partial f}{\partial K_t}\frac{dK_t}{dt}. \quad \text{... (4)}$$

Subtracting equation (2) from equation (4), we have

$$\frac{dQ_t^*}{dt} - \frac{dQ_t}{dt} = \left[a(t)\frac{\partial f}{\partial L_t^*} - \frac{\partial f}{\partial L_t}\right]\frac{dL_t}{dt} + L_t\frac{\partial f}{\partial L_t^*}\frac{da(t)}{dt}. \quad \text{... (5)}$$

Since $L_t^* = a(t)L_t$, $L_t = L_t^*/a(t)$, and consequently,

$$\frac{\partial f}{\partial L_t^*} = \frac{\partial f}{\partial L_t}\frac{\partial L_t}{\partial L_t^*} = \frac{\partial f}{\partial L_t}\frac{1}{a(t)}. \quad \text{... (6)}$$

Putting (6) in (5), we have

$$\frac{dQ_t^*}{dt} - \frac{dQ_t}{dt} = \left[a(t)\frac{\partial f}{\partial L_t}\frac{1}{a(t)} - \frac{\partial f}{\partial L_t} \right]\frac{dL_t}{dt} + L_t \frac{\partial f}{\partial L_t^*}\frac{da(t)}{dt} = L_t \frac{\partial f}{\partial L_t^*}\frac{da(t)}{dt}. \quad \text{... (7)}$$

If the attitude improves over time with appropriate psychological training (i.e., if *da(t)/dt* > 0), then the right-hand-side of the equation (7) is positive. This confirms that improvement in attitude by augmenting the labor input enhances overall productivity and hence the average productivity of labor over time.

It can also be shown that the growth rate of output is directly related to the growth rate of the worker's attitude. Dividing both sides of equation (4) by Q_t^*, we have

$$\frac{dQ_t^*/dt}{Q_t^*} = a(t)\frac{\partial f}{\partial L_t^*}\frac{L_t}{Q_t^*}\frac{dL_t/dt}{L_t} + \frac{\partial f}{\partial L_t^*}L_t\frac{a(t)}{Q_t^*}\frac{da(t)/dt}{a(t)} + \frac{\partial f}{\partial K_t}\frac{K_t}{Q_t^*}\frac{dK_t/dt}{K_t}. \quad \text{... (8)}$$

Putting (6) in (8) and replacing L_t in the middle term of (8) by $L_t^*/a(t)$, we have

$$\frac{dQ_t^*/dt}{Q_t^*} = \frac{\partial f}{\partial L_t}\frac{L_t}{Q_t^*}\frac{dL_t/dt}{L_t} + \frac{\partial f}{\partial L_t^*}\frac{L_t^*}{Q_t^*}\frac{da(t)/dt}{a(t)} + \frac{\partial f}{\partial K_t}\frac{K_t}{Q_t^*}\frac{dK_t/dt}{K_t}. \quad \text{... (9)}$$

Defining growth rate of *X* (= g_X) as $(\partial X/\partial t)/X$, and output elasticity (= *e*) of *X* as $(\partial f/\partial X)(X/Q)$, equation (9) can be written as

$$g_{Q^*} = e_L g_L + e_{L^*} g_a + e_K g_K. \quad \text{... (10)}$$

This suggests that growth rate of output depends not only on the growth rates of labor and capital, but also on the growth rate of (improvements in) attitude. Under the simplifying assumption that $g_L = g_K = 0$, equation (10) reduces to

$$g_{Q^*} = e_{L^*} g_a, \quad \text{... (11)}$$

which suggests that even with constant supplies of capital and labor, the output may still grow at a positive rate if and only if the average growth rate of workers' attitude, which qualitatively augments the existing labor force, remains positive. The labor-augmenting psychological progress argument thus confirms that improvement in workers' attitude in general, by enhancing the overall productivity, increases the average productivity of the existing labor force. We can deduce from this general conclusion that the productivity of an *individual* worker, with other characteristics held constant, is likely to increase when his/her attitude improves. At a *micro* level therefore these two variables are likely to be positively correlated.[5]

Note that the labor-augmenting psychological progress argument presented in this sub-section establishes a positive relationship between positive attitude and productivity. This does not, however, show the relationship between attitude and wage. This missing link is bridged in the next sub-section which establishes a positive association between wage and productivity.

2.2. Psychological Capital Development Argument (Becker's Model)

Following a parallel approach to Becker's (1993) analysis of human capital development through on-the-job training, we demonstrate in the following paragraphs why a positive relationship between wage and productivity may exist even in the presence of *psychological training* designed to improve attitude.

According to the marginal productivity theory, the wage rate of a worker in a competitive labor market in the t^{th} period equals his/her value of marginal productivity (*VMP* = *MP* × product price) in the same period. Under the simplifying assumption that the product price = 1,[6] we have

$$MP_t = w_t, \qquad t = 0, 1, 2, \ldots\ldots, T. \qquad \ldots (12)$$

However, when the worker's psychological capital (attitude) improves through some training in behavioral skills (for example, value education) that involves costs, the above equilibrium condition is modified as follows.[7]

Define P_0 = marginal productivity of the worker in the initial period (0) and r = the constant discount rate. Under the assumption that the investment in psychological training is made in the initial (0) period only, the present value of the employer's income (I) stream (= value of marginal productivities = P_t) due to the employment of this worker during all (T + 1) periods including the initial period can be written as

$$PV_I = P_0 + \sum_{t=1}^{T} \frac{P_t}{(1+r)^t}. \qquad \ldots (13)$$

Since the training (value education) is offered in the initial period only, the expenditure by the employer in the initial period includes the wage = w_0 and the cost of training (k). The expenditures in other time periods equal the wages only. Thus the present value of the employer's expenditure (E) stream for the worker over all (T + 1) time periods including the initial period is given by

$$PV_E = w_0 + k + \sum_{t=1}^{T} \frac{w_t}{(1+r)^t}. \qquad \ldots (14)$$

Since investment in psychological capital affects incomes and expenditures in future time periods, the equilibrium in a competitive market must take into account the entire stream of incomes and expenditures. The equilibrium thus requires $PV_I = PV_E$, and hence the equilibrium conditions are derived from the following identity:

$$P_0 + \sum_{t=1}^{T} \frac{P_t}{(1+r)^t} = w_0 + k + \sum_{t=1}^{T} \frac{w_t}{(1+r)^t} \qquad \ldots (15)$$

$$\Rightarrow \qquad (P_0 - w_0) + \sum_{t=1}^{T} \frac{P_t - w_t}{(1+r)^t} = k > 0.$$

Since investment in psychological capital is in the nature of a general training that increases the worker's marginal productivities in all other firms, the current firm must pay the worker his/her marginal product (i.e., $w_t = P_t$), or else he/she may be hired by another firm willing to pay the same amount.[8] Thus, from equation (15), it follows that

$$\sum_{t=1}^{T} \frac{P_t - w_t}{(1+r)^t} = 0, \text{ and} \qquad \ldots (16)$$

$$w_0 = P_0 - k. \qquad \ldots (17)$$

Equation (17) shows that in case of general psychological training, the worker will have to pay the full training cost, and consequently the equilibrium wages are determined by

$$P_0 > w_0, P_t = w_t, t = 1, 2, \ldots, T. \Rightarrow \quad P_t \geq w_t, t = 0, 1, 2, \ldots, T \qquad \ldots (18)$$

Equation (18) confirms that the value of marginal product of a worker during a given time period acts as the upper bound for the wage he/she receives during that period.[9] This further indicates that in the presence of psychological training an increase in the wage rate, with other characteristics held constant, may result primarily from an increase in the worker's productivity. Productivity and wage may thus be correlated positively over time. This finding, along with the labor augmenting psychological progress argument, which shows a direct relationship between positive attitude and productivity, establishes indirectly a positive relation between positive attitude and wage.

To empirically validate the indirect relationship just mentioned, it is necessary to demonstrate positive correlations not only between positive attitude and productivity, but also between productivity and wage. This later relationship has already been examined extensively in the literature by numerous studies advocating investment in human capital, and they find the evidence that increased productivities resulting from larger human capital accumulation lead invariably to higher wages (Card and Krueger, 1992; Card, 1999). In fact, the wage rate as pointed out earlier is often treated as an observed measure of the worker's unobserved productivity (Becker, 1964, 1993; Bowles, et al, 2001). Finding correlation between these two variables is quite trivial and therefore is not pursued in this study. The relationship between the worker's attitude and productivity, however, still remains an important empirical issue that, to our knowledge, has not yet been researched well in the literature. Consequently, the current study, with a view to establishing an indirect relationship between attitude and wage through productivity, focuses primarily on estimating this attitude-productivity relationship in the next three sections.

3. Test of Attitude-Productivity Correlation in a Cross-Sectional Framework

The models presented in the last section in favor of labor-augmenting psychological progress and psychological capital development arguments are based on a time series framework in which the relevant variables are observed over time. In a cross-sectional framework, however, these arguments call for a slight modification. For example, the labor augmenting psychological progress argument in a cross-sectional framework can be interpreted as follows. At a given point in time, a worker with a better attitude is equivalent to more than one worker with a poor attitude and consequently has a higher average productivity than otherwise identical workers in the population. Similarly, the psychological capital development argument modified in a cross-sectional framework suggests that workers with training in behavioral skills during a given time period earn higher wages in a competitive labor market because their productivities are higher. Both these arguments support the hypothesis that in a cross-section of workers, an individual with a better attitude, which may have resulted from training in behavioral skills, earns more because he/she is more productive. The evidence of positive relationship between positive attitude and earnings found in several cross-sectional studies may thus be attributed to a positive correlation between the worker's positive attitude and productivity. This section presents a model to test this hypothesis in a cross-sectional framework.

Given the data on workers' attitude and productivity, the above hypothesis can be tested easily by obtaining their sample correlation coefficient and conducting a standard t-test.[10] A more general test of this hypothesis can also be conducted by running a linear regression of productivity on attitude along with other productivity related explanatory variables, such as education, experience, intelligence etc. An appropriate t-test in this case would confirm whether or not attitude, with other characteristics held constant, affects productivity. All these standard tests, although straight-forward, are not feasible because the information on the worker's productivity is hardly available in current labor market micro data sets. To conduct these tests therefore the current study proposes a new procedure to estimate this rare variable in the next sub-section.

3.1. Estimation of Productivity

Note that, with other variables held constant, a worker seeking employment is hired when the value of his/her marginal productivity is at least as large as the wage he/she is likely to receive (see equation 18). Defining y_i, the employer's preference function for the i^{th} worker, as the difference between his/her hourly value of marginal productivity (m_i) and wage rate (w_i),[11] we define the worker's condition of employment (EMP_i = 1) as follows:

$$y_i = m_i - w_i, \text{ and} \quad \text{... (19)}$$

EMP_i = 1, if $y_i > 0$, and = 0, otherwise. ... (20)

Equation (19) provides a mechanism for estimating the worker's marginal productivity m_i from the estimates of his/her wage rate w_i and the employer's preference function y_i.[12]

In most data sets, wages are available for employed workers only. Estimation of the wage equation from the sample of these employed workers, however, results in sample selection bias that calls for Heckman's (1979) two-step procedure for its correction. Using this procedure, we present in this section a wage-employment model that helps us estimate both w_i and y_i for all workers in the labor force to obtain an estimate of m_i.

Defining x_i as the vector of characteristics that determines the i^{th} worker's wage, we can write the wage equation as

$$w_i = x_i\beta + \varepsilon_i, \quad \text{if } EMP_i = 1, \text{ and = 0, otherwise.} \quad \text{... (21)}$$

Including variables that determine the worker's productivity and wage rate in the vector z_i, the employer's preference function for the i^{th} worker, y_i of equation (19), is rewritten as

$$y_i = z_i\alpha + \eta_i. \quad \text{... (22)}$$

Assume that ε_i and η_i in the population of all labor force participants follow a bivariate normal distribution with $E(\varepsilon_i) = 0$, $E(\eta_i) = 0$, $var(\varepsilon_i) = \sigma_\varepsilon^2$, $var(\eta_i) = 1$,[13] and $cov(\varepsilon_i, \eta_i) = \sigma_{1\varepsilon}$. Under these assumptions, we have

$$Prob(EMP_i = 1) = \Phi(z_i\alpha), \quad \text{... (23)}$$

where Φ denotes the cumulative normal distribution function. With the employment probability defined in equation (23), the parameter vector α is estimated by probit from the sample of all

workers in the labor force. These coefficients are then used to obtain an estimate of y_i from equation (22) as follows:

$$\hat{y}_i = z_i\hat{\alpha}. \quad \text{... (24)}$$

Following Heckman (1979), we compute the selectivity variable for all employed workers as $\hat{\lambda}_i = \varphi(z_i\hat{\alpha})/\Phi(z_i\hat{\alpha})$ which is included in the wage equation as an additional explanatory variable. The modified wage equation thus is written as

$$w_i = x_i\beta + \sigma_{1\varepsilon}\hat{\lambda}_i + v_i, \quad \text{... (25)}$$

where $v_i = \varepsilon_i - \sigma_{1\varepsilon}\hat{\lambda}$. Since $E(v_i \mid EMP_i = 1) = 0$, estimation of equation (25) by OLS from the sample of employed workers yields consistent coefficient estimates.[14] Using these coefficients, wages of all workers in the labor force are estimated as follows:

$$\hat{w}_i = x_i\hat{\beta} + \hat{\sigma}_{1\varepsilon}\hat{\lambda}_i, \quad \text{... (26)}$$

where the selectivity variable for the unemployed worker is computed as $\hat{\lambda}_i = -\varphi(z_i\hat{\alpha})/[1-\Phi(z_i\hat{\alpha})]$.[15] Equations (24) and (26) can then be used in equation (19) to obtain following estimates of productivities (m_i) for all workers in the sample – employed and unemployed:

$$\hat{m}_i = \hat{y}_i + \hat{w}_i, \; i = 1, 2, \ldots\ldots\ldots, n. \quad \text{... (27)}$$

It is important to note that most studies in the standard labor economics literature estimate wage equations with a semi-log specification where the dependent variable is the natural log of the worker's hourly wage rate. This helps in interpreting the coefficient of a continuous independent variable directly as the percentage change in the wage rate as a result of a unit change in that variable, when all other variables are held constant. Since the focus of the current study is not to examine the percentage effects of different variables on wage, but to obtain an estimate of the actual wage rate for equation (27), it becomes unnecessary to estimate a semi-log wage equation, because estimating the predicted wage rate of the worker ($\hat{w}$) from these estimates would further involve computing $e^{(\ln w)}$. Estimating the wage equation with actual hourly wage as the dependent variable avoids this unnecessary problem and therefore is pursued in this study.

3.2. Hypothesis Testing

Using the estimated productivity variable obtained in equation (27) and the self-reported positive attitude available in the data set, we can compute their correlation coefficient (*r*). As mentioned earlier, a standard asymptotic *t*-test can be conducted to verify whether or not this correlation is significantly different from zero in the population (see footnote 10). Evidence of a positive sample correlation (*r*) and rejection of the null hypothesis that population correlation is zero would validate our argument that positive attitude and productivity are positively correlated. This direct test, although simple, fails to recognize the effects of other variables and econometric specifications on this correlation, and consequently a more comprehensive approach is called for.

A more detailed test of this correlation can also be conducted by regressing the estimated productivity variable (*m*) on attitude (*A*) and other known determinants of productivity (*W*). Thus, we have

$$m_i = \delta_0 + \delta_1 A_i + W_i \delta_2 + u_i , \quad \text{... (28)}$$

where W_i and δ_2 respectively are row and column vectors of appropriate dimensions. A positive and statistically significant coefficient of A_i would confirm whether or not attitude affects productivity. Such an approach would also allow further verification of whether or not this productivity variable satisfies the standard criteria of a typical productivity variable.[16]

It is important to note that there may be numerous other individual specific factors contributing to the worker's productivity that are not available in standard labor market data sets. For example, genetic endowments, physical stamina, family background, cultural values etc., although unobserved, may have significant effects on productivity. To control for these unobserved individual heterogeneities, it is desirable to estimate equation (28) by a fixed effect or random effect approach using panel data. The wage equation then is modified as

$$m_{it} = \delta_0 + \delta_1 A_{it} + W_{it} \delta_2 + \delta_3 v_i + u_{it} , \quad \text{... (29)}$$

where *i* represents individual and *t* represents time period. The vector v_i includes all individual specific time-invariant variables which may or may not be correlated with the included variables A_i and W_i. Depending on whether or not they are correlated, we can use fixed effect or random effect approach to estimate equation (29). Since fixed effect approach does not allow inclusion of important time-invariant productivity determinants, such as gender, race etc., we estimate equation (29) following both approaches.

Estimation of the productivity equation can be improved further by including observed instruments for unobserved household characteristics that may be correlated with the worker's attitude and productivity. Family religiosity is such a variable that is likely to be related to the individual's attitude and is unlikely to be correlated with the error term. Inclusion of such an instrument in the productivity equation in place of positive attitude would not only resolve the problem of reporting bias associated with the self-reported attitude variable, but also allow an analysis of the causal effect of attitude on productivity.[17] Unfortunately, however, the two-period panel data used in this study reports the family religiosity variable during the first period only. Consequently, an instrumental variable estimation of the productivity equation to examine the causal effect of attitude on productivity using panel data is not feasible. As the next best alternative, we use the religiosity information available in the first time period as a random treatment variable and apply the difference-in-difference (*D-in-D*) technique to estimate the treatment (causal) effect of religiosity on productivity in the second period.

Using the data pooled over both time periods, the *D-in-D* regression equation can be written as follows:

$$m_{it} = \delta_0 + \delta_1 A_{it} + W_{it} \delta_2 + \delta_3 D_t + \delta_4 REL_i + \delta_5 (D_t \times REL_i) + u_{it} , \quad \text{... (30)}$$

where D_t = 1, if the observation is from the second time period and is zero, otherwise. The dummy variable REL_i = 1, if the respondent attended religious services regularly during the first time period, and is zero, otherwise. The coefficient of REL_i in this equation shows the effect of

religiosity on productivity which may partly be attributed to the presence of correlation between these two variables, whereas the coefficient of the interaction term measures exclusively the treatment effect (the causal effect) of religiosity on productivity. Effects of the inclusion of a time dummy, a religiosity dummy and an interaction term with both these dummies in equation (30) on the coefficient of attitude (δ_1) would also indicate whether or not the effect of attitude on productivity is influenced by the worker's family religiosity.[18]

4. Data

To empirically test the hypothesis that productivity is correlated with attitude, we drew a two-period balanced panel of workers in the labor force from 1980 and 1987 surveys of the National Longitudinal Survey of Youth, 1979 (NLSY79). The NLSY79 is a US longitudinal data set that contains information on the worker's positive attitude in its 1980 and 1987 surveys, and consequently these two years were chosen to create the necessary panel for this study. In 1980, the sample respondents were aged between 15 and 23, whereas their ages ranged between 22 and 30 in 1987. After eliminating workers not in the labor force and those with missing values in relevant variables, we formed a balanced panel of 5,979 workers. To compare our panel data estimates with cross-sectional estimates, we drew two different labor force samples separately from 1980 and 1987 surveys. The reason for drawing separate cross-sectional samples and not using the same cross-sectional samples associated with our panel data is to check for the robustness of our findings to variations in samples. Our results thus are based on three sets of estimates – 1980 cross-section, 1987 cross-section and the 1980-1987 panel data. The 1980 sample has 6,202 workers out of which 5,094 are employed. In the 1987 sample, there are 6,874 workers and 6,655 are employed.

Following the standard labor economics literature, we choose the variables that are likely to affect the worker's wage and employment equations. The variables known to influence the employer's hiring decision and so the worker's employment are years of schooling, intelligence measured by Armed Force Qualifications Test score, work experience, current school enrollment status,[19] health problem and the unemployment rate in the local labor market. The demographic variables that may affect this equation are the worker's marital status, gender, race, region of residence, and the location of residence – urban or rural.

The human capital variables that influence the worker's hourly wage rate are years of schooling, intelligence, work experience, tenure with the current employer and full-time status at work. Presence of health problem, union status, government employment status, size of the workplace and the employer, and occupation may influence the worker's wage and therefore are included in the wage equation as explanatory variables. The demographic variables, such as gender, race, marital status, region of residence and location of residence, may also have effects on the worker's wage rate and therefore are included in this regression. Note that several job related variables included in the wage regression are not included in the employment equation because they are not available for those who are currently unemployed.[20] With these exclusions, both wage and employment equations of the model are identified.

The variables that influence the worker's productivity are primarily the human capital variables, such as education, innate ability, work experience, job tenure and full-time employment status. In addition, marital status by affecting the worker's family stability may influence his/her productivity positively. Presence of health problems by adversely affecting the ability to work may,

on the other hand, have a negative impact on productivity. To see if the worker's race and gender influence his/her productivity, we include two dummy variables to control for these characteristics. Test of our proposed hypothesis requires inclusion of attitude as an explanatory variable in the productivity regression. Three variants of this variable, discussed in detail in the next paragraph, are used separately in different equations to check for the robustness of our hypothesis to variations of this key variable. Finally, to identify the causal effect of religiosity on productivity, we include in the productivity equation three additional variables: a time period dummy, a religiosity dummy and an interaction term with both these dummies, especially when obtaining *D-in-D* estimates from the 1980-1987 pooled sample. Variable definitions, their means and standard deviations from 1980 and 1987 cross-sectional samples are reported in Appendix 1.

To test the hypothesis that productivity is positively correlated with the worker's attitude, we used the self-reported positive attitude variable available in both 1980 and 1987 surveys of the NLSY79. The respondents were asked to choose one of the following four options, "strongly agree," "agree," "disagree" and "strongly disagree," with respective number codes 1, 2, 3 and 4, to the statement "I have a positive attitude to life." Following the earlier literature, we generated a binary positive attitude variable (POSTRNG) that assumes the value 1 when the respondent strongly agrees to the attitude statement just mentioned and is zero, otherwise.[21] To check for the robustness of our finding, we created another positive attitude variable (POSTV) with multiple values between 0 and 1 by recoding the original codes as follows: 1 = 1, 2 = 0.67, 3 = 0.33 and 4 = 0. Although arbitrary, this variable with more variability provides another alternative to the binary positive attitude variable used extensively in the literature.[22] To have yet another measure of attitude, we generated a second binary attitude variable (POSALL) which assumes the value 1 when the respondent strongly agrees or simply agrees to the above positive attitude statement, and is zero, otherwise.[23] The means and standard deviations of these three attitude variables are reported in Table 1A. To examine further other possible pathways by which positive attitude may affect productivity, we include in the regression three other interaction terms that relate attitude to the worker's gender, race and tenure with the current employer.[24]

5. Results

Following the two-step procedure mentioned earlier, we estimated both employment and wage equations separately from 1980, 1987 and 1980-1987 pooled samples. The first stage probit estimates of the employment equation coefficients are presented in Appendix 2, and the selectivity bias corrected estimates of the wage equation coefficients are reported in Appendix 3. Estimated coefficients in both these equations assume expected signs and desired levels of significance. Using the first stage probit coefficients, we estimated the employer's preference functions ($\hat{y}_i$) for all workers in the labor force. The two-step estimates of the wage coefficients were then used to compute $\hat{w}_i$ for all workers. Finally, by summing up these two estimated variables (see equation 27), we obtained an estimate of the worker's hourly productivity $\hat{m}_i$ (in \$). The means and standard deviations of all these estimated variables obtained from the sample of all workers in all three samples are reported in Table 1A. As shown in this Table, the average hourly productivity of the worker is \$4.33 in 1980 and \$8.68 in 1987.[25] Interestingly this estimated

average productivity exceeds the estimated hourly wage rate by approximately a dollar in 1987 and 93 cents in 1980.

With the three measures of the attitude variable introduced in the last section, we computed sample correlations between the worker's positive attitude and productivity and conducted appropriate t-tests. These test results are reported in Table 1B. With t-statistics assuming values above 7 in all cases, the null hypothesis of no correlation between positive attitude and productivity is rejected at all conventional levels of significance. With positive signs and magnitudes larger than the critical limits,[26] these correlation coefficients further confirm that positive attitude and the worker's productivity are positively correlated.

Table 1A. Means and Standard Deviations of Relevant Created Variables.[a]

Variable	*1980*	*1987*	*1980-87 Pooled*
YHAT	0.9276	0.9936	0.7714
	(0.259)	(0.079)	(0.419)
WHAT	3.3983	7.6867	5.2978
	(1.703)	(2.868)	(3.343)
PRODHAT	4.3259	8.6803	6.0692
	(1.797)	(2.885)	(3.618)
POSTRNG	0.3515	0.4351	0.3909
	(0.477)	(0.496)	(0.488)
POSTV	0.7609	0.8014	0.7814
	(0.201)	(0.187)	(0.194)
POSALL	0.9343	0.9679	0.9537
	(0.248)	(0.176)	(0.210)
Sample Size	6,202	6,874	11,958

Table 1B. Correlation and t-statistic.[b]

Between variables	*1980*	*1987*	*1980-87 Pooled*
PRODHAT & POSTRNG	0.0942***	0.1203***	0.1423***
	(7.452)	(10.042)	(15.724)
PRODHAT & POSTV	0.1275***	0.1359***	0.1666***
	(10.127)	(11.372)	(18.470)
PRODHAT & POSALL	0.1229***	0.0967***	0.1205***
cc	(9.974)	(8.052)	(13.271)

a Quantities in parentheses are standard deviations.

b Quantities in parentheses are absolute t-ratios.

*** Significantly different from zero at 1 percent level.

To examine the effect of attitude on productivity, we estimated different productivity equations with different variants of attitude as one of the independent variables. The fixed effect and random effect estimates are reported respectively in Table 2 and Table 3. Cross-sectional estimates obtained separately from 1980 and 1987 samples are reported in Table 4 and Table 5 for comparison purposes only. In each table, we present three sets of estimates corresponding to three different variants of the positive attitude variable.

Fixed effect estimates in all columns of Table 2 provide very similar results for the coefficients of productivity equations. As expected, years of schooling, intelligence (AFQT), and tenure have positive effects on the worker's productivity. Interestingly, increase in work experience increases the worker's productivity at a decreasing rate only. Fulltime workers and

married workers are more productive than their otherwise identical part-time and unmarried counterparts. The random effect results in Table 3 are very similar to those in Table 2. In addition, this table shows that males and whites are more productive than identical female and non-white workers. Interestingly, the fixed effect and random effect results remain more or less unaffected by the type of attitude variable controlled in the regression.

Table 2. Fixed Effect Estimates of Productivity Equations with Binary and Continuous Positive Attitude Variables from 1980-1987 Panel Data.[a]

Variable	*Binary (Strong)*	*Continuous*	*Binary (All)*
YEARSCHL	0.3484**	0.3489**	0.3522**
	(34.352)	(34.366)	(34.787)
EXP	0.7353**	0.7345**	0.7344**
	(30.099)	(30.052)	(30.011)
EXPSQ	-0.0327**	-0.0327**	-0.0327**
	(15.450)	(15.409)	(15.388)
AFQT	0.0128**	0.0128**	0.0130**
	(16.075)	(16.040)	(16.294)
TENURE	0.1707**	0.1823**	0.1571**
	(14.605)	(5.312)	(3.534)
FULLTIME	1.2541**	1.2539**	1.2577**
	(31.162)	(31.137)	(31.210)
MARRIED	0.3706**	0.3681**	0.3677**
	(9.191)	(9.123)	(9.100)
HLTHPROB	-0.0031	-0.0070	-0.0077
	(0.027)	(0.062)	(0.067)
POSTRNG	0.1618**	_____	_____
	(3.898)		
POSTRNG*TENURE	-0.0159	_____	_____
	(1.022)		
POSTV	_____	0.3231**	_____
		(3.120)	
POSTV*TENURE	_____	-0.0232	_____
		(0.557)	
POSALL	_____	_____	0.0160
			(0.178)
POSALL*TENURE	_____	_____	0.0071
			(0.159)
Sample Size	5,979	5,979	5,979
Adjusted R Squared	0.8868	0.8867	0.8865

a The number in the parenthesis is the absolute t-ratio.

** (*) Coefficients are significantly different from zero at 5 (10) percent level.

Table 4 reports the cross-sectional estimates of productivity equations from the 1980 sample, and Table 5 presents the same from the 1987 sample. Even though workers differ in age, on the average, by seven years between these two samples, signs and significance levels of most of their productivity equation coefficients, with a few minor exceptions, remain more or less the same. Interestingly, they are very similar to the fixed effect and random effect estimates in Table 2 and Table 3. The only difference between the 1980 and 1987 cross-sectional results is the sign and significance level of the health limitation coefficient. As expected, this variable affects productivity negatively, but it is true in the 1987 sample only. In the 1980 sample, its effect

is surprisingly positive. Although the reason for this is not clear, it may have resulted from possible reporting bias attributed partly to age differences between these two groups of workers.[27] Despite this minor difference, almost all the variables known in the literature as standard determinants of productivity emerge as significant determinants in our productivity equations (Table 2 – Table 5).[28] This justifies our new approach and validates m_i in equation (27) as a reliable measure of productivity that can be used as an alternative to the traditional measure, the wage rate.

To test the hypothesis proposed in this study, we then turn to the coefficient of the attitude variable in productivity equations of all four tables (Table 2 – Table 5). As predicted, the worker's positive attitude emerges as a significant determinant of his/her productivity in all equations except those which control for the weaker version of the binary attitude variable, POSALL.[29] This conclusion remains valid in both cross-sectional and panel data estimation regardless of whether the attitude is binary (strong) or continuous, which confirms that the worker's positive attitude influences his/her productivity positively. It is interesting to note that the interaction terms in most tables, especially in panel data estimation, are statistically insignificant. Their presence in these equations also does not affect the size, sign and significance level of the attitude variable in any significant manner.[30] These findings thus provide further support to our earlier correlation tests and confirm that positive attitude and productivity in fact are positively correlated. With ample theoretical and empirical evidence of a positive correlation between the worker's productivity and wage rate available in the literature, this evidence of a significant attitude-productivity correlation validates our claim that the positive correlation between wage and positive attitude demonstrated by several studies in the recent literature may be attributed partly to a positive relationship between the worker's positive attitude and productivity.

To further examine the effects of religiosity on productivity, we included a dummy variable for regular weekly religious attendance observed in the 1980 survey as an explanatory variable in the 1980-1987 pooled regression. A dummy variable for the year 1987 and an interaction term with time period and religious attendance dummies were also included in this regression to obtain the *D-in-D* estimate of the treatment effect of religiosity on productivity. These results are reported in Table 6. To focus exclusively on the effect of religiosity on productivity, we excluded from these equations all interaction terms associated with the attitude variable used in earlier tables.

Interestingly, all the standard determinants of productivity except health limitation retain the same signs and significance levels as those obtained from cross-sectional or panel data estimation in Table 2 – Table 5. As predicted, positive attitude assumes a statistically significant positive coefficient in all equations except the one that controls for the weaker binary attitude variable (column 3). Sign and significance level of the time period variable, with other human capital characteristics held constant, indicate the importance of numerous unobserved factors contributing to the growth of productivity between 1980 and 1987. Interestingly, contrary to our expectation, regular religious attendance emerges as a significant determinant with a negative effect on productivity. Although the reason is not clear, it is not surprising because mere religious attendance without concurrent growth in the worker's human capital or psychological capital endowments may not necessarily lead to growth in productivity.[31] On the contrary, by taking the precious time away from human capital or psychological capital formation, it may affect productivity negatively. Interestingly, the coefficient of the interaction term is statistically insignificant, and thus we do not find any evidence of treatment (causal) effect of religiosity on the worker's productivity.

Table 3. Random Effect Estimates of Productivity Equations with Binary and Continuous Positive Attitude Variables from 1980-1987 Panel Data.[a]

Variable	*Binary (Strong)*	*Continuous*	*Binary (All)*
Constant	-3.8256**	-3.9773**	-3.8614**
	(51.972)	(35.246)	(33.356)
YEARSCHL	0.4374**	0.4378**	0.4396**
	(65.734)	(65.780)	(66.306)
EXP	1.0295**	1.0292**	1.0299**
	(71.572)	(71.514)	(71.543)
EXPSQ	-0.0473**	-0.0473**	-0.0473**
	(34.796)	(34.747)	(34.768)
AFQT	0.0078**	0.0078**	0.0079**
	(15.341)	(15.311)	(15.579)
TENURE	0.1663**	0.1833**	0.1906**
	(21.003)	(7.850)	(6.289)
FULLTIME	0.9681**	0.9677**	0.9689**
	(35.219)	(35.198)	(35.232)
MARRIED	0.4877**	0.4868**	0.4871**
	(18.130)	(18.092)	(18.093)
HLTHPROB	0.1116	0.1095	0.1114
	(1.439)	(1.413)	(1.436)
WHITE	0.2016**	0.2194**	0.2299**
	(5.694)	(2.261)	(2.213)
MALE	1.3082**	1.3259**	1.2793**
	(46.305)	(14.753)	(12.643)
POSTRNG	0.1053**	_____	_____
	(2.196)		
POSTRNG*WHITE	-0.0005	_____	_____
	(0.001)		
POSTRNG*MALE	-0.0152	_____	_____
	(0.344)		
POSTRNG*TENURE	-0.0095	_____	_____
	(0.906)		
POSTV	_____	0.2453**	_____
		(2.119)	
POSTV*WHITE	_____	-0.0278	_____
		(0.236)	
POSTV*MALE	_____	-0.0286	_____
		(0.257)	
POSTV*TENURE	_____	-0.0266	_____
		(0.941)	
POSALL	_____	_____	0.0523
			(0.523)
POSALL*WHITE	_____	_____	-0.0421
			(0.399)
POSALL*MALE	_____	_____	0.0302
			(0.292)
POSALL*TENURE	_____	_____	-0.0291
			(0.957)
Sample Size	5,979	5,979	5,979
Adjusted R Squared	0.8847	0.8847	0.8846

a The number in the parenthesis is the absolute t-ratio.

** (*) Coefficients are significantly different from zero at 5 (10) percent level.

Table 4. OLS Estimates of 1980 Productivity Equations with Binary and Continuous Positive Attitude Variables.[a]

Variable	*Binary (Strong)*	*Continuous*	*Binary (All)*
Constant	0.2262**	-0.0155	0.0870
	(2.059)	(0.098)	(0.573)
YEARSCHL	0.1560**	0.1553**	0.1561**
	(15.048)	(14.981)	(15.095)
EXP	1.0450**	1.0438**	1.0424**
	(26.364)	(26.348)	(26.313)
EXPSQ	-0.1541**	-0.1538**	-0.1535**
	(17.797)	(17.772)	(17.735)
AFQT	0.0068**	0.0067**	0.0068**
	(10.317)	(10.198)	(10.341)
TENURE	0.3919**	0.5297**	0.5523**
	(15.581)	(7.196)	(7.620)
FULLTIME	1.0064**	1.0057**	1.0071**
	(29.237)	(29.226)	(29.259)
MARRIED	0.1324**	0.1315**	0.1325**
	(2.943)	(2.924)	(2.947)
HLTHPROB	0.2138**	0.2137**	0.2143**
	(2.239)	(2.238)	(2.244)
WHITE	0.0889**	0.1573	0.0397
	(1.968)	(1.274)	(0.335)
MALE	0.7667**	0.7923**	0.7509**
	(20.771)	(6.914)	(6.538)
POSTRNG	0.1398**	_____	_____
	(2.006)		
POSTRNG*WHITE	-0.0182	_____	_____
	(0.298)		
POSTRNG*MALE	-0.0611	_____	_____
	(0.905)		
POSTRNG*TENURE	-0.0501	_____	_____
	(1.277)		
POSTV	_____	0.4017**	_____
		(2.541)	
POSTV*WHITE	_____	-0.1203	_____
		(0.781)	
POSTV*MALE	_____	-0.0427	_____
		(0.294)	
POSTV*TENURE	_____	-0.2046**	_____
		(2.199)	
POSALL	_____	_____	0.2126*
			(1.749)
POSALL*WHITE	_____	_____	0.0187
			(0.152)
POSALL*MALE	_____	_____	0.0102
			(0.086)
POSALL*TENURE	_____	_____	-0.1912**
			(2.572)
Sample Size	6,202	6,202	6,202
Adjusted R Squared	0.5939	0.5942	0.5942

a The number in the parenthesis is the absolute t-ratio.

** (*) Coefficients are significantly different from zero at 5 (10) percent level.

Table 5. OLS Estimates of 1987 Productivity Equations with Binary and Continuous Positive Attitude Variables.[a]

Variable	*Binary (Strong)*	*Continuous*	*Binary (All)*
Constant	-2.8795**	-3.1434**	-3.1239**
	(18.876)	(13.918)	(12.242)
YEARSCHL	0.4206**	0.4206**	0.4239**
	(37.966)	(37.960)	(38.460)
EXP	0.7046**	0.7042**	0.7048**
	(23.829)	(23.802)	(23.805)
EXPSQ	-0.0303**	-0.0302**	-0.0302**
	(12.278)	(12.248)	(12.261)
AFQT	0.0234**	0.0234**	0.0235**
	(24.360)	(22.324)	(24.456)
TENURE	0.1944**	0.2303**	0.2302**
	(17.799)	(6.629)	(4.922)
FULLTIME	0.7290**	0.7289**	0.7305**
	(15.600)	(15.597)	(15.633)
MARRIED	0.4133**	0.4113**	0.4109**
	(10.389)	(10.338)	(10.327)
HLTHPROB	-0.4178**	-0.4213**	-0.4273**
	(2.816)	(2.840)	(2.879)
WHITE	0.2132**	0.2798	0.6235**
	(3.485)	(1.541)	(2.810)
MALE	1.6269**	1.5069**	1.2610**
	(31.223)	(8.959)	(5.849)
POSTRNG	0.1464*	_____	_____
	(1.710)		
POSTRNG*WHITE	0.0352	_____	_____
	(0.423)		
POSTRNG*MALE	0.0092	_____	_____
	(0.120)		
POSTRNG*TENURE	-0.0194	_____	_____
	(1.250)		
POSTV	_____	0.4116*	_____
		(1.852)	
POSTV*WHITE	_____	-0.0664	_____
		(0.307)	
POSTV*MALE	_____	0.1565	_____
		(0.768)	
POSTV*TENURE	_____	-0.0558	_____
		(1.319)	
POSALL	_____	_____	0.2773
			(1.233)
POSALL*WHITE	_____	_____	-0.4249*
			(1.894)
POSALL*MALE	_____	_____	0.3917*
			(1.790)
POSALL*TENURE	_____	_____	-0.0457
			(0.969)
Sample Size	6,874	6,874	6,874
Adjusted R Squared	0.7026	0.7025	0.7024

a The number in the parenthesis is the absolute t-ratio.

** (*) Coefficients are significantly different from zero at 5 (10) percent level.

Table 6. Difference-in-Difference Estimates of Productivity Equations with Binary and Continuous Positive Attitude Variables from 1980-1987 Pooled Data.[a]

Variable	*Binary (Strong)*	*Continuous*	*Binary (All)*
Constant	-3.7258**	-3.8146**	-3.7550**
	(55.190)	(50.428)	(47.282)
YEARSCHL	0.4092**	0.4094**	0.4108**
	(64.668)	(64.698)	(65.135)
EXP	0.7058**	0.7054**	0.7054**
	(45.316)	(45.284)	(45.259)
EXPSQ	-0.0311**	-0.0311**	-0.0311**
	(23.090)	(23.058)	(23.047)
AFQT	0.0117**	0.0117**	0.0118**
	(24.133)	(24.083)	(24.301)
TENURE	0.1749**	0.1747**	0.1746**
	(27.130)	(27.102)	(27.079)
FULLTIME	0.9051**	0.9050**	0.9057**
	(34.439)	(34.430)	(34.451)
MARRIED	0.3781**	0.3773**	0.3770**
	(14.745)	(14.713)	(14.696)
HLTHPROB	0.1222	0.1207	0.1209
	(1.641)	(1.622)	(1.623)
WHITE	0.2848**	0.2823**	0.2761**
	(10.997)	(10926)	(10.724)
MALE	1.3503**	1.3509**	(1.3540**
	(63.135)	(63.165)	(63.400)
POSTRNG	0.0644**	_____	_____
	(2.969)		
POSTV	_____	0.1466**	_____
		(2.673)	
POSALL	_____	_____	0.0377
			(0.758)
PERIOD2	1.7099**	1.7104**	1.7124**
	(44.094)	(44.103)	(44.154)
RELGWEEK	-0.0798**	-0.0801**	-0.0799**
	(2.573)	(2.583)	(2.576)
PERIOD2*RELGWEEK	0.0089	0.0095	0.0098
	(0.204)	(0.217)	(0.224)
Sample Size	11,958	11,958	11,958
Adjusted R Squared	0.90281	0.90279	0.90274

a The number in the parenthesis is the absolute t-ratio.
** (*) Coefficients are significantly different from zero at 5 (10) percent level.

It is important to note that inclusion of religiosity in the regression to a large extent controls for the household fixed effects and thus is expected to improve the coefficient estimates. Interestingly, however, the sign, size, and significance level of the coefficient of our attitude variable remain unaffected by the inclusion of the religiosity variable. This clearly indicates that attitude affects productivity regardless of whether or not the worker regularly attends religious services. Our claim of a positive relation between attitude and productivity thus remains robust to different estimation techniques and variable specifications of the productivity equation.

6. Policy Recommendations

The findings of this study have important policy implications. Since productivity, as shown in Section 2 of this study, has a direct effect on wage rate, and since attitude affects productivity, significant improvements in workers' economic wellbeing can be achieved simply by improving their attitudes. In other words, a comprehensive plan to improve the worker's economic performance should include, among other human capital augmenting measures, appropriate policies to improve the attitude.

The above recommendation is not new in the literature. In different contexts, several earlier researchers (Bowles et al, 2001; Groves, 2005; Waddell, 2006; Sai Baba, 2007; Borghans et al., 2008; Mohanty, 2009a, 2009b, 2010) have also provided similar recommendations. Sai Baba (2007), one of the greatest humanitarians of this century, recommends training in behavioral skills through value education to accompany traditional schooling so that students can not only earn a good living, but also live a good (positive) life. The current study extends Sai Baba's claim even a step further and suggests that value education improves not only the worker's quality of life, but also his/her standard of living through its effects on productivity and wage. Consequently, programs to improve the behavioral skills should be considered seriously while providing students the traditional schooling that promotes primarily their cognitive skills.

A question may arise, "Is it possible to change the worker's attitude through value education or training in behavioral skills?" The answer to this question is very well summarized by Borghans et al. (2008, p.1020) in the following lines: "*In summary, the answer to the question of whether the change in personality is possible must be a definite yes, both in terms of mean-level and rank-order change*." Their study clearly indicates that, although difficult, it is not impossible to change the individual's attitude through deliberate efforts. Further real-world experiments, however, are necessary to test the validity of this important claim.[32]

Interestingly, by actually implementing a human values development program known as Education-in-Human-Values (EHV) in several countries of the world during the last four decades, Sai Baba (2007) has already demonstrated that the attitude of an individual can be improved through proper value education and training, especially when he/she is young. Due to its phenomenal success in reshaping the character of youth, this EHV program introduced in India by Sai Baba in 1968 has spread to more than a hundred countries all over the world including the developed countries like England, France, Germany, Canada and United States. In fact, this program has already been adopted in some public schools in India, England, Zambia, Mexico, Brazil, New Zealand, Taiwan, Australia, Venezuela, Denmark, Japan, Thailand, Malaysia, Canada and several other South American countries (Sai Baba, 2007, Ch. 4).[33]

The numerous success stories of the EHV program along with the optimistic conclusion of Borghans et al. (2008) mentioned in the above paragraphs clearly suggest that transformation of one's attitude, although difficult, is feasible, especially when the individual is young. Consequently, an educational curriculum that includes elements from both traditional schooling designed to improve cognitive skills and value education oriented towards personality development is preferred to a program that focuses on one aspect only. Such an integral educational system that provides students the ingredients for both good life and better living is

clearly superior to the current system that promotes mere academic learning leading to better living only,[34] and thus it deserves serious consideration by today's educational policy makers.

7. Summary and Conclusion

By extending Solow's input augmenting technological progress argument and Becker's human capital accumulation argument to a cross-sectional framework, the study claims that the recent evidence of a significant positive relationship between the worker's positive attitude and wage may be attributed partly to a positive correlation between attitude and productivity. To test this hypothesis, the study presents an econometric framework to obtain an alternative measure of the worker's productivity, a variable hardly available in current labor market data sets. Using two samples from the 1979 National Longitudinal Survey of Youth, the study estimates this productivity variable and estimates its correlation with the worker's attitude. The estimated productivity is also regressed separately on three different variants of the worker's attitude along with other known determinants of productivity. These productivity equations are estimated with different variable specifications following both cross-sectional and panel data methods. The standard tests under both correlation and regression analyses confirm the presence of a significant positive correlation between these two variables. This supports our claim that the recent evidence of a positive correlation between the worker's positive attitude and wage may in fact result indirectly from a positive correlation between positive attitude and higher productivity.

The study concludes with a few precautionary notes. First, the study does not claim any novelty with regard to the theoretical derivation of the results in Section 2 because they are in line with the earlier results derived by Solow and Becker. It simply shows that the relationship between positive attitude and higher wages through higher productivities can be explained easily by using different variants of the earlier theories. Connecting this indirect link through earlier theories is what is novel in the current study. This study should not therefore be confused with a major theoretical production or a mere replication of the earlier work. The study admittedly uses different variations of the earlier models to establish a result that is novel in the current literature.

Second, with a view to obtaining an alternative measure of productivity different from the worker's wage rate, the study follows a new approach. Under the assumption that the employer's preference function for a given worker depends on the difference between the value of his/her marginal productivity (benefit) and wage rate (cost), the study generates the productivity variable by using their respective estimates. Alternative assumptions may result in different estimates of the worker's productivity, and consequently our results should be interpreted with caution.

Third, the pathway by which attitude may affect productivity is not necessarily direct. It may affect productivity indirectly through other variables, for example, schooling. In a different context, Mohanty (2009a) has shown that the worker's positive attitude affects his/her schooling which in turn affects the wage rate. We can thus claim that attitude by directly affecting schooling may influence his/her productivity indirectly. This alternative pathway is not examined here because it involves simultaneous estimation of productivity and schooling equations which is beyond the scope of this study. We reserve this interesting extension as a topic for future research. There may also be other pathways affecting the attitude-productivity relationship, and consequently our results should be interpreted carefully.[35]

Fourth, in deriving the results of Section 2, we have assumed that the training in value education is offered in the initial period only. This should not, however, be confused with the claim

that the worker's attitude improves to a higher level during the initial period only as a result of psychological training and remains unchanged thereafter. Due to its psychological nature, attitude may in fact grow continuously over time after that initial training. Moreover, the training may be continued over an extended period of time depending on the need of the trainee. Although the study does not examine these complex possibilities explicitly, we claim that our general conclusion would still remain the same even when continuous improvement in attitude is introduced into the model, because the correlation between attitude and wage through productivity in that case would be even much larger. Further research in this direction is highly recommended.

Fifth, it is important to note that the productivity measure developed in equation (27) of this study cannot be free from the possible effects of gender discrimination, if in fact wage discrimination against females is present in the labor market, because the monetary wage constitutes a major component of this formulation. This limitation, however, is true for any measure of productivity that includes wage rate as one of its components. Since most past studies in the literature approximate workers' productivities directly by their wages, they are also equally subject to this unavoidable criticism. This calls for further research in developing alternative measures of productivity independent of the worker's wage rate.[36] Our results should therefore be interpreted with caution.

Finally, our recommendations for value education and training in behavioral skills, like those in numerous earlier studies, are simply deduced from our empirical findings, and are not based on a real world experiment. Such an experiment is beyond the scope of this study and therefore is left for future research. Our recommendations should therefore be interpreted accordingly.

End Notes

1. To our knowledge, Mohanty (2009a) is the only exception who has suggested this relationship explicitly in a footnote.
2. An excellent discussion on the measurement of productivity is presented in the Organization for Economic Cooperation and Development (OECD) Manual by Giovannini and Nezu (2001).
3. Bowles et al (2001), who examine the effects of incentive enhancing preferences on productivity, also use wage as a measure of the worker's productivity.
4. The author thanks a reviewer for raising this important issue and providing this interesting explanation.
5. Note that it is risky to draw conclusion on individual workers based on the aggregative results appropriate for the entire group. Such inferences may remain valid as long as all workers are homogeneous. For a population with non-homogeneous workers, our results are applicable to the average worker only. We thank a reviewer for raising this important aggregation issue.
6. This assumption only simplifies the derivation of our results, but does not affect our general conclusions. We thank a reviewer for this useful suggestion.

7. This process is similar to how investment in human capital through on-the-job-training affects the equilibrium in a competitive labor market (Becker, 1993).

8. See Becker (1993) for important distinctions between the effects of general training and specific training on wage rate.

9. Note that productivity remains as the upper bound for the wage regardless of whether the psychological training is considered general or specific to a given firm. In the later case, the firm will bear the current training cost *k* with the hope that it will recover the same in future due to increased productivity of the worker. Equation (15) in that case suggests the following:

$$P_0 = w_0 , \sum_{t=1}^{T} \frac{P_t - w_t}{(1+r)^t} = k > 0 \Rightarrow P_t > w_t , t = 1, 2, \ldots\ldots\ldots, T,$$

which like equation (18) suggests $P_t \geq w_t$, $t = 0, 1, 2,..., T$.

10. The t-statistic relevant for this test is $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$ where *r* represents the sample correlation between positive attitude and productivity.

11. Note that the employer's preference function y_i, although unobserved, can be estimated objectively by quantifiable variables, wage and the value of marginal productivity, and thus can assume a money value.

12. In a different context, Mohanty (2005) used a similar procedure to estimate workers' reservation wages from their estimated wages and job preference functions.

13. Assumption of unit variance is standard in probit analysis. It helps us avoid estimating regression coefficients to a scalar proportion.

14. Note that $E(\varepsilon_i | EMP_i = 1) \neq 0$, and consequently estimation of the uncorrected wage equation (eq. 21) by OLS from the sample of employed workers yields biased estimates.

15. For estimating wages of all workers in the sample, it is necessary to generate λ for all workers – both employed and unemployed.

16. Note that the wage rate, which acts as a proxy for the worker's productivity, depends to a large extent on his/her human capital and demographic characteristics, such as education, work experience, job tenure, innate abilities, marital status, full-time employment status, physical disabilities, gender and race. Desired signs and significance levels of the coefficients of these variables in the productivity equation (eq. 28) would therefore provide a basic test of whether or not m_i in equation (27) can be used as a reliable measure of the worker's true productivity.

17. The author thanks a reviewer for raising these important issues of household fixed effects and the causality analysis, and suggesting to resolve these problems partly by including family religiosity in the regression. The remainder of this section and related empirical estimation in Section 5 are motivated primarily by this valuable suggestion of the reviewer.

18. A more appropriate method of testing whether religiosity affects productivity through attitude is to estimate at least a recursive system of equations in which productivity is

regressed on attitude and attitude is regressed on religiosity. Due to the unavailability of data on religiosity during the second period, such an exercise, although interesting, is not feasible, and therefore is left for future research.

19. Since the workers in the 1980 sample are quite young, a large percentage of them are expected to be attending school. Although this percentage is likely to be lower in 1987, it may still be significant, and consequently this variable is controlled in the productivity regression. See Appendix 1 for more details on this variable.

20. When these variables are included in the employment equation, the final conclusion of this study still remains unchanged. These variables, however, are meaningless for unemployed workers and therefore to avoid misspecification bias and misinterpretation of coefficients we excluded them from the employment equation which is estimated from the sample of all workers in the labor force.

21. This procedure has been used in the past because the option “strongly agree” is a more reliable indicator of one’s positive attitude than the option “agree” (Mohanty, 2009a, 2009b, 2010).

22. Recording these choices with alternative values while keeping the ordering unchanged yields very similar results. Consequently, for the sake of easier interpretation, we chose their values between 0 and 1.

23. The author thanks a reviewer for suggesting this alternative definition of attitude that is likely to strengthen the robustness of our findings.

24. The author thanks a reviewer for suggesting this approach to examine the alternative pathways by which attitude may affect productivity.

25. Such a significantly lower average wage in 1980 compared to that in 1987 is primarily due to a larger percentage of younger and part-time workers in the 1980 sample.

26. Although these correlations in absolute values are not quite large, they are significantly higher than their respective critical values (i.e., $2/\sqrt{n}$) at which they deserve consideration (Newbold et al., 2012, p. 64). These critical limits in 1980, 1987 and 1980-1987 pooled samples are 0.025, 0.024 and 0.018, respectively.

27. Teenagers (1980 sample) and adults (1987 sample) may respond to questions on a sensitive issue, such as health limitation, differently.

28. As mentioned earlier, past studies approximate the worker’s productivity by his/her wage rate. Consequently, any variable that affects wage can be considered as a standard determinant of the worker’s productivity (see also footnote 16).

29. When the second binary positive attitude variable (POSALL), which is generated by assigning 1 to all respondents who either strongly agree or simply agree to the positive attitude statement, is included in the regression, this variable remains statistically insignificant in tables 2, 3 and 5. This is not surprising because a strong response to the attitude statement is clearly a better representation of the worker’s true positive attitude than a weaker response, which may partly indicate a temporary optimism (Mohanty, 2010). Consequently, the group that includes workers with both types of responses may

have, on the average, a level of positive attitude weaker than the group with stronger response only.

30. These unreported results can be obtained from the author on request.

31. Note that regular religious attendance may guarantee knowledge of specific rituals associated with a particular religion. It does not, however, guarantee development of psychological capital unless it is accompanied by appropriate behavioral training for improving ones personality traits. Religious attendance should not therefore be confused with specific psychological training or counseling recommended in earlier studies to promote the worker's economic performance (Bowles et al, 2001; Grove, 2005; Borghans et al, 2008, Sai Baba, 2007; Mohanty, 2009a, 2010).

32. It is important to note that the validity of our recommendation for value education can be tested only by conducting a real-world experiment in which the treatment group is administered some value training not available to the control group and then examining their subsequent outcomes. Such an experiment, however, is not possible by simply encouraging religious attendance because, as explained in footnote 31, religious attendance alone does not necessarily guarantee training in desirable psychological skills. Consequently, special efforts are necessary to promote these skills through some organized programs applicable to all workers regardless of their religious affiliations.

33. See the International Sai Organization website http://www.sathyasai.org for more details on this educational program.

34. The current system of education clearly enhances the workers' abilities to earn a good living. However, value education, while preparing them for a good life, also augments their productivities still further, leading to higher wages and even better living standards. Thus it supports the traditional schooling in achieving its purpose of augmenting earnings even at a larger scale. Value education may therefore be used as a good supplement to our current system of schooling.

35. The author thanks a reviewer for suggesting possibilities of different alternative avenues by which attitude may affect productivity.

36. We thank a reviewer for bringing to our notice this important limitation of all studies including the current study that either estimate productivity with wage as one of its components or approximate this variable directly by the current wage rate. It clearly opens up a new area of research in this important direction.

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Appendix 1
Definition of Variables, their Means and Standard Deviations.[a]

Variable	*Definition*	*1980*	*1987*
YEARSCHL	= completed years of schooling	11.313	12.882
		(1.90)	(2.28)
EXP	= years of work experience	1.328	5.893
		(1.19)	(2.56)
EXPSQ	= experience squared		
AFQT	= Armed Force Qualification Test score	42.053	42.329
		(28.46)	(28.83)
TENURE	= years of tenure with the current employer	0.729	2.456
		(0.79)	(2.49)
FULLTIME	= 1, if the worker works 40 hours A week	0.365	0.755
		(0.48)	(0.43)
MARRIED	= 1, if the worker is married with spouse present	0.134	0.439
		(0.34)	(0.49)
HLTHPROB	= 1, if the worker has some health limitations	0.024	0.017
		(0.15)	(0.13)
GOVT	= 1, if the worker has a government job	0.104	0.113
		(0.31)	(0.32)
UNION	= 1, if the worker has a union job	0.145	0.208
		(0.35)	(0.41)
PLNTSIZE	= 1, if the number of workers at the workplace is at least 500	0.078	0.155
		(0.27)	(0.36)
FIRMSIZE	= 1, if the number of workers at all work places of the employer is at least 1,000	0.208	0.321
		(0.41)	(0.47)
NOTHEAST	= 1, if the worker lives in the North-East	0.191	0.188
		(0.39)	(0.39)
NOTHCENT	= 1, if the worker lives in North-Central	0.263	0.236
		(0.44)	(0.42)
WEST	= 1, if the worker lives in the West	0.195	0.186
		(0.40)	(0.39)
URBAN	= 1, if the worker lives in an urban area	0.797	0.797
		(0.40)	(0.40)
WHITE	= 1, if the worker is white	0.729	0.692
		(0.44)	(0.46)
MALE	= 1, if the worker is male	0.513	0.517
		(0.50)	(0.50)
MANGPROF	= 1, if worker has a managerial or professional job	0.061	0.236
		(0.24)	(0.42)
SALES	= 1, if worker has a sales job	0.046	0.089
		(0.21)	(0.28)
CLERICAL	= 1, if the worker has a clerical job	0.192	0.175
		(0.39)	(0.38)
SERVICE	= 1, if worker has a service job	0.219	0.146
		(0.41)	(0.35)
CRFTFRMN	= 1, if worker has a craftsman or foreman job	0.068	0.128
		(0.25)	(0.33)
OPERTIVE	= 1, if worker has an operative job	0.132	0.126
		(0.34)	(0.33)
ENROLL	= 1, if the worker is currently enrolled	0.454	0.074
		(0.50)	(0.26)
UNMPRATE	= unemployment rate in the local labor market	2.836	2.893
		(0.81)	(0.89)
RELGWEEK	= 1, if the attends religious services every week	0.311	0.334
		(0.46)	(0.47)
PERIOD2	= 1, if the observation is from the year 1987		
Dependent Variables			
EMP	= 1, if the worker is currently employed	0.821	0.968
		(0.38)	(0.18)
HRWAGE	= the hourly wage rate of the worker	3.353	7.748
		(2.44)	(5.09)
Labor Force Sample Size		6,202	6,874

a Quantities in parentheses are standard deviations.

Appendix 2

Probit Maximum Likelihood Estimates of Employment Equation Coefficients.[a]

Variable	*1980*	*1987*	*1980-87 Pooled*
Constant	-0.4061**	-0.1707	-0.4571**
	(2.182)	(0.541)	(3.277)
YEARSCHL	0.0387**	0.0723**	0.0202*
	(2.515)	(3.235)	(1.838)
AFQT	0.0064**	0.0057**	0.0017**
	(6.396)	(2.520)	(2.154)
EXP	1.0812**	0.5167**	0.7827**
	(17.704)	(9.956)	(27.728)
EXPSQ	-0.1489**	-0.0272**	-0.0514**
	(8.987)	(4.621)	(16.420)
ENROLL	0.1092**	-0.2118	-0.4405**
	(2.165)	(1.368)	(10.469)
MARRIED	-0.1294*	0.1855**	-0.2212**
	(1.739)	(2.103)	(4.060)
NOTHEAST	-0.0066	-0.0863	0.0352
	(0.105)	(0.623)	(0.710)
NOTHCENT	0.0538	-0.3742**	0.0455
	(0.886)	(3.854)	(0.990)
WEST	0.0025	-0.2166*	0.0441
	(0.040)	(1.873)	(0.860)
URBAN	-0.0356	0.0721	0.0619
	(0.630)	(0.737)	(1.424)
WHITE	0.1773**	0.2520**	0.1793**
	(3.469)	(2.762)	(4.248)
MALE	0.1149**	0.1331*	0.1332**
	(2.648)	(1.661)	(3.869)
HLTHPROB	-0.0815	-0.2557	-0.1592
	(0.603)	(1.167)	(1.443)
UNMPRATE	-0.0964**	-0.2131**	-0.0949**
	(3.487)	(4.455)	(4.370)
PERIOD2	———	———	0.2425**
			(4.130)
Log likelihood function	-2250.237	-621.832	-3599.266
Chi squared(df)	1321.26 (14)	696.82 (14)	5673.76 (15)
Number of observations	6,202	6,874	11,958

a The number in the parenthesis is the absolute t-ratio.

** (*) Significant at 5 (10) percent level.

Appendix 3

Selectivity Bias Corrected Two-Stage Estimates of Wage Equation Coefficients

Variable	*1980*	*1987*	*1980-87 Pooled*
Constant	0.0148	-3.3077**	-3.4198**
	(0.036)	(4.534)	(7.468)
YEARSCHL	0.1354**	0.3385**	0.3245**
	(6.544)	(9.702)	(12.605)
AFQT	0.0042**	0.0202**	0.0103**
	(2.843)	(7.081)	(5.338)
EXP	0.9208**	0.5339**	0.3484**
	(5.219)	(3.781)	(3.528)
EXPSQ	-0.1077**	-0.0160	-0.0008
	(3.555)	(1.543)	(0.107)
TENURE	0.0498	0.1197**	0.0994**
	(1.324)	(4.627)	(4.459)
FULLTIME	0.1147*	-0.1283	0.0685
	(1.802)	(0.931)	(0.690)
MARRIED	0.2251**	0.5091**	0.4493**
	(2.596)	(4.358)	(4.860)
HLTHPROB	0.1824	-0.3226	0.0955
	(0.975)	(0.733)	(0.319)
NOTHEAST	0.0995	0.9741**	0.6360**
	(1.204)	(6.040)	(5.504)
NOTHCENT	0.1092	-0.4046**	-0.1299**
	(1.460)	(2.632)	(1.213)
WEST	0.4134**	0.5658**	0.6511**
	(5.048)	(3.449)	(5.541)
URBAN	0.3266**	0.9427**	0.7061**
	(4.508)	(6.383)	(6.786)
MALE	0.6116**	1.5572**	1.2016**
	(9.155)	(12.094)	(13.017)
WHITE	0.0012	0.3639**	0.2589**
	(0.016)	(2.508)	(2.442)
GOVT	-0.2027**	-0.1727	-0.1913
	(2.400)	(0.963)	(1.510)
UNION	0.7297**	0.8994**	0.8478**
	(10.076)	(6.408)	(8.145)
PLNTSIZE	0.6675**	0.8878**	0.8889**
	(6.811)	(5.568)	(7.197)
FIRMSIZE	0.1126*	0.3663**	0.2965**
	(1.699)	(2.944)	(3.207)
MANGPROF	0.1488	1.2577**	1.0425**
	(1.101)	(4.918)	(5.709)
SALES	-0.2183	-0.0226	-0.1872
	(1.591)	(0.080)	(0.919)
CLERICAL	-0.3646**	0.0292	-0.1711
	(3.476)	(0.113)	(0.984)
SERVICE	-0.4356**	-0.4394*	-0.4324**
	(4.620)	(1.747)	(2.599)
CRFTFRMN	0.4071**	1.4912**	1.1777**
	(3.396)	(5.965)	(6.557)
OPERTIVE	0.1441	0.1423	0.1794
	(1.424)	(0.568)	(1.055)
PERIOD2	———	———	1.8415**
			(13.675)
LAMBDA	1.7161**	3.8093**	1.1797**
	(4.280)	(3.991)	(3.893)
R^2	0.1906	0.2120	0.3275
Selected Sample size	5,094	6,655	9,218

a The number in the parenthesis is the absolute t-ratio. ** (*) Significant at 5 (10) percent level.

♦♦♦