TITLE: THE DETERMINANTS OF CHIEF EXECUTIVE COMPENSATION IN TRANSITIONAL ECONOMIES: EVIDENCE FROM BULGARIA

AUTHOR: DEREK C. JONES, Hamilton College
         and TAKAO KATO, Bard College

THE NATIONAL COUNCIL
FOR SOVIET AND EAST EUROPEAN RESEARCH

TITLE VIII PROGRAM

1755 Massachusetts Avenue, N.W.
Washington, D.C. 20036
PROJECT INFORMATION:

CONTRACTOR: Hamilton College

PRINCIPAL INVESTIGATOR: Derek C. Jones

COUNCIL CONTRACT NUMBER: 808-03

DATE: February 28, 1995

COPYRIGHT INFORMATION

Individual researchers retain the copyright on work products derived from research funded by Council Contract. The Council and the U.S. Government have the right to duplicate written reports and other materials submitted under Council Contract and to distribute such copies within the Council and U.S. Government for their own use, and to draw upon such reports and materials for their own studies; but the Council and U.S. Government do not have the right to distribute, or make such reports and materials available, outside the Council or U.S. Government without the written consent of the authors, except as may be required under the provisions of the Freedom of Information Act 5 U.S.C. 552, or other applicable law.

1 The work leading to this report was supported in part by contract funds provided by the National Council for Soviet and East European Research, made available by the U. S. Department of State under Title VIII (the Soviet-Eastern European Research and Training Act of 1983, as amended). The analysis and interpretations contained in the report are those of the author(s).
CONTENTS

Abstract ........................................................................................................... 1

Introduction ..................................................................................................... 2

Management under Communism and During Early Transition:
   Conceptual Framework and New Survey Data ............................................. 3

Determinants of Executive Compensation ...................................................... 5

Summary and Implications .............................................................................. 9

References ...................................................................................................... 11

Tables ............................................................................................................. 13
THE DETERMINANTS OF CHIEF EXECUTIVE COMPENSATION IN TRANSITIONAL ECONOMIES: EVIDENCE FROM BULGARIA

Derek C. Jones and Takao Kato

ABSTRACT

Using a new probabilistic panel survey of Bulgarian firms with matching information for chief executives, we present the first econometric evidence on the determinants of chief executive compensation in transitional economies. In our fixed effects model estimates, we find consistently that chief executive compensation is positively related to size (measured by assets, sales and employment) and productivity. The estimated pay elasticities of assets and sales of around 0.3 are comparable to what has been found for firms in advanced market economies. In general we do not find significant relationship of pay to profitability whereas we find some evidence on positive pay-profitability relationship for a small fraction of firms that have been privatized. Moreover, for these privatized firms we find some evidence for a stronger relationship of pay to productivity and a weaker relationship of pay to size.

Derek C. Jones is Professor of Economics, Hamilton College, Clinton, N.Y 13323. Phone: 315-859-4450. Fax: 315-859-4632. Internet: DJONES@HAMILTON.EDU. Takao Kato is Resident Scholar at the Jerome Levy Economics Institute, Bard College, Blithewood, Annadale-on-Hudson, NY 12504. Phone: 914-758-7716 Fax: 914-758-1149. Internet: KATO@CENTER.COLGATE.EDU. He is also Associate Professor of Economics at Colgate University, Hamilton, NY 13346. Phone: 315-824-7562 Fax: 315-824-7726.

Jones acknowledges support from NSF 9010591 and Jones and Kato acknowledge support from the National Council for Soviet and East European Research. Kato also acknowledges support from the Jerome Levy Economics Institute. Brandon Weber provided excellent research assistance.
THE DETERMINANTS OF CHIEF EXECUTIVE COMPENSATION IN TRANSITIONAL ECONOMIES: EVIDENCE FROM BULGARIA

I. Introduction

The crucial importance of diverse issues concerning the managerial function in Soviet Type Economies (STEs) has long been recognized. Researchers have investigated diverse topics including appropriate reward systems for managers (e.g., Granick, 1954; Berliner, 1957) with special emphasis on the role of incentive systems for managers (e.g. Bonin, 1976; Weitzman, 1976). Equally the vital contribution of the managerial labor market to the success of overall reform during transition has been widely noted (e.g. Aghion et al. 1994; Roland and Sekkat, 1992). Unfortunately to date factual knowledge, both of the managerial labor market during planning and during early transition often has been scant --for example note the need to derive information on managers during communism from Russian emigres, e.g. Linz, (1988). The need to improve our limited understanding of what is actually happening in the managerial labor market during early transition in the economies of the former USSR and Eastern and Central Europe is also clearly evident in the literature (e.g. Pinto et al. 1993). It is against this background that the aims of this paper can be understood.

By drawing on a new survey, we respond to the weaknesses of the available data and report the first econometric evidence on the determinants of executive compensation for an economy during the final days of communism and the early stages of transition.¹

We continue in the next section by briefly reviewing some of the key issues that have appeared in the literature concerning management in communist countries and economies in transition. Next we turn to a new panel survey of firms that contains most unusual data from a large and new probability sample of Bulgarian firms with corresponding data at the chief executive level. We use these data to estimate fixed effects models in order to examine several hypotheses on the determinants of chief executive pay. Our preliminary estimates for the early stages of transition are most interesting. We find consistently that chief executive compensation is positively related to size (measured by assets, sales and employment) and productivity. The estimated pay elasticities of assets and sales of around 0.3 are comparable to what has been found for firms in advanced market economies. On the other hand, in general, we do not find a significant relationship of pay to profitability whereas we find some evidence of a positive pay-profitability relationship for a small fraction of firms that have

¹In another paper (Jones and Kato, 1994) we draw on a separate, smaller survey to present an improved picture of aspects of the Bulgarian managerial labor market.
been privatized. Moreover, for these privatized firms we find some evidence for a stronger relationship of pay to productivity and a weaker relationship of pay to size.

II. Management Under Communism and During Early Transition: Conceptual Framework and New Survey Data

The managerial labor market in a STE was believed to have a number of features. Top managers of "firms" were posited to have limited autonomy or scope for discretionary power (Linz, 1988). Reflecting the dominance of state-owned firms, the government acted as a monopsonist in the managerial labor market, with managers appointed by the communist party (or its agents, such as ministries). Frequently managers had little experience in that sector. Managerial reward systems under communism were distinguished by several attributes. Pay was mainly a base wage, with limited variation with respect to success indicators such as plan fulfillment. Consistent with egalitarian values, the pay of top managers was a low multiple of the average wage. Indeed not only was the chief executive pay affected by the phenomenon of wage levelling, but in many industries in the past chief executives were not even amongst the highest paid.

Theorists have pointed out how these arrangements would be expected to result in acute incentive and motivational problems for managers (e.g. Bonin, 1976; Weitzman, 1976). Partly because of asymmetries in information between managers and planners, a "ratchet effect" would emerge with extensive managerial slack (e.g. Ickes and Samuelson, 1987; Litwack, 1991). In turn, several systemic inefficiencies were predicted including diverse pathologies of production (e.g. Putterman, 1990).

At the same time, this portrayal of the conventional wisdom of the way things were in the managerial labor market under communism is typically based on limited evidence, often of a case study or anecdotal nature. This was the case for example with studies including Granick (1954) and Berliner (1957), and the studies of Russian emigres (e.g. Linz, 1988). Many have noted the crucial importance of new payment systems for managers in order to facilitate successful overall reform during early transition (e.g. Aghion et al., 1994). For instance, more market-oriented managerial behavior will be encouraged when executive compensation is structured so as to provide pecuniary incentives for managers to pursue profitability. In the context of early transition, downsizing of overstaffed state owned firms and productivity increases appear to be key ingredients of successful reform. Arguably such adjustments will be facilitated when executive compensation is structured so as to reward managers for rational downsizing and productivity increases.

At the same time, it is recognized that reform of executive contracts is only one ingredient of change. In order to produce well motivated management who will engage in
intelligent restructuring other complementary changes are needed. These measures include policies to change enterprise ownership (privatization) and the context within which firms operate (underline macro stabilization, new competition policies, and reform of the banking and taxation system). Equally recent empirical studies have pointed to the potentially important role of differences in management behavior in accounting for at least some of the differences in firm adjustment during early transition (e.g. Pinto et al 1993). Arguably such differences in management quality are linked with differences in the structure of executive compensation.

At the same time to date very little evidence has been furnished on what is actually happening in the managerial labor market during transition. Knowledge of the ways things are thought to be changing in practice during early transition is also typically based on limited evidence, often of a case study nature e.g. the studies by Lawrence and Vlachoutsicos (1990). The need to improve knowledge reflects not only recognition of the crucial role that institutions play in shaping development paths, but also the likelihood that extensive institutional inertia, will characterize transition in former communist countries (North, 1992). If the "conventional wisdom" characterization of payment systems for top managers in the past is in fact accurate, and if there is substantial institutional inertia, then this suggests that serious inefficiencies may well persist in managerial labor markets during transition, even as other reforms towards a market economy are introduced.

It is against this backdrop of limited data that the idea of a survey of business executives was conceived. The Bulgarian Management Survey (BMS) collected survey data from the chief executive officers in the 490 Bulgarian firms. A wide variety of questions were asked including information about chief executives—e.g. pay, method and terms of appointment—and the form of enterprise ownership. The population was defined as all state-owned (in 1989) Bulgarian manufacturing organizations (SOE's) that operated on a for profit basis and had more than 80 employees in 1992. The sampling design for enterprises operated at two levels. First, five groupings of the 320 municipal districts in Bulgaria were selected on the bases of geographic and urban variability, reproducing aggregate country-wide industry distributions, and minimizing data collection costs (Sofia, Pernik, Pleven, Burgas and Plovdiv). Second, within each of the five regions, population enumeration lists of SOE's were compiled by the Central Statistical Bureau. The number of sampled firms per region was set to reproduce the population proportions of firms per region. The five regions contained a population of 727 SOE's. Within each region, within major industry categories, firms were ordered by size and the approximate two-thirds largest were selected up to the desired sample size of about 500. Thus the sample contains 69% of the population of firms, but selected to reproduce population distributions by region and industry. In terms of
employment, the sample SOE's contain about 95% of all SOE employees in the five regions. Data for executives are for all executives in the same sample of firms.

III. Determinants of Executive Compensation

To explore the determinants of executive compensation in STEs in transition, we adopt the empirical method typically used in studies of top managers of western firms, to the different circumstances of firms in transition. Specifically, we consider the following general chief executive compensation equation:

\[ \text{PAY}_t = F(\text{SIZE}_t, \text{PERFORMANCE}_t, \text{ALTERNATIVE}_t, Z_t) \]

where \( \text{PAY}_t \) = chief executive pay of firm i in year t; \( \text{SIZE}_t \) = size of firm i in year t; \( \text{PERFORMANCE}_t \) = standard performance measures such as stock market returns and various accounting profitability measures of firm i in year t; \( \text{ALTERNATIVE}_t \) = a vector of other firm performance measures that may be relevant to STEs; and \( Z_t \) = a vector of firm specific effects. SIZE and PERFORMANCE are standard variables that have been included in prior empirical studies of executive compensation in the U.S., the U.K., Japan and other advanced market economies.\(^2\) PERFORMANCE is measured either by stock market returns or by various accounting measures such as ROA (Return On Assets), and is almost always included as a possible determinant of executive compensation in the literature. This reflects the fact that the application of the principal-agent theory to the design of executive compensation contracts in general predicts a positive correlation between managerial pay and some observable measures of the well-being of shareholders. Most studies do find a significant positive correlation between pay and performance. They also find that the estimated sensitivity of pay to stock market returns is usually lower than the estimated sensitivity of pay to accounting measures. For example, Rosen (1990) in reviewing various studies finds that the effects on log of pay of the rate of return to shareholders are in the 0.10 - 0.15 range, whereas the estimated sensitivity of pay to accounting measures are in the 1.0 - 1.2 range. For our study, only accounting profitability measures such as ROAs are used since stock market measures are irrelevant to STEs in transition like Bulgaria.

SIZE, measured either by total assets or by sales, is also often considered in the literature. Typically this reflects the fact that the executive compensation literature began as a

result of the early managerialist debates over the firm objective (sales versus profits). Most studies find significant positive correlations between size and pay (again, Rosen, 1990 in summarizing findings on the estimated elasticities of pay with respect to scale finds a typical value of about 0.25.) SIZE may be particularly relevant to STEs. Under communism, being a chief executive of a larger firm arguably means more political power, and thus an improved ability to obtain higher pay from the state.

In an economic environment where there has been little privatization of large firms (Jones and Rock, 1994), and where capital markets are embryonic, alternative firm performance measures may be relevant. For instance, in the face of transition and eventual privatization, increasing labor productivity (via labor shedding and/or increased work intensity) may be a prime goal of the firm and their chief executives.

\[ Z_i \text{ is a vector of all time invariant firm specific factors that may affect chief executive pay (for instance, managerial style/corporate strategy and chief executive's innate ability).} \]

We estimate various specifications of Eq. (1) by using what is perhaps the first probability data base that includes individual data for some characteristics of chief executives and matching information at the firm level during the early years of transition (1989 through 1991). The data base was created by merging data from two new surveys: (i) the aforementioned BMS; and (ii) the Bulgarian Economic Survey (BES). The BES comprises mainly economic data from the firms that participated in the BMS.

We begin with the simplest specification:

\[ \ln(PAY_{it}) = \alpha + \beta \ln(SIZE_{it}) + \gamma \text{ROA}_{it} + Z_i \eta_i + \epsilon_{it} \]  

where we assume \( \epsilon_{it} \sim NID(0, \sigma^2) \). As summarized in Table 1 (for Tables see pp. 13-15), PAY is annual chief executive compensation in thousands of 1989 Leva. During 1989, the average chief executive earned a little over 8 thousand leva whereas during 1991 he/she earned less than 7 thousand in 1989 Leva. The decline in real income for chief executive over these three years is caused by a sharp increase in the Consumer Price Index from 100 in 1989 to 542.7 in 1991.\(^4\) Our enterprise data allow us to use three alternative size measures: (i) ASSET (the total assets in thousands of 1989 Leva); (ii) SALES (income from sales in thousands of 1989 Leva); and (iii) EMPLOY (number of workers). Employment is not often used in the literature yet it might be a very relevant size measure for STEs for the reason

\(^3\)All chief executives in our sample have been chief executives at the same firm from 1989 through 1991.

\(^4\)Data series for countries in transition have well-known problems and estimates of key series such as the CPI often differ. The deflators we use are taken from UNICEF and PLANECON (June 1994).
discussed above. The political power of chief executive may be positively correlated with the number of his workers. The determination of chief executive pay may be highly political, especially for those state-controlled firms. If so, employment may be a meaningful size measure. For this reason, we consider employment as an additional size measure. Table 1 shows that our sample of firms are quite large (for instance, the average firm employed almost 900 workers in 1989).

For PERFORMANCE, as mentioned above, we are not faced with the standard issue of stock market versus accounting measure simply because the stock market measures are irrelevant to the Bulgarian economy for the period under consideration. We use a standard accounting measure of profitability, ROA (Return On Assets), defined as after tax profit divided by total assets. As shown in Table 1, ROA was 0.8 in 1989 and 0.6 in 1991, unusually high compared to ROAs of firms in advanced market economies, presumably in large part reflecting differences in accounting practices between STEs and advanced market economies.

Data on Zt are typically unavailable. This is the case for our data. The OLS estimates of Eq. (2) omitting Zt are obviously subject to omitted variable bias. A standard practice in the literature to account for this problem is to extend single-year cross section data to panel data and estimate fixed effect models. A simple version of this practice is to collect the data for period t+1 and difference out Zt. That is,

\[
\ln(PAY_{t+1}) = \alpha + \beta \ln(SIZE_{t+1}) + \gamma \text{ROA}_{t+1} + Z_t \eta' + u_{t+1}
\]

\[
\ln(PAY_{t+1}) - \ln(PAY_t) = \beta (\ln(SIZE_{t+1}) - \ln(SIZE_t))
\]

\[
+ \gamma (\text{ROA}_{t+1} - \text{ROA}_t) + (u_{t+1} - u_t)
\]

\[
\Delta \ln(PAY_t) = \beta \Delta \ln(SIZE_t) + \gamma \Delta \text{ROA}_t + \epsilon_t
\]

Our OLS estimates of Eq. (5), which are now free from omitted variable bias, are reported in Table 2.

Specification (i) in Table 2 reports estimates of \(\beta\) and \(\gamma\) when ASSET is used as a size measure; columns (ii) and (iii) are for sales and employment respectively. In the first specification, the estimate of \(\beta\) is positive and significant at the 1% level whereas the

---

5 In addition, for reasons such as the reliability of asset valuation during transition, employment measure may be subject to less measurement error.

6 Following the literature for western firms, we also considered profit margin defined as after tax profit divided by SALES. In general we find similar but less significant results to those reported in the paper. All unreported results are available from the authors upon request.
estimate of $\gamma$ is not significantly different from zero even at the 10% level. Moreover, the estimated size elasticity of 0.27 is similar to those obtained elsewhere (Rosen, 1990: 42). Specifications (ii) and (iii) of the same Table show that the positive and significant relationship of pay to size is obtained regardless of the choice of the size measure. The estimated elasticity of pay with respect to employment (column (iii)) is substantially greater than those derived from the other two standard size measures, supporting our prior that employment may be a very relevant size measure for STEs.

For all three specifications, the estimated coefficients on ROA are not significantly different from zero. Considering that most firm during the period under consideration are still largely state-controlled, the result is not too surprising. However, we realize that about 6% of firms in our sample became free from state control either by becoming cooperatives that were independent of state control or by becoming private (limited or unlimited liability legal forms). One may predict that profitability would be more relevant to those firms than state-controlled firms whereas size would be less relevant to those firms.

To test this hypothesis we create a dummy variable, STATE, which takes a value of one if the firm was still controlled by central bodies as of 1991, and a value of zero otherwise. We then add the interaction terms involving this dummy variable, and SIZE and ROA to Eq. (2). That is,

$$\ln(PAY_{it}) = \alpha + \beta_0 \ln(SIZE_{it}) + \gamma ROA_{it} + \beta_1 \text{STATE}_{it} \ln(SIZE_{it}) + \gamma_1 \text{STATE}_{it} \* ROA_{it}$$

The elasticity of pay with respect to SIZE for firms with STATE=0 (or private and cooperatives) is now given by $\beta$ whereas the one for firms with STATE=1 (or state-controlled firms) is given by $\beta + \beta_1$. Likewise, the semi-elasticity of pay with respect to ROA for private or cooperatives is given by $\gamma$ whereas the one for state-controlled firms is given by $\gamma + \gamma_1$.

The fixed effects estimates of Eq.(5) are reported in the last three specifications of Table 2. As shown, the results are somewhat sensitive to the choice of size measures and thus they need to be interpreted with caution. When ASSET is used as a size measure (column (iv)), the estimated $\gamma$ is now positive and significant at the 1% level, confirming our hypothesis that profitability is a relevant determinant of chief executive pay for firms that are no longer state-controlled. Moreover, reassuringly the estimates of $\beta_1$ are negative and significant at the 1% level, and the size of the coefficients are quite close to that of $\beta$.

---

7The term, "semi-elasticities" is from Rosen (1990).
indicating that the semi-elasticities of pay with respect to ROA for state-controlled firms are close to zero. Somewhat similar results emerge when other two size measures are used instead although they are not precisely estimated.

The estimated semi-elasticities of pay with respect to ROA for firms with STATE=0 are much smaller than those obtained in the West. They are actually much closer to the estimated semi-elasticities of pay with respect to stock market returns in the U.S.

As discussed above, in transition economies, labor productivity (PRODUCT) defined as total production divided by EMPLOY, may be a very relevant firm performance measure. To test this hypothesis, we repeat the above analyses including PRODUCT as an additional determinant of chief executive pay. These findings are reported in Table 3. For the first three specifications without interaction terms, the estimated coefficients on log of productivity are positive and significant (at the 1% level for the first and third specifications, and at the 10% level for the second), confirming our hypothesis that productivity is a very relevant firm goal in transition economies. Reassuringly our key findings from Table 2 (positive and significant relationship of pay to size and no relationship of pay to profitability for the whole sample) are also maintained.

In columns (iv)-(vi) of Table 3 findings on the effects of STATE on the slope coefficients are reported. In the main, findings are less robust. The estimated coefficients on the interaction involving STATE and productivity are always negative (and significant at the 1% level when size is measured by ASSET), suggesting that the elasticity of pay with respect to productivity is lower for state-controlled firms than for private firms.

**IV. Summary and Implications**

Using a probabilistic panel survey of firms with matching information for chief executives, we obtain the first econometric evidence on the determinants of chief executive compensation. In our fixed effects estimates, we find consistently that chief executive compensation is positively related to size (measured by assets, sales and employment) and productivity. The estimated pay elasticities of assets and sales of around 0.3 are comparable to what has been found for firms in advanced market economies. On the other hand, in general, we do not find a significant relationship of pay to profitability whereas we find some evidence of a positive pay-profitability relationship for a small fraction of firms that have been privatized. Moreover, for these privatized firms we find some evidence for a stronger relationship of pay to productivity and a weaker relationship of pay to size.

The strong pay-size relationships, coupled with the absence of pay-profitability relationships for the majority of firms, suggest that executive compensation is still largely structured so as to provide incentives for managers to increase size (or resist downsizing) and
pay no attention to profitability. On the other hand, the equally strong pay-productivity relationships point to the existence of incentives for managers to increase productivity (or slow down the deterioration of productivity). Finally, the presence of pay-profitability relationship for a small fraction of firms that have been privatized suggests that management may become less size-oriented and more profitability-oriented as privatization progresses.

More broadly, our finding that some change in the determinants of executive compensation is apparent even without widespread privatization is consistent with findings in other areas for Bulgaria including wage determination (Jones and Ilayperuma, 1994) and employment dynamics (Jones, 1994). However, as with these other studies we also find evidence of substantial inertia in the forces influencing executive compensation. Hence, we recognize that this is an area where more research is needed. In this fast changing context, there is a need to undertake similar exercises using more recent data. Indeed, currently we are processing later waves of the larger survey so that we can examine whether the story has changed during these more recent phases of the transition.\footnote{Also, to explore the potentially changing impact on executive compensation of time invariant individual and firm characteristics during this period of systemic change for which we have information (e.g., length of contract, method of chief executive appointment and industry) we will estimate separate cross sectional models.}
REFERENCES


Table 1 —— Summary Statistics: Means (Standard Deviation)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>1989 Means (Standard Deviation)</th>
<th>1991 Means (Standard Deviation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAY</td>
<td>annual chief executive compensation in thousands of 1989 Leva</td>
<td>8.3418 (7.9304)</td>
<td>6.5781 (18.541)</td>
</tr>
<tr>
<td>ASSET</td>
<td>total assets in thousands of 1989 Leva</td>
<td>19462 (30755)</td>
<td>4540.2 (7005.3)</td>
</tr>
<tr>
<td>SALES</td>
<td>income from sales in thousands of 1989 Leva</td>
<td>32436 (47403)</td>
<td>13031 (27654)</td>
</tr>
<tr>
<td>EMPLOY</td>
<td>number of workers</td>
<td>890.34 (933.31)</td>
<td>625.54 (586.06)</td>
</tr>
<tr>
<td>ROA</td>
<td>Return On Assets (after-tax profit/ASSET) where after-tax profit=gross profit - total taxes paid.</td>
<td>0.82771 (1.9577)</td>
<td>0.55407 (12.541)</td>
</tr>
<tr>
<td>PRODUCT</td>
<td>total production/EMPLOY in thousands of 1989 Leva.</td>
<td>43.600 (50.895)</td>
<td>24.489 (41.074)</td>
</tr>
<tr>
<td>STATE</td>
<td>1 if the firm is still controlled by central bodies as of 1991, and 0 otherwise.</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

Notes: The mean and S.D. for all variables are based on 220 firms.

Sources: Bulgarian Management Survey and Bulgarian Economic Survey
TABLE 2—FIXED EFFECTS ESTIMATES OF THE RELATIONSHIP OF CEO COMPENSATION TO FIRM SIZE AND PROFITABILITY

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable: Δln(PAY)</th>
<th>(i)</th>
<th>(ii)</th>
<th>(iii)</th>
<th>(iv)</th>
<th>(v)</th>
<th>(vi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δln(ASSET)</td>
<td></td>
<td>0.26566</td>
<td>(8.526)</td>
<td></td>
<td>0.033019</td>
<td>(0.240)</td>
<td></td>
</tr>
<tr>
<td>Δln(SALES)</td>
<td>0.30429</td>
<td>(10.186)</td>
<td></td>
<td>0.24407</td>
<td>(1.867)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δln(EMPLOY)</td>
<td></td>
<td>0.81781</td>
<td>(9.008)</td>
<td></td>
<td>0.78240</td>
<td>(2.008)</td>
<td></td>
</tr>
<tr>
<td>Δ(ROA)</td>
<td>0.0028195</td>
<td>(0.764)</td>
<td></td>
<td>0.0017924</td>
<td>(0.478)</td>
<td>0.10519</td>
<td>(3.125)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0008877</td>
<td>(0.252)</td>
<td></td>
<td>0.057711</td>
<td>(1.447)</td>
<td>0.045639</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0017924</td>
<td>(0.478)</td>
<td></td>
<td>0.045639</td>
<td>(1.033)</td>
<td></td>
</tr>
<tr>
<td>STATE* Δln(ASSET)</td>
<td></td>
<td></td>
<td></td>
<td>0.23565</td>
<td>(1.669)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATE* Δln(SALES)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.053160</td>
<td>(0.395)</td>
<td>-0.002869</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.007)</td>
</tr>
<tr>
<td>STATE* Δln(EMPLOY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.057434</td>
<td>(1.002)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.044411</td>
<td></td>
</tr>
<tr>
<td>STATE* Δ(ROA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: See Table 1 for definitions of the variables. The t-ratios are given in parentheses.

Sources: Bulgarian Management Survey and Bulgarian Economic Survey
TABLE 3—FIXED EFFECTS ESTIMATES OF THE RELATIONSHIP OF CEO COMPENSATION TO FIRM SIZE, PROFITABILITY AND PRODUCTIVITY:

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable: $\Delta \ln(PAY)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(i) (ii) (iii) (iv) (v) (vi)</td>
</tr>
<tr>
<td>$\Delta \ln(\text{ASSET})$</td>
<td>0.12786 (3.046)</td>
</tr>
<tr>
<td>$\Delta \ln(\text{SALES})$</td>
<td>0.21398 (3.441)</td>
</tr>
<tr>
<td>$\Delta \ln(\text{EMPLOY})$</td>
<td>0.49406 (4.679)</td>
</tr>
<tr>
<td>$\Delta (\text{ROA})$</td>
<td>0.0015147 (0.431)</td>
</tr>
<tr>
<td>$\Delta \ln(\text{PRODUCT})$</td>
<td>0.26664 (4.836)</td>
</tr>
<tr>
<td>STATE* $\Delta \ln(\text{ASSET})$</td>
<td>0.82375 (3.388)</td>
</tr>
<tr>
<td>STATE* $\Delta \ln(\text{SALES})$</td>
<td>0.49128 (1.431)</td>
</tr>
<tr>
<td>STATE* $\Delta \ln(\text{EMPLOY})$</td>
<td>0.40259 (0.581)</td>
</tr>
<tr>
<td>STATE* $\Delta (\text{ROA})$</td>
<td>$-0.056023$ (1.657)</td>
</tr>
<tr>
<td>STATE* $\Delta \ln(\text{PRODUCT})$</td>
<td>$-0.94015$ (3.062)</td>
</tr>
<tr>
<td>sample size</td>
<td>220</td>
</tr>
</tbody>
</table>

Notes: See Table 1 for definitions of the variables. The t-ratios are given in parentheses.

Sources: Bulgarian Management Survey and Bulgarian Economic Survey