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Enterprise Reform on the South African Labour Market**

by

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Abstract

This article examines the impact of public enterprise reform on employment, wages, and measures of productivity in South Africa. Most analyses of the process of enterprise reform have to date focussed mainly on the agency problem between managers and owners, changes in management organisation, and incentives. However, these studies have largely ignored the labour market. Accordingly, we use a conventional labour market model (Brown and Medoff 1988, Litchenberg and Siegel 1992, and Haskel and Szymanski 1993) to examine the effects on employment, wages, and measures of productivity when government-owned enterprises in South Africa were commercialised and regulatory reforms introduced. Using data from 1980-1996 and time series/cross sectional tests for changes in objectives and increased competition, three principal results emerge for the labour market. First, employment fell following commercialisation and deregulation. Second, both commercialisation and deregulation appear to be associated with increases, and not decreases, in wages per worker. Finally, commercialisation is linked to improved productivity, perhaps due to the efficiency effects of a commercial management culture within the enterprise. By contrast, deregulation is correlated with reduced productivity, perhaps due to adverse competition effects.

Key Words: public enterprise reform, South Africa, commercialisation, deregulation

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Introduction

Most theoretical and empirical work on public enterprise reform has treated the impact of this process on the labour market in a rudimentary manner. With some notable exceptions, for example, Haskel and Szymanski (1993), Haskel (1994), Winston (1993), and Winston 1998, the bulk of this literature has looked only at the impact of privatisation on labour, and has not attempted to focus on the effects of commercialisation and deregulation. Moreover, the main approaches in previous studies have been either cross-sectional (i.e. comparing the performance of private and public firms at the same point of time), like Boardman and Vining (1989), or alternatively, studies of privatisation of the ‘before-after’ variety that fail to control for factors other than privatisation, as in Bishop and Kay (1989). In general, cross-sectional studies cannot satisfactorily control for firm specific ‘fixed effects’, while ‘before-after’ studies cannot control for ‘period effects’ and other influences apart from privatisation. The only work that has improved on these shortcomings appears to be Haskel and Szymanski (1993). Using panel data on 14 UK firms, these researchers found that, after controlling for factors such as output demand, trade union influence and market power, the effects of privatisation and deregulation on the labour market were relatively easily identifiable. However, their model, although highly innovative, was tested by the Seemingly Unrelated Regressions (SUR) method with data for 1973-1988 period only. Following Zellner (1962), Griffiths *et al* (1993) and Greene (1993), estimating combined equations into a system by the SUR method on a small sample is either unreliable or may result in generating unknown effects on the regressors.

In this paper, we seek to remedy this problem by using a Time Series/Cross-sectional (TSCS) statistical approach on a sample of South African public enterprise firm level data for the period 1980-1996. This should produce more conclusive and reliable results

as suggested by several econometricians, like Greene (1997), Brown (1991), Griffiths *et al* (1993).

The paper itself is divided into five main parts. Section 2 provides the institutional background to public enterprise reform in contemporary South Africa. Section 3 attempts to model the effects of public enterprise reform on the South African labour market. The data used in the estimation exercises is described in section 4, whereas section 5 examines the empirical results obtained from the models. The paper ends with some brief concluding remarks in section 6.

Institutional Background

Since at least 1948 when the (then) white minority Afrikaner Nationalist Party came to power, successive governments acquired powerful regulatory functions to protect and promote the interests of poor white workers and farmers and to create Afrikaner capitalism at the expense of the rest of South African society. Different government administrations were able to use state corporations to produce goods and services, structure local markets, prices and employment, and encourage private capital accumulation by Afrikaner business interests. Throughout the period spanning the 1960s, 1970s and 1980s, government-owned corporations in South Africa continued to operate in a socioeconomic system that carefully protected the interests of both the white electorate and the dominant mining industry. By 1980, government-owned enterprises employed 34% of economically active whites and about 16% of other ethnic groups (Lazar 1994).

It has long been recognised by virtually all participants in South African policy debates that the South African economy is in urgent need of reform. Eckert and van Niekerk (1993) note that the first official proposal aimed at comprehensive economic reform, the 1987 *Economic Development Programme, 1978-1987* (later amended to form the 1991 *Revised Long-Term Strategy*), had its genesis in the then Prime Minister's Economic Advisory Council as far back as 1979. The essence of this document was a proposal to reduce the role of the public sector in the South African economy so as to "afford the private sector more opportunity to conduct business on a profit basis. It is hoped that in

the process the natural operation of market forces will bring about a healthy competitive economic structure that will, among other things, create more job opportunities” (Economic Advisory Council of the State President, 1991, p.12). Mohr (1994) also points to a parallel confidential official document with much the same message entitled *Ekonomiese Herstruktureering in Suid-Afrika*. Although the essence of this official policy stance was retained and set out in some detail in the 1993 *Normative Economic Model*, it is now clear that the impetus for economic reform under the previous minority National Party government had already evaporated. Qadir (1994, p.183) has described the stalling of reform initiatives as follows:

“The former white minority NP government came only belatedly to free market economies as this conflicted so markedly with the heavily state interventionist economic approach of apartheid. A key turning point was the publication in 1987 of the *White Paper on Privatization and Deregulation in the Republic of South Africa* and subsequent implementation efforts. The privatisation initiative soon stalled, however, when negotiations over the transition began in earnest after 1990. The new National party policy of deregulation and growth has been tempered latterly by electoral expediency, as nonwhite voters need to be won by some promise of redistribution.”

The historic announcement by the De Klerk administration on 2 February 1990 unbanning the African National Congress and other political organisations included a commitment to freeze any further economic restructive initiatives.

This is not to suggest that no economic reform had taken place. As far as privatisation is concerned, the first major policy reform began with the privatisation of the giant government-owned oil-from-coal corporation, SASOL Limited, in 1979. Subsequently, several other smaller government-owned enterprises and activities were privatised, but the privatisation of the iron and steel enterprise (ISCOR) at the end of 1989 using a traditional stock market flotation plus preferential issues of shares to management and workers, marked a change in the direction of public enterprise reform. Other major candidates for privatisation (including the electricity utility ESKOM, the Post Office, Telkom and the transport services Transnet) started the process via commercialisation in the late 1980s. For example, the South African Transport Services (SATS) was renamed Transnet and converted into a limited liability government corporation with several

operating divisions. Similarly, the Department of Posts and Telecommunications (DPT) was divided into three separate entities, including the telecommunications monopoly which was commercialised and renamed Telkom SA Limited. Commercialisation of these enterprises largely emanated from their inability to curb rising production costs. As a result, the government pursued the goal of commercialisation in order to separate enterprise activities and decision making from the traditional bureaucratic hierarchy of public administration, and to make the new companies more efficient and productive before their eventual privatisation.

In assessing South Africa's efforts aimed at public enterprise reform, it is important to note that while there is a broad consensus in the country on the need to internationalise the economy and modernise the bureaucratic apparatus of the state, there have been severe disagreements on the impact that these reforms could have on labour. Commercialisation, privatisation and deregulation remain deeply unpopular with organised labour and their political allies. While the government proceeds with commercialisation and the sale of some of its state corporations, the pace has slowed in many areas. Indeed, in many instances, privatisation efforts have been completely shelved.

An Empirical Model of Public Enterprise Reform

The theory of public enterprise reform indicates that one of the most important changes brought about by this process is the introduction of the profit motive into the decision making of the firm. Profit maximization has various consequences for the labour market. In particular, profit maximization can lead to a reduction in employment, wages and other perquisites (Fourcans and Vrceanu 1995).¹ Employment might decline for two main reasons. First, the public sector is thought to have an allocatively inefficient bias toward high output and low prices because it is politically obliged to favour consumers. Secondly, the public sector is thought to attach some weight to the welfare of its

1. The term 'wages' is used in this paper to refer to total salary costs divided by the number of workers. These costs include salaries only and exclude production and incentive bonuses, payments for overtime, employer's contribution, fringe benefits, commission and other allowances as well as lump sum payments, such as Christmas and leave bonuses.

employees.² Accordingly, if both of these effects disappear (because of commercialisation and privatisation), then employment will fall (Haskel and Sanchis 1996). Moreover, wages would also decrease because the reformed public enterprise or private sector firm is willing to concede less to the workforce than companies that are backed by the taxation power of a national government.³ By contrast, in South Africa the government is generally viewed to have a sympathetic bias toward workers and public sector unions are thought to be able to influence public enterprise policy and extract higher wage concessions. As far as productivity is concerned, commercialisation and privatisation are policies expected to raise productivity since commercially-minded private sector firms desire low wages and a 'right-sized' labour force to raise profits.

On the other hand, if commercialisation and privatisation initiatives are accompanied by the deregulation of markets (that is, government relaxing statutory entry barriers to encourage new competition), then wages would tend to fall as the surplus that reformed public enterprises and privatised firms share with unions becomes smaller (Haskel and Szymanski, 1993). Employment is also likely to be pushed downward as the reformed public enterprise loses its market share in a deregulated environment characterised by robust competition or even a threat of competition within a particular industry. With lower market power, employment falls as a firm moves closer to competitive conditions. As for productivity, deregulation is expected to make a firm more efficient in production. Accordingly, labour productivity, capital productivity and total factor productivity are likely to increase. However, the loss of market power due to increased competition is likely to have a negative effect on any excess profits a firm can make.

The main interest in this paper lies in the summation of the above effects of commercialisation and deregulation and their implications for employment, wages and

2. It may be argued here that weights assigned to various interest groups are determined by the importance of each interest group in getting political allies re-elected. In the private interest theory of economics, interest groups would normally comprise of political allies

3. By contrast, in a model that considers the effect of effort, Haskel and Sanchis (1996) argue that if effort rises with privatisation, then wages may rise too. The reason for this outcome is that firms are more likely to settle for higher wages if workers can put in more effort. Since reliable empirical evidence on effort is complicated by the fact that effort is unobservable, the effect of effort on privatisation and public enterprise reform will not be pursued in this study.

measures of productivity. In essence, economic theory predicts that employment and wages will fall and that productivity measures will rise, fall, or remain the same. This prediction is striking because under competitive labour market conditions we would expect wages and employment to move in opposite directions (Rima, 1981). Thus, it is interesting to see if similar conclusions on the effects of public enterprise reform can be drawn in the South African restructuring situation.⁴

Tests on Employment

The model proposed to test for employment effects is similar to a number of recent labour market models (see, for example, Brown and Medoff 1988, Haskel and Szymanski 1993, and Haskel and Sanchis 1995) that are common in the literature. To control for the effects of factors other than commercialisation and deregulation, a reduced form regression is estimated in which change in employment is the dependent variable. Similar specifications are made for wage and productivity equations in the next two sections. Specifically, the following regression equation is used for employment (N_{it}):

$$\ln N_{it} = a_0 + a_1 \text{CDU} + a_2 \text{DDU} + a_3 \ln \text{WPW}_{it} + a_4 \ln \text{PPW}_{it} + a_5 K_{it} + a_6 \text{Msha}_{it} + \varepsilon_{it} \quad (1)$$

where $\ln N_{it}$ is natural logarithm of total employment (number of workers N) per firm, CDU and DDU are dummy variables for commercialisation and deregulation respectively (CDU = 1 after date of commercialisation for each firm in the panel, otherwise CDU = 0; DDU = 1 after 1987, otherwise DDU = 0), $\ln \text{WPW}_{it}$ is the natural logarithm of wages per worker, $\ln \text{PPW}_{it}$ is the natural logarithm of profits per worker, $\ln K_{it}$ is the natural logarithm of capital expenditures or assets, MSHA_{it} is the *proxy* for competition that captures the market share of a firm within a particular industry and ε_{it} is the classical error term. The subscript ' i ' indexes a particular firm or number of firms and ' t ' indexes years.

4. In recent years, two divergent views on the effects of public enterprise reform have emerged inside South Africa. On the one hand, the government and the business sector have promoted these economic reforms with a view that they will lead to an appropriate development orientation (including the promotion of entrepreneurship) so that the newly privatised firms could have the means to invest in growth options (eg. Launching new products and services or pursuing acquisitions) thus leading to higher employment (Ministry for Public Enterprises 1995). On the other hand, union leaders have almost always vehemently opposed public enterprise reform fearing large-scale job losses and wage reductions.

The predicted employment effects in equation (1) rest on the standard neo-classical approach to the labour market. From a labour market perspective, commercialisation (CDU) is expected to reduce employment, since the profit - maximizing private sector 'cares' less about high output than the public sector. Deregulation (DDU) is negatively related to the demand for labour if the firm loses market power. In conventional economic theory, deregulation naturally obliges firms to perform more commercially. In a competitive labour market, the demand for labour is inversely related to the real wage (WPW). In the production process (at least in the short-run period and given a fixed capital-labour ratio and technology) the level of capital stock invested is positively associated with the demand for labour.

With respect to profitability, if the marginal productivity of a worker rises, then the demand for labour should also increase. The idea here is that progress in enterprise reform and privatisation, by increasing investors' confidence, will lead to an increase in capital stock and in labour productivity, which in turn strengthens the profitability of a firm. Therefore the profits per worker (PPW) variable is likely to be positively related to the demand for labour. Finally, the competition proxy (market share or MSHA) is positively related to the demand for labour since possessing a higher market share means that a reformed public enterprise is experiencing less competition. As a result, the enterprise is likely to hire more workers since theory indicates that, for political reasons, the public sector attaches a weight to the maximization of social welfare.

Tests on Wages

Turning to wages, the following equation is employed:

$$\text{Ln WPW}_{it} = b_0 + b_1\text{CDU} + b_2\text{DDU} + b_3\text{lnNit} + b_4\text{lnPPW}_{it} + b_5 \text{Kit} + b_6\text{MSHA}_{it} + \epsilon_{it} \quad (2)$$

where Ln WPW_{it} again denotes the natural logarithm of real wages per worker. Other variables are defined as in equation (1).

The above regression holds that in circumstances where commercialisation is accompanied by deregulation, wages are expected to decline since a fall in market power reduces the surplus over which unions can bargain. Market share, capital expenditure,

and real profits per worker terms are all expected to have a positive relationship with real wages per worker, while deregulation (DDU), commercialisation (CDU) and employment (N) are expected to be negatively related to real wages. With regard to commercialisation and deregulation, both are expected to have a negative effect on real wages per worker because of the hypothesis that political factors are likely to lead to higher-than-market wages within public enterprises. Accordingly, the removal or weakening of political factors would naturally lead to a fall in wages to market levels.

Not shown explicitly in equation (2) is the influence of union density on wages per worker. We recognise the strength that a union movement can have when it comes to negotiating wages for its members. Theoretically speaking, a positive relationship is expected between union density and the wage level because higher levels of unionization can raise the power of the union through effective strikes (Pencavel, 1984). Thus, higher union density would lead to higher wages for a given employment level.

Tests on Productivity

With regard to measures of productivity, the following equation is employed:

$$\text{Ln PROD}_{it} = d_0 + d_1\text{CDU} + d_2\text{DDU} + d_3\text{lnN}_{it} + d_4\text{lnWPW}_{it} + d_5\text{K}_{it} + d_6\text{Msha}_{it} + \varepsilon_{it} \quad (3)$$

where Ln PROD_{it} represents the natural logarithm for, alternatively, labour productivity, capital productivity and total factor productivity (TFP). The rest of the variables in equation (3) are again defined as in equation (1). However, equation (3) needs further exposition. In theory, productivity can be measured either for a single input (e.g. labour or capital) or for all inputs (total factor productivity, TFP). Generally speaking, labour productivity is important because it is closely related to per capita income or the 'standard of living' (Lichtenberg, 1992). It is also often used because data on inputs, such as capital and materials, that are required for the measurement of TFP are not always readily available. Capital productivity is also essential because it can be used as a gauge of capital intensity. In this regard the lower the capital ratio (say, compared to labour productivity ratio), the more capital intensive is the operation of the firm or industry. Capital productivity also indicates the efficiency by which capital is being utilised to generate return on assets or new wealth. Over time, and given constant or proportionately

changing prices of units of output and inputs, increasing trends theoretically imply an improvement in the utilization of capital and decreasing trends indicate a deterioration. However, if one is interested in measuring producer efficiency as is the case in this paper, then TFP is a perfect measurement index because it accounts for and gives proper weight to the services of all of the inputs (e.g labour, capital and materials) employed by the firm. In this study, we use labour productivity, capital productivity and TFP to measure productivity. For this purpose, we focus on the effects of commercialisation and deregulation on labour productivity (denoted by real profits per worker (PPW) and real sales per worker (SPW)), capital productivity (represented by real sales per assets (SPA) and real profits per assets (PPA)) and TFP (denoted by real sales per operating expenses (SPX)).

Data Definitions and Sources

In order to investigate the effects of public enterprise reform on the labour market, time series data were gathered from annual company accounts and other relevant sources for the period 1980 – 1996. These data provide the pre-and post public enterprise reform performance of nine companies that were government-owned in 1980 and have since undergone either a change in objectives (commercialisation) or privatisation or both. Although mostly large, these companies face diverse market circumstances, ranging from monopolies, such as the South African Post Office (SAPOS), to those facing stiffer competition, like Abakor (a government-owned meat processing company). While this list does not contain all the reformed public enterprises or privatised firms, it does include all the major public sector firms. Together these companies account for a substantial percentage of public sector employment in South Africa and are widely considered to be most visible and politically vital to the success of the reconstruction and development framework of the country.

Some basic features of the data need to be highlighted. Table A1 in Appendix A provides names, definitions and summary statistics on all variables in the data set for all the years covered in the survey.

To measure the effects of commercialisation in the panel of companies, we created a dummy variable (CDU), which employs 0 for the years before commercialisation and 1 thereafter. The use of dummies for commercialisation is considered necessary in this paper because direct measures of commercialisation are largely non-existent. Table A2 in Appendix A identifies the dates of the most significant re-orientations in objectives of the companies since 1980. Many of these changes correspond to the appointment of new management and substantial reorganizations of the business (e.g. changes in financial regimes and management personnel, tighter performance requirements, such as profit targets, and promoting a commercial management culture within the enterprise). These changes were widely interpreted as a shift to more commercial objectives. Others correspond to Acts of Parliament that were intended to facilitate entry into the industry and prepare the company for privatisation. For example, the first step toward a change in objectives in Alexkor (a diamond mining corporation) was taken in 1989 when, by Act of Parliament (Act No.46 of 1989), the old State Alluvial Diggings (SAD) corporation started diversifying its operation into other profit making ventures. All of the firms in the panel have experienced significant reorientation from social to profit objectives. Dates on re-orientation in objectives were provided by companies themselves and were confirmed by officials in the Ministry of Public Enterprises.

The deregulation dummy variable (DDU) is created to represent the enactment of the 1987 *White Paper on Privatization and Deregulation in the Republic of South Africa*. This document heralded the introduction of competition or the government's intention to extend competition over goods and services rendered by public enterprises. The dummy created for this variable takes the value of 0 before 1987 and 1 for the period thereafter. The variable WORKERS (N) refers to the number of employees employed by the company in one particular year. The figure provided refers to the number of paid employees including casual and seasonal workers as at the end of each financial year. The variable WAGES is the annual real wage bill for each company. This variable included salaries and wages only and excluded production and incentive bonuses, payments for overtime, employer's contribution, fringe benefits, commission and other allowances as well as lump sum payments, such as Christmas and leave bonuses. The variable was created by deflating the gross salaries and wages by the annual CPI for all

expenditure groups. WAGWOK (WPW) is the annual real wage bill per worker in the company. This variable was created by dividing the annual real wage bill of the company by the annual number of employees in the same company.

The variable PROFIT refers to the annual real operating profits of the company. This variable was created by dividing the annual operating profits by the annual inflation index. The variable PROWOK (PPW) refers to the annual real operating profits per worker. To create this variable I divided the annual real operating profits by the annual number of employees in the company. ASSETS refer to total fixed assets, investments and loans, long-term debtors and current assets (in real terms) as shown in the balance sheet of each company. CAPEX is the capital expenditures (in real terms) employed by each company. This variable was created by dividing annual capital expenditures for each company by the investment goods deflator. The variable SALES refers to the annual operating sales/revenue in real terms within a company while SALWOK (SPW) is the annual operating sales per worker. SALWOK was created by dividing the annual operating sales within a company by the annual total number of workers in the same company. The variable SAPEXP (SPX) refers to the annual operating sales per operating expenditures. This variable was created by dividing the annual real sales within a firm by the annual operating expenses. The variable SAPAS is the ratio of real sales or the value of production to the total value of total assets during the operating period. This variable was created to measure productivity of net assets.

The variable PROPAS is the ratio of real profits per unit of total assets. The variable was created to measure return on total assets or to indicate the efficiency by which assets are being utilised to generate profitability. Data on employment, wages and salaries, assets, profits, capital expenditure, operating sales/revenue and operating expenditures were taken from each company's annual financial reports and some were provided directly to me by officials within the corporations' human resource, finance and communication divisions. To measure the effect of competition, we included the variable MSHARE (MSH). This variable presents a *proxy* that captures the market penetration of each firm in its respective industry. For example, the total market share (market penetration) of ISCOR in local and international iron and steel manufacturing and mining was 73% for

the year 1985, 72% for 1987 and 73% for 1990. These figures are published in ISCOR' s annual reports. In this paper, the market share variable was adjusted by a factor reflecting the share of foreign companies operating in the South African market. This is because domestic market share is not a good measure of market power since some of the reformed public enterprises compete in international markets. For example, ISCOR' s market share was calculated as the company' s control (in percentage terms) of the local steel market minus the share of 8 other local steel manufacturers and the share of steel imports and substitute products such as aluminum, concrete, wood, plastic, glass and ceramics.

The variable UNION was created to represent the presence and density of union membership in each of the companies. The variable was created by dividing the annual total number of workers within the company who are members of a specific labour union or unions (i.e. unionised workers) by the annual total number of employees in the same company. Most figures on union density were collected from each of the companies. Other figures were provided by various labour organizations (e.g the Congress of South African Trade Unions, COSATU; the Federation of South African Labour Unions, FEDSAL; and the National Council of Trade Unions, NACTU) and also by Andrew Levy and Associates, a private sector labour relations research organization. We also conducted a number of informal interviews with managers in both public and private sectors and with leaders of various labour union movements and private labour research organizations to confirm that the reported figures are accurate.

In sum, most of the data were collected from records kept by each of the firms included in the survey. Other sources included the South African Ministry of Public Enterprises, which oversees the public sector companies and from the records kept by the Ministry of Labour, the Ministry of Posts and Telecommunications, the Ministry of Transport, the Ministry of Agriculture, the Ministry of Mineral and Energy Affairs and from the government's Statistical Services Agency (SSA). These records are compiled from reports submitted by individual firms, which are based upon employment and wage registers and are tabulated every 12 months. Table A4 in Appendix A gives a summary of the sources of data used in this paper.

Compared to data sets of other studies conducted on public enterprise reform (see, for example, Bhaskar and Khan 1995, Lichtenberg and Siegel 1992, and Haskel 1994), this sample has several advantages. First, the data cover public enterprises that have undergone a significant restructuring process and include small, medium and large establishments located all over South Africa. This allowed us to measure commercialisation activities more accurately, and hence the effects of enterprise reform on employment, wages, and productivity measures. Second, the dates which cover the introduction of commercialisation and deregulation allow sufficient time (over ten years in some instances) for the effects of commercialisation, privatisation and deregulation to be felt. Finally, the data is more reliable since it was collected from official records/documents kept by the companies themselves and various government and non-government organizations, departments and agencies.

Empirical Results

We test the predictive implications of the three models presented in the previous section using the TSCS statistical approach. Several justifications are offered for this methodology. First, examination of the panel data suggests that the variance is quite different in the nine time series, with visible variation in the scales of most variables. As a result, we provide for cross-sectional heteroscedasticity by allowing the variance to change across all firms. Secondly, in the panel data there are three firms (SAPOS, SABC, and Telkom) that are in the communications industry; two in the transportation industry (SARCC and Transnet) and two major suppliers (Eskom and Iscor) to all seven of the others. Accordingly, it is likely that macroeconomic factors (for example, the 1980-1981 and 1989-1992 recessions and the 1984-1992 economic sanctions imposed against South Africa) affected these companies to varying degrees. For the transportation industry, the fates of SARCC and Transnet are clearly tied to the economy as a whole and to factors that are specific to the two firms. Thus, it seems appropriate to allow correlation of the disturbances across firms (that is, cross-sectional correlation). Finally, the data are in a time-series setting. It is thus likely that serial correlation of the disturbance term across periods is present. In addition, the way seasonally adjusting variables used in this study (e.g CPI) are produced by the government's central statistical

agency (SSA) make autocorrelation a foreseeable outcome. Following Greene (1997), the most appropriate method to correct for cross-sectional heteroscedasticity, cross-sectional correlation and autocorrelation in panel data is the TSCS model. This model uses the 2-Step Generalised Least Squares (GLS) estimator to increase the estimation precision of the parameters.

Estimates of the effects of commercialisation and deregulation on employment, wages and measures of productivity are summarised in Table 1.⁵ The appropriate *t*-statistic for each variable is given in each case. The CDU results suggest that the process of commercialisation has decreased employment, profits per worker and sales per operating expenses. Meanwhile, the process has led to an increase in wages per worker, real sales, sales per worker, sales per assets and return on assets. On the other hand, the estimates on DDU show that increased competition caused by deregulation has decreased employment, real sales, real sales per worker, profits per worker, returns on assets and sales per operating expenses in the firms that have experienced regulatory reforms in South Africa. While these results are of particular interest and importance, findings for two of the measures of productivity (i.e. profits per worker and sales per operating expenses) are not statistically significant.

As far as wages are concerned, there are several reasons why wages per worker would rise with commercialisation and deregulation. First, commercialisation and deregulation may be accompanied by higher productivity on the part of the remaining workers (Haskel and Sanchis 1996).⁶ Second, wages per worker may rise to reflect a “catch-up” effect since public sector management wages often tend to lag behind those in the private sector. Thirdly, wages per worker may rise because reformed public enterprises are not

5. Estimates of the TSCS model for each of the dependent variables are shown in Tables B1 to B7 in Appendix respectively. In each Table, columns 1 and 2 show separately the estimated effects of CDU and DDU on employment, wages, real sales and productivity equations. This is because a cross-correlation check run on explanatory variables revealed that there was a strong, positive correlation between CDU and DDU. In addition, both CDU and DDU were found to have a high positive correlation with union density, thus indicating that commercialisation and deregulation were accompanied by the relative growth and strengthening of the union movements. Results of cross-correlation tests are given in Table A3 in Appendix A.

6. A related possibility is that employers in these enterprises may have hired highly valued workers who would command higher wages even if they were not employed in a regulated, unionised, lower competition

yet competitive, and for political reasons substantial rents remain to be shared. Fourth, it is possible that while labour unions are supposed to be weakened by public enterprise reform, there may be instances where these organizations are sufficiently powerful to extract higher wages for their members.

The reasons advanced above may require further elaboration. As for effort or labour productivity, it appears reasonable to expect firms to be prepared to settle for higher wages if workers put in more effort. For example, the addition of effort may explain why, controlling for other factors, wages rose following privatisation and deregulation in some UK firms (Haskel and Szymanski 1993, Haskel 1994). Less exhaustive evidence is available for South Africa regarding changes in labour productivity within the reformed public enterprises, but studies by Herbst (1994) and Baird (1995) indicate that these firms have recorded poor productivity growth in recent years. However, with regard to the question of unions, several studies, including Herbst (1994), de Wet (1987), Reekie (1993) and IMF (1992), point to the effectiveness of labour union militancy in South Africa in securing higher wages. As the Reserve Bank Annual Report (1992) has noted, labour unions in South Africa have been partially responsible for the fact that real wages within the government and private sectors have increased since the early 1980s despite the recessions, poor productivity growth and rapidly rising unemployment. This observation is not surprising since South Africa is already regarded as a high-wage economy. According to the IMF Report (1992), the country's wage bill at the central and general government levels, including public enterprises, has been extraordinarily high since the late 1970s. For example, by mid-1980s South Africa's wage bill already proportionately exceeded that of industrial and lower-middle income countries and only fell slightly below that of the upper-middle income group (IMF Report 1992, Tables 4 and 5).

The results on employment and wages per worker also provide interesting reading. They indicate that commercialisation had a small (12 percent) negative effect on employment and a large (19 percent) positive effect on wages per worker. However, they indicate that

industry (Peoples 1998). In this study no evidence was found to test or support this possibility because detailed individual data on the relevant worker characteristics did not exist.

deregulation had a large (25 percent) negative effect on employment and a small (11 percent) positive effect on wages per worker. The most plausible explanation for this outcome is that commercialisation, at least for the South African situation, is a process that has to accommodate various strands of opposition and interest groups. For example, current managers and other employees of public enterprises, fearing loss of their jobs and the lowering of their wages and salaries, have often lobbied the politicians against reforms. Since this opposition is generated within the public enterprises themselves, it seems plausible to argue that to overcome or at least reduce the efforts of the opposition at a time when commercialisation is implemented, retrenchments may be fewer while at the same time remaining workers are given promotions and higher salaries. From a theoretical perspective, higher wages and salaries for remaining workers can act as a compensation for the fall in employment and as a mechanism to release political pressure on the government. In stark contrast, when increased competition caused by deregulation is infused into the markets in which reformed public enterprises operate, huge job losses and decreased salaries are an inevitable outcome as these enterprises try to operate efficiently. In any case, economic theory holds that commercialisation is often a weaker kind of public enterprise reform whereas deregulation is a more effective policy because it exposes the firms to rigorous competition. Accordingly, firms are obliged to operate efficiently. In most cases considered in this study, commercialisation was found to have preceded deregulation.

With regard to the effects on measures of productivity, the regression estimates also highlight an interesting issue. With the exception of the effects on profits per worker and sales per operating expenses, the results indicate that commercialisation produces a strong, independent productivity effect while deregulation produces a strong, independent competition effect. Specifically, the results indicate that commercialisation and deregulation consistently work in opposite directions. These findings suggest an important conclusion: the privatisation dummy often used to net out the effects of enterprise reforms on labour and productivity is perhaps not necessarily a sufficiently precise economic variable because it incorporates two distinct economic effects which may negate each other. Thus econometric results associated with the privatisation dummy are likely to be relatively weak regarding the productivity and competition effects.

The finding that wages per worker is increased as a result of commercialisation and increased competition is striking, and does not support the notion that these policies reduce wages. This result holds for all firms in the panel even after controlling for the effects of the firms' **size**, productivity, initial wages and employment. However, the result is consistent with findings by other researchers, such as Bishop and Kay (1989), Hartley et al (1991), Parker and Hartley (1991), Bishop and Thompson (1994), Haskel (1994), Peoples (1998), that public enterprise reform tends to lead to wage increases. The difference between these results and the present study needs to be explained because, like these other studies, we also used firm level data. In the other studies, wage increases were found to be associated with improvements in labour productivity growth and the ability of the reformed enterprises to curtail union wage-raising activities. In contrast, our findings are not supportive of this relationship. Instead, our results seem to suggest that the greater the shift toward a private ownership structure, commercial objectives and competition, the stronger is the bargaining position of unions.

Table 1 Summary of Predicted and Assessed Effects of Public Enterprise Reform on Employment, Wages, Real Sales and Measures of Productivity

Variable	Effect	Predicted	TSCS Results	Estimated Coefficient
Commercialisation	Employment	Decrease	Decrease	-0.1242 (-2.379)
	Wages per worker	Decrease	Increase	0.1965 (8.240)
	Real sales	Increase	Increase	0.1360 (2.379)
	Profits per worker	Increase	Decrease	-0.1872 (-0.872)
	Sales per worker	Increase	Increase	0.1570 (2.568)
	Sales per assets	Increase	Increase	0.2233 (1.544)
	Profits per assets	Increase	Increase	0.1439 (2.313)
	Sales per expenses	Increase	Decrease	-0.2585 (-0.339)
Deregulation	Employment	Decrease	Decrease	-0.2523 (-5.539)
	Wages per worker	Decrease	Increase	0.1151 (5.422)
	Real sales	Increase	Decrease	-0.4299 (-1.822)
	Profits per worker	Decrease	Decrease	-0.2248 (-0.471)
	Sales per worker	Increase	Decrease	-0.1046 (-0.220)
	Sales per assets	Increase	Decrease	-0.1189 (-2.048)
	Profits per assets	Decrease	Increase	-0.1204

				(-2.097)
Sales per expenses	Increase	Decrease	-0.6534	(-1.195)

Note: *t*- statistics are in parentheses

The finding that public enterprise reform has not had a significant positive effect on some measures of productivity is largely inconsistent with those of researchers mentioned above. It seems that this difference may be due to the fact that productivity rates within industries in South Africa have not been impressive since the mid-1970s. As for employment, we find no evidence supporting the hypothesis in some of these studies that commercialisation would lead to job creation by either increasing employment in reformed enterprises or by increasing investors' confidence to undertake new projects in the private sector, thus leading to higher employment. Instead, findings in our study provide evidence for the notion that both commercialisation and deregulation reduce employment.

With regard to the effects of commercialisation and deregulation on real sales and returns on assets, the regression estimates seem to suggest that two opposing forces were at work. In particular, it is possible that inefficiencies caused by regulation may, on one hand, have raised costs within the public enterprises, but the insulation from competition created by regulation may, in turn, have raised the revenues of the firms, especially in industries that are inherently highly competitive. On the other hand, the regression estimates suggest that deregulation was effective in dissipating excess profits that firms earned under regulation. At first glance, these results, particularly those on employment and wages per worker, are theoretically plausible, but they may be misleading because comparing a whole panel before and after commercialisation and regulatory reforms fails to isolate the effects of these policies on each firm. Accordingly, the possibilities for misinterpretation of firm level effects exist.

One important caveat about the results presented thus far is that data used in this paper does not cover the change in technology of the firm. Litchenberg and Seigel (1992) find that failure to account for technological changes leads to underestimating productivity gains associated with enterprise reforms. They argue that the machinery and equipment to capital stock ratio could provide a *proxy* for the level of technology of the firm. This may imply that given the same level of capital stock, the firm that uses more equipment and machinery is more technologically advanced. Including this variable may also be viewed as an adjustment to account for the fact that, other things being equal, labour productivities will be higher in capital intensive firms. According to McGuckin and Nguyen (1994), this assumption is standard and does not necessarily weaken the quality of the results on the effects of public enterprise reform on productivity.

Summary and Conclusions

This paper has used a new data set to investigate the consequences for employment, wages and measures of productivity of commercialisation and deregulation in South Africa. We have found that these processes have had various significant effects on the labour market in South Africa. Both commercialisation and deregulation were found to have a large negative effect on employment, but a positive effect on wages per worker. Although inconsistent with *a priori* theoretical predictions, the latter results were found to be unsurprising in the South African situation. This is because South Africa is regarded as a high-wage economy at most levels of government, including the public enterprises, despite the fact that productivity rates and the country's international competitiveness have not been impressive.

On the effects of public enterprise reform on measures of productivity, the findings indicate a weak relationship between commercialisation and deregulation on one hand and some measures of productivity (e.g profits per worker and sales per operating expenses) on the other hand. These results suggest that increased competition and the quest for profits have not enhanced efficiency within the reformed public enterprises.

Among the factors that may have constrained productivity in reformed public enterprises in South Africa, at least three require special attention. First, there was evidence that most of the reformed public enterprises still owe their existence to market failure, and this being so, opening up a market to competition seems to have achieved little, or may even have proved counter-productive. For example, opening up a market in the telecommunications, broadcasting and atomic energy industries has thus far only attracted modest competition, and both commercialisation and deregulation may only have resulted in a monopoly position being more fully exploited. Second, it was pointed out earlier that the impact of commercialisation and increased competition might have been stifled, particularly in instances where public enterprises are still called upon to pursue non-commercial objectives (e.g. cross-subsidization of loss-making activities). The third factor that might have limited competition and the productivity of reformed enterprises is the absence of effective regulatory policies. In theory, regulation is an essential component of effective competition policy in order to deter large public and private sector firms from erecting strategic price and non-price barriers.

The general validity of the conclusions reached in this paper is subject to several caveats outlined earlier. Nevertheless, it is hoped that this work will act as an input for more generalised conclusions regarding the role of competition and the markets in the process of restructuring public enterprises currently underway in South Africa. Nevertheless, the results obtained in this study should be considered as suggestive, rather than conclusive. Several reasons for this have been discussed. First, data was used that does not cover all the commercialised firms in South Africa, although it does include the major public corporations that have undergone reforms. Second, no data was included for industry level performances in the analysis. Third, the analysis looks at total employment rather than treat management and general labourers separately. Undoubtedly, separating them would have shed more light on the impact of commercialisation and deregulation on wages and shifts in the skill distribution of workers within the firm. Fourth, the analysis of the effects of commercialisation and deregulation on employment does not take into consideration some dynamic components. In a practical sense, public enterprise reform of government-owned huge firms can create some incentive for investors to undertake new

projects in the private sector, leading to higher employment. Despite these shortcomings, it does seem that the results suggest that commercialisation and deregulation have various significant implications for the labour market. More important, it seems that further examination of this issue in South Africa must proceed with a more extensive data set and detailed models. It should also extend the data set in time to account for more than one commercialisation and deregulation wave and to include other firms and industries.

Appendix A

Table A1 Variable Definitions and Descriptive Statistics

Variable	Description	Mean	Std Dev	Max	Min	S.E
CDUM	= Commercialisation dummy					
DDUM	=Deregulation dummy					
WORKERS	=Number of workers in the firm	47192.1	59328.7	278,289	2147	59134.5
WAGEB	= Real wage bill in the company	1,904,957	1,809,414	7,687,836	4,266	1,893,491
WAGWOK	= Real wage bill per worker	51,770	22,701	103,577	16,756	22,685
PROFIT	= Real profit in the company	553,114	1,048,533	3,317,630	-990,909	104,510
PROWOK	= Real profit per worker	2,687	30,912	71,764	-199,881	30,811
CAPEX	= Capital expenditure of the firm	675,914	1,248,475	5,364,000	7,360	1,244,389
SALES	= Operating sales/revenue	6,549,722	7,255,339	24,066,608	22,259	7,231,589
SALWOK	= Operating sales per worker	128,910	106,672	436.546	8,833	106,326
SAPEXP	= Sales per expenditures	3.0109	2.9632	2.9453	2.9294	2.9588
SAPAS	= Sales per Assets	184.78	514.64	270.48	10.31	512.95
PROPAS	= Profits per Assets	21.179	61.353	45.039	1.106	61.152
MSHARE	= Market share of the company	0.722	0.214	1.00	0.25	0.213
UNION	= Union density in the company	0.139	0.1736	0.59	0.012	0.1731

Note: Figures for WAGES, ASSETS, PROFITS, SALES and OPERATING EXPENSES are denoted in million South African Rands (R' 000s).

Table A2 Panel of South African Public Enterprises and Dates of Public Enterprise Reform

Name of Company	Services Rendered	Date of Enterprise Reform	Act Under Which Company was Incorporated
ABAKOR Ltd	Abattoirs management	February 1987	Abattoir Industry Act no. 54 of 1986
AEC Limited	Atomic energy	September 1985	Atomic Energy Act of 1985
AIRPORTS Co.	Airports management	April 1993	Airports Company Act of 1993
ALEXKOR	Diamond mining	November 1992	Alexandra Bay Development Corp. Act No. 46 of 1989
AVENTURA	Hotels/holiday resorts	April 1993	Details unavailable
ESKOM	Electricity supply	March 1987	Eskom Act No. 40 of 1987
ISCOR	Steel products	November 1989	Conversion of Iscor Ltd Act No. 59 of 1989 (<i>privatised</i>)
SAFCOL	Forestry management	April 1993	Management of State Forests Act No. 128 of 1992
SAPOS	Postal Services	October 1991	Post Office Amendment Act. No. 85 of 1991
SABC	Broadcasting	November 1994	Independent Broadcasting Authority Act of 1993
SARCC	Rail Commuter Services	January 1993	South African Transport Services Act No. 9 of 1989
TELKOM	Telecommunications	October 1991	Post Office Amendment Act No. 85 of 1991
TRANSNET	Transport businesses*	April 1990	South African Transport Services Act No. 9 of 1989

* Includes the South African Airways, liquid petroleum pipeline network, luxury passenger coach services, general cargo, tanker and refrigerated transport by road, container shipment and consignment distribution businesses, transportation of freight, containers and passengers by rail as well as related businesses and property.

Table A3 Cross-Correlations for Selected Explanatory Variables

	CDU	DDU	PROF	PROFW	WAGB	WAGW	SALE	SALW	ASSET	WORK	UNION	MSH
CDU	1.00	0.70	-0.030	-0.038	0.048	0.295	0.039	0.139	0.216	-0.13	0.77	-0.05
DDU		1.00	-0.064	-0.103	0.050	0.297	0.004	0.155	0.132	-0.11	0.67	-0.27
PROF			1.00	0.69	0.637	-0.290	0.770	0.427	0.321	0.65	-0.10	0.26
PROFW				1.00	0.286	-0.210	0.448	0.469	0.367	0.23	-0.14	0.30
WAGE					1.00	-0.08	0.848	0.196	0.236	0.90	-0.10	0.05
WAGW						1.00	-0.272	0.120	-0.028	-0.29	0.29	-0.03
SALE							1.00	0.53	0.51	0.81	-0.05	0.25
SALW								1.00	0.679	0.77	0.11	0.31
ASSET									1.00	0.05	0.12	0.21
WORK										1.00	-0.23	0.076
UNION											1.00	-0.01
MSH												1.00

Table A4 Data Sources

Variable Name	Variable Description	Data Sources
CDUM	Commercialisation dummy	Company's Annual Reports (1980-1996) and South Africa's Ministry for Public Enterprises
DDUM	Deregulation dummy	The White Paper on Privatisation and Deregulation in the Republic of South Africa (RSA 1987)
WORKERS	Number of workers in the firm	Company's Annual Reports (1980-1996) and Figures provided by the company's Human Resources department
WAGEB	Real wage bill in the company	Company's Annual Reports (1980-1996) and Figures provided by the company's Corporate Finance department
WAGWOK	Real wage bill per worker	Calculated from above Reports/Figures provided
PROFIT	Real profit in the company	Company's Annual Reports/Financial Statements (1980-1996)
PROWOK	Real profit per worker	Calculated from above Reports/Statements
CAPEX	Capital expenditure of firm	Company's Annual Reports (1980-1996) and Figures provided by the Company's Corporate Finance department
SALES	Operating sales/revenue	Company's Annual Reports/Financial Statements (1980-1996)
SALWOK	Operating sales per worker	Calculated from above Reports/Statements
SAPEXP	Sales per operating expenses	Calculated from Annual Reports/Financial Statements (1980-1996)
MSHARE	Market share of the company	Company's Communication and Corporate Services
UNION	Union density in the company	Andrew Levy Associates; Ministry of Labor; Corporate Industrial department and various labour organisations
OUNDX	Output price index for industry	South African Statistics 1997: Central Statistical Services

Appendix B

Table B1 Summary of 2 step GLS Estimates of the Effects of Public Enterprise Commercialisation, Privatisation and Deregulation on Employment (N)

Model: Panelwise Heteroscedastic, Cross-Sectionally Correlated, and Within Panel Autocorrelated

Regressor	Regressor Definition	Dependent Variable is Employment (Log N_{it})	
		(1)	(2)
C	Constant	10.786 (12.281)	11.179 (13.769)
CDU	Commercialisation	-0.1242 (-2.379)**	..... .....
DDU	Deregulation	..... .....	-0.2523 (-5.539)***
WPW	Wages per Worker	-0.3357 (-4.932)	-0.3769 (-6.237)***
PPW	Profit per Worker	0.2002 (3.926)***	0.2826 (5.083)***
MSHA	Market Share	-0.1155 (-0.918)	-0.1700 (-1.289)
K	Capital Expenditures	0.1733 (12.346)***	0.1818 (11.900)***
Log-Likelihood Function		63.38	45.57
Likelihood Ratio Statistic		266.06	223.62
Number of Observations		153	153

Note: *t*-statistics are in parentheses

* Significant at the 0.10 level, two-tailed test

** Significant at the 0.05 level, two-tailed test

*** Significant at the 0.01 level, two-tailed test

Table B2 Summary of 2 Step GLS Estimates of the Effects of Public Enterprise Commercialisation, Privatisation and Deregulation on Wages per Worker (WPW)

Model: Panelwise Heteroscedastic, Cross-Sectionally Correlated, and Within Panel Autocorrelated

Regressor	Regressor Definition	Dependent Variable is Wage per Worker (Log WPW _{it})	
		(1)	(2)
C	Constant	13.031 (25.547)	
CDU	Commercialisation	0.1965 (8.240)***	..... .....
DDU	Deregulation	..... .....	0.1151 (5.422)***
N	Employment	-0.1715 (-8.801)***	-0.1919 (-10.809)***
PPW	Profit per Worker	0.3539 (0.943)	-0.1033 (-1.273)
MSHA	Market Share	0.1131 (0.185)	-0.3786 (-0.484)
K	Capital Expenditures	0.2906 (3.030)***	0.1775 (1.665)**
Log-Likelihood Function		79.57	111.47
Likelihood Ratio Statistic		114.11	187.83
Number of Observations		153	153

Note: *t*-statistics are in parentheses

* Significant at the 0.10 level, two-tailed test

** Significant at the 0.05 level, two-tailed test

*** Significant at the 0.01 level, two-tailed test

Table B3 Summary of 2 Step GLS Estimates of the Effects of Public Enterprise Commercialisation/Privatisation and Deregulation on Profits per Worker (PPW)

Model: Panelwise Heteroscedastic, Cross-Sectionally Correlated, and Within Panel Autocorrelated

Regressor	Regressor Definition	Dependent Variable is Profit per Worker (Log PPW _{it})	
		(1)	(2)
C	Constant	-11.670 (-2.306)	-14.909 (-1.887)
CDU	Commercialisation	-0.1872 (-0.872)	..... .....
DDU	Deregulation	..... .....	0.2248 (-0.4710)
N	Employment	-0.5089 (-3.198)***	-0.4021 (-2.193)**
WPW	Wages per Worker	0.3491 (0.930)	0.2736 (1.483)
MSHA	Market Share	0.4083 (0.938)	0.255 (0.581)
K	Capital Expenditures	0.1215 (2.439)**	0.635 (1.826)*
Log-Likelihood Function		88.81	86.04
Likelihood Ratio Statistic		152.14	144.31
Number of Observations		153	153

Note: *t*-statistics are in parentheses
 * Significant at the 0.10 level, two-tailed test
 ** Significant at the 0.05 level, two-tailed test
 *** Significant at the 0.01 level, two-tailed test

Table B4 Summary of 2 Step GLS Estimates of the Effects of Public Enterprise Commercialisation/Privatisation and Deregulation on Sales per Worker (SPW)

Model: Panelwise Heteroscedastic, Cross-Sectionally Correlated, and Within Panel Autocorrelated

Regressor	Regressor Definition	Dependent Variable is Sales per Worker (Log SPW _{it})	
		(1)	(2)
C	Constant	12.134 (0.897)	8.147 (0.061)
CDU	Commercialisation	0.1570 (2.568)***	..... .....
DDU	Deregulation	..... .....	-01046 (-0.220)
N	Employment	-0.4155 (-9.558)***	-0.3934 (-8.716)***
WPW	Wages per Worker	0.3130 (0.3171)	0.1524 (1.654)*
MSHA	Market Share	0.1848 (0.456)	0.1877 (0.533)
K	Capital Expenditures	0.2937 (2.892)***	0.3024 (2.755)***
Log-Likelihood Function		16.18	18.73
Likelihood Ratio Statistic		159.74	169.51
Number of Observations		153	153

Note: *t*-statistics are in parentheses
 * Significant at the 0.10 level, two-tailed test
 ** Significant at the 0.05 level, two-tailed test
 *** Significant at the 0.01 level, two-tailed test

Table B5 Summary of 2 Step GLS Estimates of the Effects of Public Enterprise Commercialisation/Privatisation and Deregulation on Sales per Assets (SPA)

Model: Panelwise Heteroscedastic, Cross-Sectionally Correlated, and Within Panel Autocorrelated

Regressor	Regressor Definition	Dependent Variable is Profit per Worker (Log SPA _{it})	
		(1)	(2)
C	Constant	14.58 (1.885)	-23.40 (-2.579)
CDU	Commercialisation	0.2233 (1.544)**	..... .....
DDU	Deregulation	..... .....	0.1189 (-2.048)*
N	Employment	0.1117 (4.371)**	0.1934 (2.876)**
WPW	Wages per Worker	0.884 (0.247)	0.1774 (1.029)
MSHA	Market Share	0.1370 (0.032)	0.2736 (0.873)
K	Capital Expenditures	0.3885 (4.259)***	0.3159 (3.495)***
Log-Likelihood Function		-654.54	-680.47
Likelihood Ratio Statistic		709.16	651.18
Number of Observations		153	153

Note: *t*-statistics are in parentheses
 * Significant at the 0.10 level, two-tailed test
 ** Significant at the 0.05 level, two-tailed test
 *** Significant at the 0.01 level, two-tailed test

Table B7 Summary of 2 Step GLS Estimates of the Effects of Public Enterprise Commercialisation, Privatisation and Deregulation on Sales per Operating Expenses (SPX)

Model: Panelwise Heteroscedastic, Cross-Sectionally Correlated, and Within Panel Autocorrelated

Regressor	Regressor Definition	Dependent Variable is Profit per Worker (Log SPX _{it})	
		(1)	(2)
C	Constant	3.9107 (5.110)	4.466 (5.904)
CDU	Commercialisation	-0.2585 (-0.339)	..... .....
DDU	Deregulation	..... .....	-0.6534 (-1.195)
N	Employment	-0.5563 (-0.585)	-0.1251 (-0.770)
WPW	Wages per Worker	-0.5002 (-6.612)***	-0.5566 (-7.535)***
MSHA	Market Share	0.1355 (0.555)	0.3041 (1.453)
K	Capital Expenditures	0.9399 (4.426)***	0.6206 (3.787)***
Log-Likelihood Function		12.10	6.40
Likelihood Ratio Statistic		116.55	89.27
Number of Observations		153	153

Note: *t*-statistics are in parentheses
 * Significant at the 0.10 level, two-tailed test
 ** Significant at the 0.05 level, two-tailed test
 *** Significant at the 0.01 level, two-tailed test

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