Aggregate Versus Disaggregate Models for Accounting Numbers: Empirical Results for Earnings - Per - Share

by

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Working Paper No. 18-81

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The authors are indebted to Joel Demski, James Ohlson, Jim Patell and Mark Wolfson for their insightful comments and criticisms.

The contents of this paper are the sole responsibilities of the authors.

1. Introduction

Debates involving the issue of aggregation versus disaggregation of accounting numbers are often encountered in accounting and finance. This report is primarily concerned with issues likely to be encountered in empirical work dealing with the aggregation/disaggregation problem. Specifically we are concerned with the gains (or losses) available from aggregation in the modeling of earnings-per-share numbers via univariate time series models. One of our major inferences is that there are no dramatic gains or losses. In view of some available empirical work -- such as that on "premier" models of accounting income numbers -- this is somewhat surprising.

The next section provides an overview of and some motivation for the empirical work described here. Section 3 describes our sample of firms and Section 4 describes our modelling and forecasting procedures. Section 5 contains a discussion of our estimation and forecasting results. A summary and discussion of implications are provided in Section 6.

2. General Remarks and Focus of Paper

As indicated, we are attempting to add to the body of empirical results that can be exploited in works dealing with aggregation/disaggregation issues. We shall not be making any direct contribution to the theoretical literature on these issues. In order to provide some perspective on the relevance of our results, we shall briefly consider several areas where aggregation/disaggregation issues are encountered.

One of these areas is work on "line-of-business" reporting. A familiar question here is whether "better" forecasts of, say, a firm's income number can be obtained by aggregating separately forecasted line-of-business income numbers or by directly forecasting the firm's total income number. This question may arise within the context of empirical work on the time series properties of line-of-business numbers (e.g., on whether the latter facilitate forecasting of a firm's total income number) or on the effects of such numbers on securities' equilibrium values. In the latter kind of work, the forecasting question arises when, for example, proxies for investors' income expectations are sought.

In any event, selecting one of the indicated forecasting methods over the other involves, among other things (such as data availability), making tradeoffs between aggregation errors and specification errors, along the lines described by Grunfeld and Griliches [1960]. Loosely stated, "specification errors" arise when forecasting models used for the separate lines of business are not perfectly specified. "Aggregation errors" arise when heterogeneous lines are treated as if they are homogeneous -- with respect to model form and parameters' values.

Similar tradeoffs arise when aggregation over different firms is contemplated. This is one of the issues confronted by those doing empirical work on alternative time series models for firms' total income numbers. One major question asked in this area pertains to the relative descriptive adequacy of models identified and estimated using different types of sample evidence -- such as evidence consisting of aggregated or disaggregated data. For a given firm one can infer a model using estimation results based on the observed values of that firm's income number. One can also infer a model for a firm by using observed values of income for, say, an industry grouping to which the firm belongs. The latter model, inferred from aggregate data, can then be used for any firm in the industry grouping on the assumption of within-group homogeneity regarding model form and parameters' values. The on-going debate over the existence of a "premier" model for firms' income numbers deals with this issue, at least with respect to model form.[1]

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1. The work on this topic with which we are familiar does not, in general, constrain any contemplated premier model's parameter values to be identical across firms. Only the model form is presumed to be identical. See, e.g., Brown and Rozeff [1979] and Collins and Hopwood [1981].

The aggregation/disaggregation issue is also relevant to empirical work where the number of available observations on accounting numbers seems small relative to the demands of statistical practice and theory. Consider, for example, forecasting income numbers of "young" firms, for which there are few observed values of accounting numbers. Identifying and estimating a time-series model using whatever data are available for this type of firm often seems inadvisable. In such a situation one might seek an alternative source of sample evidence that is informative vis-a-vis the objects of ultimate interest. One possibility is to identify and estimate a model using data on firms or entities "similar" to the firm of interest. For example, one could get estimates using data on the firm's industry and then apply these results to the firm of interest. This presumes that aggregation gains are sufficiently large to offset the (seemingly inevitable) specification and estimation errors that would be encountered if the firm's own data were used for model identification and estimation. In any event, this approach is one way of getting data-based priors for the model form and parameter values to be used for empirical work on a firm of interest.

The above remarks deal with cross-sectional aggregation, over firms or other entities. The general aggregation/disaggregation issue also has a temporal dimension. For example, when one is comparing quarterly models for accounting numbers to annual models, one is dealing with temporal aggregation issues. This is the type of aggregation considered by Hopwood, McKeown, and Newbold [1981] and Brewer [1973], among others. We shall not provide empirical results pertinent to this topic.

Finally, we shall not provide any decision-theoretic framework that identifies our model comparison and selection criteria as being "appropriate" bases for attaining maximum expected utility in a world with estimation costs and costs of dissaggregation.[2] As in most empirical works, we shall be using a variety of procedures in a manner presumed to be consistent with utility maximization objectives.

The basic empirical issues that we shall consider pertain to the potential gains from aggregation. Different levels of aggregation will be investigated. Each is based on a industry grouping specified within the Standard Industrial Classification (SIC) Code. Two-, three-, and four-digit groups are used, along with individual firms' data. A major question asked is whether a model inferred from the data of a specific entity (a firm or an industry group) is "superior," for forecasting purposes, to a model inferred from the aggregate data for a group to which that entity belongs. This is analogous to asking whether the model inferred for a firm's consolidated (i.e., aggregate) income number is better at forecasting the income for each of the firm's

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2. In a world without such costs, more disaggregation (of private information) would not decrease a given individual's expected utility. Thus, in this setting, the aggregation/disaggregation issue is easily handled.

lines of business than are the models inferred for the separate lines' income numbers (i.e., the disaggregated numbers).[3] In this case, we apply an "aggregate" (or "macro") model to "disaggregated" (or "micro") data to get micro forecasts. We also ask whether aggregated micro forecasts are "better" at predicting aggregate numbers than are the forecasts from the models inferred directly from aggregate data. That is, if our ultimate objective is to forecast the aggregate number, should we "build up" an aggregate forecast from micro forecasts or should we forecast the aggregate number directly? In dealing with this question, we shall be presuming that several conventional descriptors of forecast performance provide appropriate bases for model selection.

All models considered here are univariate time series models. Thus, for an income number at any particular level of aggregation, our inferences are conditional on the information set consisting of past values of that income number. (This is a seemingly nontrivial restriction.) The procedures used to infer models are modifications of those described by Box and Jenkins [1970]. These procedures were applied to aggregated and disaggregated data taken from COMPUSTAT Annual Industrial Tapes for the years 1946-1972. The sample of firms that we used is

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3. A direct link between our results and the details of the line-of-business issue presumes, of course, that the classification of firms (lines) by product-line corresponds to a classification based on firms' EPS time-series properties.

described in the following section.

3. Sample Selection

Our initial sample consisted of the 180 firms used by Elton and Gruber [1971], [1972]. These firms belonged to 44 different four-digit SIC industry groups according to the firms' 1966 SIC industry classifications. Elton and Gruber obtained this sample via a two-step procedure; see Elton and Gruber [1972; fn. 17, p. 414]. First they selected a four-digit SIC code at random. Then they applied data-availability criteria to each firm in this industry grouping, using a COMPUSTAT Annual Industrial tape as their source of data. These criteria required the availability of observations on several variables from the period 1948-1966. All firms that satisfied these criteria were included in the Elton-Gruber (EG) sample. Another four-digit SIC number was then selected at random, and the EG data-availability criteria were applied to all firms in this second industry grouping. Elton and Gruber continued to apply their two-step procedure until a total of 180 firms was selected.

The EG sample selection procedure has no particular virtue relative to our immediate substantive objectives. We elected to begin with the EG sample because we initially planned to conduct comparative analyses using their results and ours.

From the 180 EG firms we selected those whose annual earnings-per-share could be obtained from our composite COMPUSTAT tape for each of the years 1946-1971.[4] A total of 150 firms met this earnings-per-share availability criterion.

The 26 earnings-per-share values from 1946 through 1971 were used to estimate parameters of selected time-series models for each entity of interest. (The estimation procdures are discussed later.) The earnings-per-share values for 1972 were used to

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4. The earnings-per-share figures that we required were not directly available from the COMPUSTAT tape. Rather, they had to be calculated from the three data items that we collected from the tape: Item 20, Available for Common After Adjustments for Common Stock Equivalents; Item 25, Common Shares Outstanding; and Item 27, Cumulative Adjustment Factor for Common Shares.

The Adjustment Factor (Cumulative) is a ratio that enables a user to adjust shares outstanding for all stock splits and stock dividends that occur subsequent to the end of a given fiscal year. These factors can be used to convert shares outstanding from earlier years to a basis consistent with a given year's shares outstanding. Thus, the time-series of earnings-per-share that we used were retroactively adjusted for the effects of stock dividends and stock splits.

For each of the 26 years, 1946-1971, the earnings-per-share time-series was:

$$\frac{\text{Item 20}}{\text{Item 25} \times \text{Item 27}}$$

The use of the Adjustment Factor allowed us to hold the capital structure constant over our estimation (and forecast) period.

assess the forecast accuracy of the estimated time-series models; 1972 data were not used for any of our estimation results. The period 1946-1971 will hereafter be referred to as the "estimation period" and the year 1972 will be referred to as the "forecast year."

Eight other firms were eliminated from the EG sample because of problems encountered in estimating either of two models that we entertained: viz, the first- or second-order moving average model. Estimating these models (with backcasting of disturbances) involves, in general, nonlinear estimation procedures. These procedures incorporate convergence tests which were not "passed" by the additional eight firms (for at least one of the indicated models). See Box and Jenkins [1970; ch. 7] or Nelson [1973; ch. 5] for discussions of these estimation procedures.

Finally, we did not require that forecast year data be available when selecting firms for our estimation sample. Our forecasting results will be based on the 139 estimation sample firms that had 1972 earnings-per-share data available from the COMPUSTAT tape.

A complete listing of the 142 firms in our estimation sample is provided in Appendix A.

4. Modelling and Forecasting Procedures

4.1 Modelling: Firm EPS

For each firm in our sample, 26 consecutive observations on earnings-per-share were used to estimate parameters for prespecified autoregressive integrated moving-average (ARIMA) models. The general form of the models that we estimated is:

$$(4.1)\quad w_t = \delta + \phi_1 w_{t-1} + \ldots + \phi_p w_{t-p} + e_t + \Theta_1 e_{t-1} + \ldots + \Theta_q e_{t-q}$$

where $w_t = (1-B)^d z_t$; B is a backward shift operator ($B^d z_t = z_{t-d}$) ; δ is a constant; ϕ_1 through ϕ_p are p autoregressive parameters; Θ_1 through Θ_q are q moving-average parameters; the e's are realizations from a white noise process; the z's are observations on earnings-per-share; and t is a time subscript. The earnings-per-share process, $\{\tilde{z}_t\}$, is said to have an ARIMA (p,d,q) representation.

We allowed both p and q to have the values 0, 1, or 2 and d to be either 0 or 1. We did not estimate a (0,0,0) model; thus, we estimated 17 separate ARIMA (p,d,q) models for each firm's earnings per share number -- eight models for undifferenced EPS (d=0), or EPS "levels," and nine models for first differences of EPS (d=1). The values of (p,d,q) for the estimated models are given in the left-hand column of Table 1.

Because of the size of our sample and the number of models estimated for each firm, we developed an algorithm to process firms serially by estimating parameters for each of the 17 models for a given firm before estimating parameters for the next firm. In order to initiate this "mass production" of parameter estimates, we selected the starting values for parameter estimation that are depicted in Table 1, where ρ_i denotes the ith autocorrelation coefficient of the model's disturbance. The parameters that we estimated (where applicable) head columns two through four of Table 1. In addition to these parameters, we estimated a constant term, δ , for all 17 models. In the case of the undifferenced observations, the starting value for estimating δ was the mean of the earnings per share series. For the first differences of EPS, the starting value for estimating δ was .01.

Starting values for estimating the autoregressive and moving-average parameters were primarily generated from the sample autocorrelations of the appropriate time-series (EPS "levels" or first differences) via the theoretical relationships among autorcorrelation coefficients and the parameter values for the model being estimated (see, for example, Nelson [1973] or Box and Jenkins [1970]). For the (2,d,1), (1,d,2), and (2,d,2) models, the solutions to the equations involving the parameters and the autocorrelations were not straightforward.[5] Rather

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5. Box and Jenkins [1970; pp. 498-500] outline a computer program to provide initial estimates of the ϕ's, θ's, δ, and the variance of the white noise term. We did not believe it worthwhile to use their program for our work.

than implement an additional algorithm to find starting values in these cases, the starting value for estimating either ϕ_2 or θ_2 was set as indicated in Table 1. Additionally, some autoregressive parameters' starting values implied a nonstationary process (e.g., $\frac{|\hat{\rho}_2|}{|\hat{\rho}_1|} \geq 1.0$). We did not estimate models where starting values for ϕ_1 or ϕ_2 implied a nonstationary process.

Once the starting values for a particular model were chosen, the estimation process began. It was terminated whenever the relative change in each parameter estimate was less than .0001, the relative change in the sum of the squared residuals was less than .00001, or such convergence was not obtained after 50 iterations. The resulting parameter estimates and selected diagnostic statistics were then saved for model comparison and forecasting purposes.[6]

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6. If the resulting (p,0,1) or (p,1,1) moving-average parameter estimate implied a noninvertible process, then the model was reestimated using the reciprocal of the estimate of θ_1 as the new starting value. The parameters resulting from this reestimation were retained regardless of their implications for invertibility.

4.2 Modelling: Industry EPS

In addition to estimating parameters of the 17 models for each firm's EPS numbers, we estimated the parameters of each model for "industry" EPS numbers using the algorithm previously described. Separate industries were identified by two-, three-, and four-digit SIC codes for our 1972 COMPUSTAT tape, and model parameters were estimated for each of these three industry groupings.

Industy earnings per share was defined to be an equally-weighted average of the earnings-per-share of all estimation-sample firms that were members of the desired industry grouping. Table 2 shows the distribution of our estimation sample firms by both two-digit and four-digit industry classifications. The 142 estimation sample firms belong to 52 separate four-digit SIC industry classes according to their 1972 "primary" activity. Of the 52 four-digit classes, 26 contain only one firm. The EPS numbers for these 26 industries are thus the same as the numbers for the underlying firms. So, for a given model, parameter estimates for these industries are identical to the parameter estimates for the underlying firms. Additionally, one can see from Table 2 that 20 (of 41) three-digit industries and six (of 17) two-digit industries contain only one firm. This means that the firm, the four-digit, the three-digit, and the two-digit industry EPS numbers are identical in six instances.

Table 2 also shows that there are three different four-digit industries (2000, 2052 and 2063) in two-digit industry #20. These three four-digit industries also constitute three separate three-digit industries (200, 205, and 206). Thus, the corresponding industry time-series at the four-digit level and at the three-digit level are identical to each other. In situations such as this, making inferences about the behavior of estimates at different levels of aggregation is meaningless.

4.3 Model Selection

From among the models estimated for each entity (firm or industry) we desired to choose the model that "best" fit the estimation period data. Results based upon several model-selection procedures were obtained. The results discussed below are based upon the following method of determining the "overall best" model for each entity.

First, we eliminated all models whose estimated moving-average parameters implied a noninvertible ARIMA model. The parameter values (θ's) were estimated in the estimation stage of the project. Starting values (i.e., pre-sample data) for the time-series process were obtained by "backcasting." When employing the "backcasted" disturbances to generate forecasts, we encountered difficulties with models whose moving-average parameters implied noninvertibility. Forecasts for such models tended to "blow-up" because of the weights placed on the more distant disturbances. Hence, we excluded all noninvertible models from our forecasting results.

From the remaining models (if any), we eliminated those that had an observed Box-Pierce statistic, Q(6), that was "significant" at the 5 percent level or less. This statistic is based on the sum of the first six squared autocorrelation coefficients of the residuals from the estimated time series model in question. A signicant value of this Box-Pierce statistic led us to infer that the disturbance of the time-series model does not conform well to a white noise process and, hence, that the estimated model is most likely inappropriate for the stochastic process at hand.

Of the models (if any) that passed the Q-statistic and invertibility criteria, we selected the model with the largest value of $\bar{R}^2$ for each level of differencing (d=0 or d=1) as the "best" model for that level of differencing.[7] We defined the "overall best" model to be the one more consistent with the null hypothesis of zero autocorrelation coefficients of the disturbance at lags 1-6. To obtain this model, we

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7. A sample R^2 was provided by the estimation routine that we used. The estimation routine was provided by Charles Nelson, 1973 version. In that routine, R^2 is defined as follows:

$$R^2 = 1 - \frac{\Sigma e_t^2}{\Sigma z_t^2}$$

were the e_t's are the deviations of the time-series residuals from their sample average; the z_t's are deviations of the observations on the time-series variable (either levels or first-differences in our case) from their sample mean; and the summation is over all periods for which there are valid observations on z_t.

Because we were ultimately interested in forecasting the level of earinings-per-share, we recomputed the R^2 statistics for first difference models to base them on the time-series of earnings-per-share rather than on the time-series of first differences in earnings-per-share, as provided by our estimation routine.

Finally, we used the adjusted R^2 for all of our model selection and forecasting results. The adjusted R^2, denoted $\bar{R}^2$, is:

$$\bar{R}^2 = R^2 - \left(\frac{p+q}{n-p-q-1}\right)\left(1-R^2\right)$$

where n is the number of observations used for parameter estimation and p and q are the number of autoregressive and moving average transformed the observed Box-Pierce statistic, Q(6), for each of the two "best" models (d=0 and d=1) to a standardized normal statistic.[8] The "overall best" model is the one with the smaller (less significant) value of the standardized normal statistic.

The above model selection procedure involves using Q-statistics, sample $\bar{R}^2$, and then Q-statistics again, in that order. Two alternative selection methods were entertained. Each is based on using Q-statistics and sample $\bar{R}^2$ in different orders. The first alternative begins by applying our "insignificant Q-statistic" test to each of our two groups of models, the d=0 group and the d=1 group. From among all the remaining d=0 models (if any) -- each of which was associated with a statistically insignificant Q-statistic -- we chose the one with the lowest value of Q(6). The same thing was done for the remaining d=1 models (if any). This left us with at most two candidate models. The one with the higher value of $\bar{R}^2$ is the one that we defined to be the "overall best model".

The second alternative selection procedure begins by applying our "maximum $\bar{R}^2$" screen to each of our two groups of models -- the d=0 group and the d=1 group. We then deleted the

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8. A transformation was necessary to find the least significant Q(6)-statistic, because, in many cases, the Q(6)-statistics were from χ^2 distributions with different degrees of freedom and, thus, could not be compared directly. The Box-Pierce statistic $Q(6) = n \times \Sigma_{j=1}^{6} r_j^2$ (where n is the length of the time-series and r_j is the estimated autocorrelation coefficient at lag j), is asymptotically chi-square distributed with 6-p-q degrees of freedom (see, for example, Nelson [1973; chapter 5]).

model(s) with significant values of $\tilde{Q}(6)$. Finally, from among the (at most) two remaining models, we selected the one that passed another application of our $\bar{R}^2$ test.[9]

The results from the above alternative selection methods are given in Appendices D and E and are not discussed below. Suffice it to say that the crux of what we inferred conditionally on these alternative selection procedures is the same as the crux of the inferences discussed below. To be sure, the magnitudes of our estimates and summary statistics were different. But the orderings of our alternative models were substantially unaffected.

4.4 Forecasting Procedures

Forecasts of 1972 earnings per share for each entity (firm, four-digit industry, three-digit industry, and two-digit industry) were obtained from the estimation period earnings-per-share data and the results of our model selection procedures. To arrive at the 1972 forecasts for each entity, we relied on the "best" models described previously.

Forecasts for each entity were obtained, where possible, by three methods: entity-to-entity, aggregate-to-entity, and disaggregate-to-entity. In the entity-to-entity method, a

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9. There will be zero (one) model at the final stage if both (one) models have significant Q(6)-statistics at the second stage.

forecast for an entity was obtained by applying the "best" estimated ARIMA (p,d,q) model to the entity's pre-1972 data to arrive at a one-step-ahead prediction of the entity's 1972 earnings-per-share. This procedure was employed for each of the 139 firms, 52 four-digit industries, 41 three-digit industries, and 17 two-digit industries.[10]

In the aggregate-to-entity method, a forecast for a particular entity's 1972 earnings-per-share was obtained by applying the "best" ARIMA (p,d,q) model inferred from an industry's estimation period data to the entity's pre-1972 data. The industry used was the one of which the entity in question was a member. For example, a given firm's 1972 earaining-per-share was forecast by applying the best four-, three-, and two-digit industry models to the firm's pre-1972 data to arrive at alternative one-step-ahead forecasts. Likewise, a particular three-digit industry's 1972 earnings-per-share could be forecast by applying the "best" estimated ARIMA (p,d,q) model for the relevant two-digit industry's earnings-per-share. In essence, the aggregate-to-entity forecast method assigns the same model form and parameter values to all members of the group that defines the aggregate.

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10. Only 139 firms were available for forecasting because, as mentioned in Section 3, we did not require that all of our sample firms have data available for 1972.

In the disaggregate-to-entity method, a forecast for a given entity is "built-up" from the "best" models for each of the entity's components. For example, a given two-digit industry's 1972 earnings-per-share was forecast by, alternatively, forecasting 1972 earnings-per-share for each of the three-digit industries, four-digit industries, or firms that were members of the particular two-digit industry and then aggregating the separate forecasts. Likewise, a four-digit industry forecast could be made by aggregating the forecasts for each of its member firms. This method allows each component to be forecast by its respective "best" model; these "best model" forecasts may then be aggregated.

Thus, at most four different forecasts were possible for each entity: entity-to-entity (1 forecast); aggregate-to-entity (0,1,2 or 3 forecasts); and disaggregate-to-entity (3,2,1 or 0 forecasts).

5. Empirical Results

We present two types of empirical results -- results from estimation and from forecasting. If the sample sizes used for estimation and forecasting for each firm were sufficiently large, we could count on the the estimation and forecasting results' being in substantial agreement. As usual, the sample sizes are not very large. Thus, the results may appear to be substantively different. And neither set of results may be interpretable in terms of conventional "large sample" properties. This is one reason for our prespecifying the univariate time-series models that we entertained, rather than using available fitting devices for model identification (see, e.g., Box and Jenkins [1970; ch. 6] and Nelson [1973; ch. 5]). We begin with our estimation results.

5.1 Estimation Results

We present tabulated results for models estimated with four types of data -- each type pertaining to a different level of aggregation. The results are summarized via statistics (e.g., sample means) computed over all estimated models (not firms), the number of which varies with the type of data used, and also over all estimated models within each two-digit SIC group. (There are 17 such groups in our sample; the number of estimated models within each group depends, once again, on the type of data used.)

Some relevant averages for our entire sample are given in Tables 3 and 4. Table 3 provides averages for the observed adjusted coefficient of determination ($\bar{R}^2$) and the observed Box-Pierce statistic (Q(6)) for model adequacy based on the first six estimated autocorrelation coefficients of each model's disturbance. Table 4 deals with estimated values of the first four autocorrelation coefficients, ρ_i , i = 1,2,3,4, for each model's disturbance.

We expected to observe some important differences among these measures of model adequacy across different models and across different levels of aggregation. But with the exceptions noted below, the general picture seems to be one of similarity rather than differences.[11] Specifically, it is difficult to detect any dramatic differences in the sample "explanatory" power of the alternative models for a given type of data (i.e., firm or industry aggregates). Nor do there seem to be dramatic differences in the explanatory power of a given model across different types of data. For example, the sample $\bar{R}^2$ for the (2,1,2) model is roughly the same for two-digit data as it is for firm data. In terms of our earlier jargon, it appears that if there are gains to be had by alleviating specification errors, they seem to be offset by equally important aggregation errors. Alternatively stated, if there are gains to be had via

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11. Recall (from Section 4.3) that our computed $\bar{R}^2$'s for models with d=0 and d=1 are directly comparable because for d=1 they are computed for the implicit predictions of levels rather than first differences.

disaggregation, they seem to be offset by specification errors.

Of course, using $\bar{R}^2$ as a gauge of model adequacy presumes that the models evaluated are well-specified. The estimation results for $\tilde{Q}(6)$ and r_i, i=1,2,3 and 4, are supposed to shed some light on this issues.[12] In attempting to interpret these results, one should note that the asymptotic distribution of $\tilde{Q}(6)$ from an ARIMA (p,d,q) model is that of χ^2 with 6-p-q degrees of freedom. Conditional on a serially uncorrelated disturbance, the "large sample" mean and standard deviation of r_i are, respectively, $-(n-i)^{-1}$ and $[(n-i)/n(n+2)]^{\frac{1}{2}}$.

With several exceptions noted below, the results on model adequacy do not point to any glaring inadequacies of different models for a given type of data or of a given model across types of data. And these sample measures of model adequacy are strikingly similar across models and types of data.[13] In any

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12. Clearly, not every contemplated model can be correct. So one might argue that some models must be inadequate. But this seems beside the point when we are essentially testing hypotheses about model applicability. For such an exercise, a given body of sample evidence can be consistent with several conflicting specifications.

Since we are dealing with stationary-invertible models, the correct model for a given process is uniquely determined by its covariance structure, so long as common factors are eliminated; see Box and Jenkins [1970; p. 198]. Thus, our $\bar{R}^2$ results on alternative models applied to a given process are not independent of those models' sample $\hat{a}_i$'s.

event, these results do not alter the inferences that we made conditionally on our sample $\bar{R}^2$.

As indicated, there are several exceptions to the above remarks on $\bar{R}^2$ and model adequacy. The exceptions are most obvious in the results on Q(6) and the $\hat{\rho}_i$'s. On balance, the two models that "stand out" are those with (p,d,q) equal to (0,0,1) and (0,0,2). If the underlying inadequacies were of the type whose importance could be altered via aggregation or disaggregation, we would expect some relationship between the level of aggregation and the estimated values of Q(6) and the ρ_i's. But this does not appear to be the case. Relatively large estimated values of Q(6) and the ρ_i's are observed at each level of aggregation. In a sense, these results for the (0,0,1) and (0,0,2) models are consistent with our other results, because they too appear to be invariant to the level of aggregation. They are exceptional only because they point to model inadequacies, whereas our other results suggest that our sample evidence is consistent with the adequacy of each other model.

We next considered the possibility that our overall results "hide" interesting differences among industry groups. Thus, we compiled summary results for each two-digit industry group. These summaries are provided in Appendix B. The format and types

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13. The 0.95 fractiles of the distribution of $\tilde{\chi}^2$ for degrees of freedom equal to 2,3,4,5,6 are, respectively, 5.99, 7.81, 9.49, 11.10 and 12.60.

of results presented are identical to those of Tables 3 and 4. Now, however, the results in each table are averages for the firms, four-digit industry groups, and three-digit industry groups that constitute the two-digit group identified in the table's headings, as well as for this two-digit group itself.

It is important to recall that some of our two-digit groups have very few firms. For these groups, results pertaining to "levels of aggregation" are close to meaningless -- because there is not much aggregation. Indeed, in some cases, the same entity or entities underlie every level of aggregation. These extreme cases are identified in Table B-23.

Of course, the magnitudes of the observed values reported in Appendix B differ from their counterparts in Tables 3 and 4, because the latter are averages computed over our entire sample. But the relevant issue is whether there are differences for a given model across levels of aggreation or across models for a given level of aggregation. Insofar as this issue is concerned, the results summarized by two-digit groups are similar to the overall summaries.

On balance, the sample explanatory power of each model seems remarkably invariant to the level of aggregation in terms of $\bar{R}^2$. And the explanatory powers of the alternative models at a given level of aggregation are roughly the same. Similar remarks apply to the diagnostic results on $\tilde{Q}(6)$ and the $\hat{\rho}_i$'s. The major exceptions, as before, are the (0,0,1) and (0,0,2) models, for which the model adequacy results seem less acceptable. But even here aggregation seems to have surprisingly little effect.

Of course, since our results for different levels of aggregation pertain to different random variables (e.g., firms' EPS, two-digit groups' EPS, etc.), we cannot directly infer that there are no gains whatsoever from aggregation or disaggregation. It is, for example, possible that there are gains to be had by estimating models with aggregated (disaggregated) data and then using those estimated models to forecast disaggregated (aggregated) random variables. This approach may provide "better" forecasting performance than models estimated directly with aggregated or disaggregated data. Tables 5 and 6 provide results from using this approach. These results are overall summaries based on "within-sample" forecasts. Thus, the values of $\bar{R}^2$ summarized here are comparable to those described in Table 3.

In effect, the results summarized in Tables 5 and 6 hold the random variable of interest constant and vary the estimated model -- in a way that indicates whether using aggregated or disaggregated data has any effect on modeling the random variable of interest. If an "aggregate model" is used, then we implicitly impose a homogeneity constraint on all members of the aggregate -- insofar as estimated models are concerned. If "disaggregated models" are used to build up to the random variable of interest, then we allow for heterogeneity within the particular group of interest.

If there were no computing problems (e.g., the convergence problems associated wih nonlinear estimation), no degrees of freedom adjustments, no stationarity problems, and no invertibility problems, the model fitted directly to the data on the random variable of interest would always seem "best" in terms of a within-sample $\bar{R}^2$. In this case, results such as those in Table 5 would just indicate what is "lost" by using a model other than the "best fitting" model, so long as any of the alternative estimated models could have been selected as the best fitting one. This is not precisely the case at hand.[14] So it is feasible to observe an increase in $\bar{R}^2$, which can be interpreted as a gain from aggregation or disaggregation.

Each row-panel of Tables 5 and 6 pertains to a different random variable of interest. The left-most column of results deals with the model estimated with the data for this variable. The next three columns describe results for this variable based on the estimated models for various aggregates of which that random variable is a component. Of course, in some cases the latter set of models is empty. For example, there can be no aggregate four-digit group consisting of three-digit entities. Nor can there be an aggregate three-digit group consisting of two-digit entities.

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14. Another reason why this is not precisely the case is that our model selection method does not entail just maximizing a sample $\bar{R}^2$. We use both Q(6)-statistics and $\bar{R}^2$'s in our model selection procedure.

The right-most set of three columns describes results based on aggregating forecasts from estimated entity models. Consider, for example, the results in the row panel for three-digit industry EPS and the column for the aggregated four-digit within-sample forecasts -- which are used to compute values of $\bar{R}^2$ for three-digit EPS variables. These forecasts are for three-digit EPS. But they are obtained, year by year, by aggregating forecasts for the four-digit groups that belong to each three-digit group. The latter forecasts are from the best-fitting models for the four-digit data.

As can be seen from Table 5, using the alternative aggregate and entity models for the given random variable of interest does not seem to change much in terms of $\bar{R}^2$. There is a slight increase in $\bar{R}^2$ in one case -- when the aggregate three-digit estimated models are applied to the four-digit entities within each three-digit group. With one exception, all other observed values are moderately lower. The exception, and the largest absolute decrease, is observed when the firm-by-firm estimated models are used to "build up" two-digit forecasts. The observed average $\bar{R}^2$ for the two-digit models is 0.7217; the corresponding aggregated firms' estimated models provide an observed average $\bar{R}^2$ equal to 0.5645. Relative to what we expected from the substantially greater variety allowed by the firms' models, this difference does seem nontrivial. This particular combination of models and random variables induced a less exceptional result, on average, under our two alternative model selection procedures. See, especially, Table E-1.

Of course, the different values of $\bar{R}^2$ summarized in Table 5 and 6 are not independent drawings -- within column/row cells or between cells. Thus, the forcefulness of our sample evidence is not as striking as might be inferred from the number of entities or alternative models underlying these tables. This may be one of the major limitations of our work. In the end, the impact of our results will probably be quite dependent on the strength of the reader's prior beliefs about the effects of aggregation and the consistency between our estimation results and our forecasting results, to which we now turn.

5.2 Forecast Results

If there are any gains from aggregation, then we expect estimated models for aggregate data to be more adequate for micro (i.e., "component") entities than the estimated models for micro entities' own data, at least when performance at predicting "hold out" data is used to assess adequacy. On the other hand, if the homogeneity assumptions implicit in the use of aggregate models are too inadequate, then aggregates of micro forecasts (based on micro models) should perform better at predicting aggregate data than do the models estimated on aggregate data. The results summarized in Tables 7-12 deal with this issue.

The format of these tables is the same as that of the Tables 5 and 6. Now, however, we are dealing with predictions of "hold-out" data (from the year 1972), rather than the within-sample data used for estimation.[15] Also, we now use statistics other than $\bar{R}^2$. Specifically, we summarize values of: (1) squared forecast error divided by the estimation sample variance of the forecasted random variable; (2) absolute value of forecast error divided by the estimation sample standard deviation of the forecasted random variable; and (3) value of forecast error divided by the estimation sample standard deviation of the forecasted random variable. Scaling by sample variance or standard deviation was used to make the different entities' forecast performance cross-sectionally comparable.

If aggregation -- and the implicit within-group homogeneity assumption -- is on the route to more descriptive adequacy, one should find that the best forecast performance for each random variable of interest is among the results for aggregate models. This is observed, however, for only one case: When the random variable of interest is a firm's EPS. In this case, the best observed forecast performance (in terms of scaled squared or absolute forecast error) is provided by the estimated models for four-digit industry groups. For the four- and two-digit entities, the best observed forecast performance is provided by those entities' own estimated models, by a margin that is more substantial for the four-digit EPS. For the three-digit EPS, the

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15. These are "hold-out" data in the sense that they were not used for estimation. But, since EPS numbers are serially correlated, the 1972 data are not independent of our estimation data.

best observed forecast performance is provided by using disaggregation -- via the estimated models for four-digit groups.

Lest we be accused of superficiality, we hasten to add that some of the results underlying our remarks do not differ by substantial amounts. For example, the observed scaled squared forecast error for two-digit EPS does not vary much across the alternative models. And for three-digit EPS, the difference between the observed scaled squared forecast error for the three-digit model (1.671) and the disaggregated four-digit model (1.533) is hardly earth-shattering. Perhaps the only impressive differences are among the observed results in the row panel for firms' EPS numbers, where the largest scaled squared (absolute) error is 1.809 (.9530) for the firms' own estimated models and the smallest is 1.291 (.8361) for forecasts from the aggregate four-digit models. With the possible exception of this case, therefore, the consistency between our forecast and estimation results is fairly good.

On balance, our results do not point to any substantial gains from using aggregate models to describe the behavior of micro entities' EPS numbers or from using disaggregated models to build up to descriptions of macro entities' numbers. For the most part, the estimated models based on the entities' own numbers seem to be the more adequate models. This is what we infer from our overall results. And upon examining the results in Appendix C -- which are summarized by two-digit industry groups -- we do not infer that these overall results are heavily dependent on extreme results for particular groups.

6. Summary and Additional Remarks

This report attempts to add to the body of empirical results that can be exploited in works dealing with aggregation/disaggregation issues. Such issues arise in works on, for example, "line-of-business" accounting numbers, the descriptive adequacy of "premier" models of firms' accounting numbers, and on the adequacy of alternative proxies for investors' expectations of accounting numbers (e.g., income or earnings-per-share numbers). No direct contributions to the theoretical frameworks pertaining to work in these areas was provided. Thus, for example, we did not deal, at a theoretical level, with the types of stochastic models that "should" characterize "line of business" numbers or investors' expectations -- along the lines of, say, rational expectations behavior. We believe, however, that empirical results such as ours will provide helpful building blocks for theoretical work of this kind -- since such work will probably be based on assumptions having empirical content.

We provide both estimation and forecasting results dealing with several aspects of the same basic question: Are there any dramatic gains (or losses) from aggregation in the modeling of earnings-per-share numbers? Our results are conditional on univariate linear time series models and aggregation/disaggregation schemes defined in terms of industry groupings. Our major inference is that, on balance, there are neither substantial gains nor losses. This is consistent with a substantial degree of offsetting with respect to aggregation and specification errors. This type of finding, if generalized, runs counter to the predominant views on, e.g., "line of business" numbers and "premier" time series models of accounting numbers; see Sec. 2.

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TABLE 1

Starting Values for Parameter Estimation
("N/A" denotes "Not Applicable")

Model (P, D, Q)	$\hat{\phi}_1$	$\hat{\phi}_2$	$\hat{\Theta}_1$	$\hat{\Theta}_2$
1, 0, 0	$\hat{\rho}_1$	N/A	N/A	N/A
2, 0, 0	values implied by: $\hat{\rho}_1 = \hat{\phi}_1 + \hat{\phi}_2 \hat{\rho}_1$; $\hat{\rho}_2 = \hat{\phi}_1 \hat{\rho}_1 + \hat{\phi}_2$		N/A	N/A
), 0, 1	N/A	N/A	value implied by: $\hat{\rho}_1 = \frac{-\hat{\Theta}_1}{1 + \hat{\Theta}_1^2}$	N/A
, 0, 1	$\frac{\hat{\rho}_2}{\hat{\rho}_1}$ a/	N/A	value implied by: $\hat{\rho}_1 = \frac{(1 - \hat{\phi}_1 \hat{\Theta}_1)(\hat{\phi}_1 - \hat{\Theta}_1)}{1 + \hat{\Theta}_1^2 - 2\hat{\phi}_1 \hat{\Theta}_1}$	N/A
, 0, 1	result of previous estimation	.1 b/	result of previous estimation	N/A

TABLE 1 (continued)

0, 0, 2	N/A	N/A	value implied by: $\hat{\rho}_1 = \dfrac{-\hat{\Theta}_1}{1 + \hat{\Theta}_1^2}$	-.01
1, 0, 2	$\dfrac{\hat{\rho}_2}{\hat{\rho}_1}$ a/	N/A	value implied by: $\hat{\rho}_1 = \dfrac{(1-\hat{\phi}_1 \ \hat{\theta}_1)\ (\hat{\phi}_1 - \hat{\Theta}_1)}{1 + \hat{\Theta}_1^2 - 2\ \hat{\phi}_1\ \hat{\Theta}_1}$	-.01
2, 0, 2	result of previous estimation	.1 b/	result of previous estimation	-.01
0, 1, 0	N/A	N/A	N/A	N/A
p, 1, q	Same procedures as above, except the autocorrelations were computed from the differenced time series.			

a/ This model was not estimated if $\left| \dfrac{\hat{\rho}_2}{|\hat{\rho}_1|} \right| \geq 1.0$.

b/ If $| \hat{\phi}_1 - \hat{\phi}_2 | \geq 1.0$, the starting values were adjusted so that $| \hat{\phi}_1 + \hat{\phi}_2 | < 1.0$.

TABLE 2

BREAKDOWN OF SAMPLE FIRMS INTO FOUR- AND TWO-DIGIT INDUSTRY CLASSES

Four-Digit Industry Class	Firms in Four-Digit Class		Firms In Two-Digit Class	
	Number	Percent	Number	Percent
1042	1	0.7	1	0.7
1311	1	0.7	1	0.7
2000	1	0.7		
2052	1	0.7		
2063	1	0.7	3	2.1
2121	1	0.7	1	0.7
2200	1	0.7	1	0.7
2600	1	0.7	1	0.7
2801	8	5.6		
2802	2	1.4		
2803	6	4.2		
2835	5	3.5		
2836	5	3.5		
2837	1	0.7		
2844	2	1.4		
2850	1	9.2		
2899	2	1.4	32	22.4
2912	13	9.2		
2950	1	0.7	14	9.9
3000	5	3.5	5	3.5
3210	1	0.7	1	0.7
3310	4	2.8		
3311	9	6.3		
3350	1	0.7	14	9.8
3430	1	0.7		
3499	1	0.7	2	1.4
3511	2	1.4		
3522	1	0.7		
3531	4	2.8		
3533	2	1.4		
3540	5	3.5		
3550	6	4.2		
3560	6	4.2		
3569	1	0.7		
3570	5	3.5		
3573	1	0.7	33	23.1
3600	3	2.1		
3610	5	3.5		
3622	2	1.4		
3630	2	1.4		
3670	1	0.7		
3679	1	0.7	14	9.8
3711	1	0.7		
3713	3	2.1		
3714	6	4.2		
3725	1	0.7	11	7.7
3811	1	0.7		
3821	1	0.7		
3861	2	1.4	4	2.8
3931	1	[illegible]		

TABLE 3

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION (MEANS COMPUTED OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q,))

MODEL (P,D,Q)	$\bar{R}^2$ FIRM	$\bar{R}^2$ INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT	MODEL (P,D,Q)	Q(6) FIRM	Q(6) INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT
1,0,0	.6343	.6576	.6574	.6451	1,0,0	5.175	4.291	4.066	3.555
2,0,0	.6395	.6590	.6569	.6488	2,0,0	3.781	3.449	3.327	3.428
0,0,1	.4695	.4888	.4901	.4583	0,0,1	20.14	20.24	20.36	17.24
1,0,1	.6639	.6755	.6775	.6972	1,0,1	3.471	2.939	2.861	2.725
2,0,1	.6706	.6570	.6604	.6428	2,0,1	3.288	3.137	3.087	2.769
0,0,2	.5727	.5857	.5899	.5697	0,0,2	12.74	12.30	12.21	9.201
1,0,2	.6742	.6793	.6829	.6915	1,0,2	2.714	2.401	2.207	2.180
2,0,2	.6982	.6775	.6754	.6599	2,0,2	2.440	2.320	2.123	1.884
0,1,0	.5203	.5401	.5445	.5402	0,1,0	6.132	4.680	4.697	3.956
1,1,0	.5487	.5616	.5666	.5735	1,1,0	3.555	3.131	3.192	3.219
2,1,0	.5815	.5834	.5896	.6006	2,1,0	2.800	2.697	2.716	2.426
0,1,1	.6027	.5939	.6016	.6196	0,1,1	3.709	3.019	2.987	2.719
1,1,1	.6261	.6613	.6707	.6808	1,1,1	2.765	2.438	2.406	2.521
2,1,1	.6401	.6221	.6535	.7075	2,1,1	2.517	2.590	2.753	2.619
0,1,2	.6512	.6681	.6681	.6511	0,1,2	2.722	2.733	2.590	2.258
1,1,2	.6999	.7063	.7169	.7039	1,1,2	2.397	1.543	1.713	3.114
2,1,2	.6398	.6327	.6287	.6115	2,1,2	2.306	2.166	1.990	2.714

TABLE 4

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION (MEANS COMPUTED OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

MODEL (P,D,Q)	FIRM	ρ_1 INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT
1,0,0	-.0007	-.0114	.0063	-.0849
2,0,0	-.0241	-.0186	-.0146	-.0162
0,0,1	.3264	.3219	.3308	.3074
1,0,1	-.0942	-.0884	-.0878	-.0890
2,0,1	-.0640	-.0581	-.0694	-.0627
0,0,2	.1425	.1297	.1211	.0615
1,0,2	-.0675	-.0837	-.0803	-.0780
2,0,2	-.0663	-.0680	-.0565	-.0758
0,1,0	-.0400	-.0387	-.0207	-.1319
1,1,0	-.0176	-.0014	.0036	-.0076
2,1,0	.0054	.0229	.0277	.0407
0,1,1	.0307	.0533	.0443	.0540
1,1,1	.0020	.0029	.0112	-.0012
2,1,1	-.0010	.0263	.0316	.0218
0,1,2	-.0064	-.0072	-.0123	-.0085
1,1,2	-.0139	.0062	-.0044	.0100
2,1,2	-.0012	.0179	.0120	.0305

MODEL (P,D,Q)	FIRM	ρ_2 INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT
1,0,0	-.0657	-.0948	-.0976	-.0909
2,0,0	-.1046	-.1250	-.1260	-.1361
0,0,1	.4686	.4915	.4897	.4830
1,0,1	-.0294	-.0580	-.0617	-.0774
2,0,1	-.0529	-.0665	-.0675	-.0940
0,0,2	.3553	.3474	.3518	.3147
1,0,2	-.0825	-.0942	-.0872	-.1098
2,0,2	-.0753	-.0779	-.0733	-.0731
0,1,0	-.0715	-.0984	-.1006	-.1245
1,1,0	-.1488	-.1442	-.1451	-.1549
2,1,0	-.0042	.0068	.0090	.0067
0,1,1	-.0311	-.0553	-.0608	-.0723
1,1,1	-.0159	.0025	+.0011	-.0294
2,1,1	-.0264	-.0134	-.0146	.0084
0,1,2	.0271	.0518	.0353	.0032
1,1,2	-.0413	.0100	-.0074	-.0424
2,1,2	-.0398	-.0362	-.0245	-.0024

MODEL (P,D,Q)	FIRM	ρ_3 INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT
1,0,0	.0502	.0386	.0397	.1240
2,0,0	.0515	.0345	.0341	.0830
0,0,1	.2759	.3045	.3078	.3414
1,0,1	.0396	.0241	.0295	.0934
2,0,1	.0199	-.0070	-.0012	.0488
0,0,2	.2700	.3013	.2891	.3219
1,0,2	.0483	.0459	.0462	.0892
2,0,2	.0225	.0172	.0072	.0462
0,1,0	.0429	.0369	.0368	.0907
1,1,0	.0154	-.0016	-.0015	.0466
2,1,0	-.0305	-.0403	-.0360	-.0151
0,1,1	.0139	-.0136	-.0123	.0209
1,1,1	.0093	-.0163	-.0167	.0325
2,1,1	-.0028	-.0109	-.0047	.0349
0,1,2	.0141	-.0019	-.0008	.0382
1,1,2	-.0020	-.0222	-.0092	.0243
2,1,2	-.0332	-.0141	-.0035	-.0057

(P,D,Q)	FIRM	ρ_4 INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT
1,0,0	-.0445	-.0840	-.0830	-.1052
2,0,0	-.0451	-.0830	-.0872	-.1160
0,0,1	.2211	.2325	.2350	.2387
1,0,1	-.0481	-.0723	-.0760	-.1094
2,0,1	-.0471	-.0780	-.0856	-.1256
0,0,2	.1213	.1224	.1254	.0835
1,0,2	-.0368	-.0517	-.0519	-.0958
2,0,2	-.0373	-.0527	-.0527	-.0931
0,1,0	-.0258	-.0661	-.0694	-.1095
1,1,0	-.0396	-.0694	-.0741	-.1015
2,1,0	-.0933	-.1153	-.1254	-.1454
0,1,1	-.0444	-.0749	-.0787	-.1217
1,1,1	-.0788	-.1198	-.1253	-.1207
2,1,1	-.0677	-.0905	-.0992	-.1219
0,1,2	-.0361	-.0681	-.0782	-.1079
1,1,2	-.0659	-.1117	-.1162	-.1263
2,1,2	-.0449	-.0744	-.0807	-.1032

TABLE 5

ADJUSTED R^2 SUMMARY STATISTICS FOR THE "BEST" MODELS FIT TO THE EPS SERIES

ENTITY FOR WHICH TIME-SERIES PARAMETERS WERE ESTIMATED	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION			AGGREGATE FORECASTS FROM ENTITY MODELS		
		TWO	THREE	FOUR	THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	.7217 .7946 .1925 .1599 17				.6559 .6807 .2259 .1722 17	.6130 .7006 .2615 .2245 17	.5645 .6784 .3075 .2473 17
THREE-DIGIT INDUSTRY	.7267 .7686 .2186 .1793 39	.6124 .6532 .3259 .2558 39				.6714 .7069 .2666 .2161 39	.6485 .6960 .2824 .2296 39
FOUR-DIGIT INDUSTRY	.6790 .7260 .2555 .2085 49	.6152 .6688 .3101 .2473 49	.6918 .7418 .2359 .1945 49				.6493 .7181 .2780 .2294 49
FIRM	.6688 .7418 .3051 .2339 138	.5608 .6688 .3873 .3154 139	.5957 .6784 .3467 .2817 139	.6013 .6885 .3388 .2760 139			

NOTE: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE 6

ADJUSTED R^2 SUMMARY STATISTICS FOR THE "BEST" MODELS FIT TO THE EPS SERIES

ENTITY FOR WHICH TIME-SERIES PARAMTERES WERE ESTIMATED	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS: THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	-.7229 -.9184 3.0137 .9558 -.3756 6				-.8662 .2166 3.707 .9232 .0857 20	-.5213 -1.109 3.2006 .9226 .0857 27	-.6885 -.8828 3.0917 .9503 0 85
THREE-DIGIT INDUSTRY	-.6226 -.7204 3.3358 .9944 .2654 20	-.8944 -.1765 3.5120 .9844 -.1600 14				-.6681 -.7460 3.4071 .9942 .0857 27	-.7679 -.3697 3.5087 .9909 0 85
FOUR-DIGIT INDUSTRY	-.6858 -.5972 3.5518 .9933 .0857 27	-.8520 -.1332 3.6892 .9839 -.1600 15	-.5819 -.8367 3.5302 .9913 .1584 23				-.7348 .4521 3.5659 .9912 0 85
FIRM	-1.5629 .3635 5.4446 .9971 -.6642 85	-.9673 .1318 4.0608 .9869 -.5859 25	-1.0697 .8466 4.7330 .9922 -.6488 57	-1.0363 .7438 4.8407 .9911 -.6488 65			

NOTE: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE 7

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(Forecast Error)^2/Variance of EPS

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS: THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	2.472 .7861 4.246 2.683 17				2.586 .9790 4.195 2.623 17	2.519 .9395 4.302 2.855 17	2.724 .8854 4.332 2.992 17
THREE-DIGIT INDUSTRY	1.671 .4657 3.352 1.903 39	1.624 .5928 3.067 1.790 39				1.533 .4657 3.284 1.759 39	1.775 .6949 3.377 2.041 39
FOUR-DIGIT INDUSTRY	1.467 .3740 3.230 1.702 49	1.641 .5581 2.915 1.760 49	1.680 .6949 3.184 1.821 49				1.852 .6949 3.587 2.167 49
FIRM	1.809 .5929 4.172 2.112 138	1.604 .5203 3.486 1.760 189	1.477 .5108 3.105 1.623 139	1.291 .4175 2.621 1.428 139			

NOTE: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE 8

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
$(\text{Forecast Error})^2/\text{Variance of EPS}$

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS: LEVEL OF AGGREGATION			AGGREGATE FORECASTS FROM ENTITY MODELS: ENTITIES AGGREGATED		
		TWO	THREE	FOUR	THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	2.402 4.934 3.903 16.58 .0021 6				2.424 5.050 3.951 16.58 .0021 20	2.304 4.446 3.853 16.58 .0021 27	2.124 3.840 3.826 16.58 .0021 85
THREE-DIGIT INDUSTRY	3.163 9.713 4.944 16.58 .0012 20	3.437 12.78 5.403 16.58 .0021 14				3.355 10.87 5.047 16.58 .0012 27	2.956 8.628 4.908 16.58 .0012 85
FOUR-DIGIT INDUSTRY	3.569 12.31 5.132 16.58 .0012 27	3.322 12.60 5.685 16.58 .0021 15	3.169 10.11 5.205 16.58 .0012 23				2.770 6.914 4.621 16.58 .0012 85
FIRM	4.857 28.96 8.261 34.47 .0006 85	5.482 37.68 8.866 30.91 .0001 25	4.832 28.91 8.217 25.52 .0001 57	4.200 19.89 6.518 17.08 .0001 65			

NOTE: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE 9

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
ABS(Forecast Error)/Standard Deviation of EPS

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS — ENTITIES AGGREGATED: THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	1.192 .8866 1.057 .7969 17				1.265 .9895 1.023 .7496 17	1.199 .9693 1.072 .7930 17	1.253 .9409 1.107 .8713 17
THREE-DIGIT INDUSTRY	.9343 .6825 .9052 .6300 39	.9650 .7699 .8431 .5991 39				.8918 .6825 .8704 .5747 39	.9809 .8336 .9133 .6247 39
FOUR-DIGIT INDUSTRY	.8597 .6116 .8618 .5805 49	.9821 .7470 .8313 .6188 49	.9607 .8336 .8794 .6195 49				.9833 .8336 .9504 .6429 49
FIRM	.9530 .7700 .9525 .6539 138	.9475 .7213 .8436 .6007 139	.8941 .7147 .8261 .5900 139	.8361 .6461 .7723 .5596 139			

NOTE: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE 10

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
ABS (Forecast Error)/Standard Deviation of EPS

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS: LEVEL OF AGGREGATION			AGGREGATE FORECASTS FROM ENTITY MODELS: ENTITIES AGGREGATED		
		TWO	THREE	FOUR	THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	1.367 1.142 3.809 4.071 .0462 6				1.338 1.264 3.934 4.071 .0462 20	1.336 .9767 3.755 4.071 .0462 27	1.104 .3039 3.635 4.071 .0462 85
THREE-DIGIT INDUSTRY	1.777 3.114 4.460 4.071 .0340 20	1.757 3.313 4.774 4.071 .0462 14				2.037 4.217 4.639 4.071 .0340 27	1.676 2.550 4.421 4.071 .0340 85
FOUR-DIGIT INDUSTRY	2.073 4.634 4.685 4.071 .0340 27	1.592 2.671 4.842 4.071 .0462 15	1.669 2.868 4.591 4.071 .0340 23				1.700 2.433 4.248 4.071 .0340 85
FIRM	2.208 6.301 6.138 5.871 .0247 85	2.195 7.074 6.578 5.559 .0100 25	1.973 5.469 6.104 5.051 .0089 57	1.865 4.537 5.340 4.133 .0089 65			

NOTE: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE 11

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS

Forecast Error/Standard Deviation of EPS

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS — ENTITIES AGGREGATED: THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	-1.078 - .8866 1.180 .8893 17				-1.151 - .9895 1.157 .8435 17	-1.085 - .9693 1.194 .8601 17	-1.139 - .9409 1.231 .9653 17
THREE-DIGIT INDUSTRY	- .8759 - .6825 .9633 .6799 39	- .7947 - .6773 1.009 .7239 39				- .7957 - .6825 .9613 .6588 39	- .8764 - .8336 1.016 .7104 39
FOUR-DIGIT INDUSTRY	- .8103 - .6116 .9094 .6218 49	- .8438 - .6814 .9740 .7191 49	- .9141 - .8336 .9286 .6584 49				- .8925 - .8336 1.038 .7233 49
FIRM	- .6924 - .5763 1.157 .7660 138	- .7046 - .6211 1.056 .6848 139	- .6946 - .6714 1.001 .6718 139	- .6212 - .5583 .9549 .6518 139			

NOTE: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE 12

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
Forecast Error/Standard Deviation of EPS

FOR 1972 RECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS			AGGREGATE FORECASTS FROM ENTITY MODELS		
		TWO	THREE	FOUR	THREE	FOUR	FIRM
IT INDUSTRY	-.9400				-.8265	-.9298	-.7599
	.4710				.5023	.3646	-.1286
	3.915				3.990	3.868	3.751
	.5471				.5471	.5471	.5471
	-4.071				-4.071	-4.071	-4.071
	6				20	27	85
IGIT INDUSTRY	-1.467	-.9543				-1.525	-1.210
	2.384	1.561				2.813	1.509
	4.794	5.000				4.804	4.543
	.5471	.9741				.5471	.5471
	-4.071	-4.071				-4.071	-4.071
	20	14				27	85
GIT INDUSTRY	-1.766	-.8819	-1.391				-1.312
	3.762	1.362	2.262				1.598
	5.078	5.180	4.973				4.450
	.5471	.9741	.5471				.5471
	-4.071	-4.071	-4.071				-4.071
	27	15	23				85
	.6642	1.119	.8176	.2838			
	7.857	8.956	7.946	5.301			
	8.672	9.116	9.115	8.592			
	5.871	5.559	5.051	4.133			
	-4.164	-4.071	-4.071	-4.071			
	85	25	57	65			

Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

APPENDIX A

Sample Companies

HOMESTAKE MINING
SUPERIOR OIL
KELLOGG CO
HELME PRODUCTS
AMALGAMATED SUGARS
GENERAL CIGAR CO
COLLINS AIKMAN CO
SCOTT PAPER CO
ALLIED CHEMICAL
AMERICAN CYANAMID
CELANESE COPR
DOW CHEMICAL
DUPONT
HERCULES
MONSANTO
UNION CARBIDE
DIAMOND SHAMROCK
ROHM HAAS
AIRCO INC
CHEMETRON
CROMPTON KNOWLES
INMONT COPR
KOPPERS CO
MACANDREWS AND FORBES
AMERICAN HOME PRODUCTS
MERCK CO
PFIZER INC
SEARLE
SMITHKLINE
BRISTOL
MILES LABORATORIES
MORTON NORWICH
RICHARDSON MERRELL
STERLING DRUG CO
KENDALL CO
NL INDUSTRIES
GILLETTE CO
CONWOOD CORP
FERRO CORP
ASHLAND OIL
ATLANTIC RICHFIELD
CITIES SERVICES
CONTINENTAL OIL
KERR MCGEE
MARATHON OIL
PHILLIPS PETROLEUM
QUAKER STATE OIL
SHELL OIL
STANDARD OF INDIANA
STANDARD OF OHIO
SUN OIL CO
UNION OIL OF CALIFORNIA
FLINTKOTE
ARMSTRONG RUBBER
FIRESTONE TIRE
B F GOODRICH
GOODYEAR TIRE
UNIROYAL INC
PPG INDUSTRIES
ARMCO STEEL
BETHLEHEM STEEL
INLAND STEEL
REPUBLIC STEEL
ALLEGHENY LUDLUM
CARPENTER TECHNOLOGY
COPPERWELD
INTERLAKE

STEEL COMPANY OF CANADA
BELDEN CO
CRANE CO
SIGNODE
BABCOCK WILCOX
COMBUSTION ENGINEERING
ALLIS CHALMERS
CATERPILLAR TRACTOR
CLARK EQUIPMENT
FMC CORP
REXNORD
DRESSER INDS
HALLIBURTON
CINCINNATI MILACRON
MONARCH MACHINE TOOL
SKIL CORP
SUNDSTRAND CORP
WARNER SWASEY
BLACK & DECKER
EX-CELLO CORP
MIDLAND ROSS
OTIS ELEVATOR CO
OUTBOARD MARINE
USMCORP
AMERICAN CHAIN CABLE
CHICAGO PNEUMATIC TOOL
BRIGGS STRATTON
GARDNER DENVER
INGERSOLL RAND
MESTA MACHINES
STEWART WARNER
ADDRESSOGRAPH MULTI
BUSINESS MACHINE
NATIONAL CASH REGISTER
PITNEY BOWES
XEROX
HONEYWELL
GENERAL ELECTRIC
RCA CORP
WESTINGHOUSE
EMERSON ELECTRIC
GLOBE UNION
MCGRAW EDISON
OHIO BRASS CO
RELIANCE ELECTRIC
CUTLER HAMMER
SQUARE D
MAYTAG
SINGER CO
FAIRCHILD CAMERA
MALLORY PR CO
GENERAL MOTORS
FRUEHAUF CORP
INTERNATIONAL HARVESTER
WHITE MOTOR CORP
WARNER CORP
DANA CORP
EATON CORP
FEDERAL MOGUL
KELSEY HAYES
TIMKEN
PIPER AIRCRAFT
ROCKWELL MFG
GENERAL SIGNAL CORP
EASTMAN KODAK
MINNESOTA MINING & MFG
HAMMOND CORP

Appendix B

TABLE B-1

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 20 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

("N.M." denotes "No Acceptable Model")

…DEL …D,Q)	$\bar{R}^2$ FIRM	$\bar{R}^2$ INDUSTRY GROUP FOUR DIGIT	$\bar{R}^2$ INDUSTRY GROUP THREE DIGIT	$\bar{R}^2$ INDUSTRY GROUP TWO DIGIT	MODEL (P,D,Q)	Q (6) FIRM	Q (6) INDUSTRY GROUP FOUR DIGIT	Q (6) INDUSTRY GROUP THREE DIGIT	Q (6) INDUSTRY GROUP TWO DIGIT
…0,0	.8041	.8041	.8041	.8451	1,0,0	4.883	4.883	4.883	2.130
…0,0	.7958	.7958	.7958	.8369	2,0,0	5.424	5.424	5.424	2.369
…0,1	.5728	.5728	.5728	.6112	0,0,1	30.09	30.09	30.09	31.31
…0,1	.7964	.7964	.7964	.8374	1,0,1	4.508	4.508	4.508	2.023
…0,1	.7783	.7783	.7783	.8222	2,0,1	5.359	5.359	5.359	1.932
…0,2	.7916	.7916	.7916	.8084	0,0,2	22.48	22.48	22.48	15.07
…0,2	.8250	.8250	.8250	.8377	1,0,2	3.213	3.213	3.213	1.262
…0,2	.8180	.8180	.8180	.8302	2,0,2	2.987	2.987	2.987	1.119
…1,0	.7602	.7602	.7602	.8282	0,1,0	4.356	4.356	4.356	1.837
…1,0	.7523	.7523	.7523	.8208	1,1,0	3.157	3.157	3.157	1.887
…1,0	.7570	.7570	.7570	.8350	2,1,0	3.260	3.260	3.260	2.411
…1,1	.7529	.7529	.7529	.8209	0,1,1	3.659	3.659	3.659	1.936
…1,1	.7786	.7786	.7786	N.M.	1,1,1	3.913	3.913	3.913	N.M.
…1,1	N.M.	N.M.	N.M.	.8483	2,1,1	N.M.	N.M.	N.M.	1.002
…1,2	.7969	.7969	.7969	.8572	0,1,2	3.929	3.929	3.929	2.588
…,2	.7117	.7117	.7117	N.M.	1,1,2	2.150	2.150	2.150	N.M.
…,2	.7186	.7186	.7186	N.M.	2,1,2	2.670	2.670	2.670	N.M.

TABLE B-2

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 20 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

MODEL (P,D,Q)	ρ_1 FIRM	ρ_1 INDUSTRY GROUP FOUR	ρ_1 INDUSTRY GROUP THREE	ρ_1 INDUSTRY GROUP TWO	MODEL (P,D,Q)	ρ_2 FIRM	ρ_2 INDUSTRY GROUP FOUR	ρ_2 INDUSTRY GROUP THREE	ρ_2 INDUSTRY GROUP TWO
1,0,0	.0595	.0595	.0595	-.0421	1,0,0	-.2121	-.2121	-.2121	-.2519
2,0,0	.0370	.0370	.0370	.0107	2,0,0	-.2361	-.2361	-.2361	-.2688
0,0,1	.4173	.4173	.4173	.4340	0,0,1	.5748	.5748	.5748	.6167
1,0,1	-.0991	-.0991	-.0991	-.1258	1,0,1	-.1541	-.1541	-.1541	-.2178
2,0,1	-.0634	-.0634	-.0634	-.0855	2,0,1	-.1538	-.1538	-.1538	-.2114
0,0,2	.3352	.3352	.3352	.1341	0,0,2	.3786	.3786	.3786	.4521
1,0,2	-.1769	-.1769	-.1769	-.1590	1,0,2	-.1245	-.1245	-.1245	-.1183
2,0,2	-.1273	-.1273	-.1273	-.1039	2,0,2	-.1305	-.1305	-.1305	-.0905
0,1,0	.1176	.1176	.1176	-.0207	0,1,0	-.0866	-.0866	-.0866	-.2111
1,1,0	.0251	.0251	.0251	-.0040	1,1,0	-.1523	-.1523	-.1523	-.2122
2,1,0	.0174	.0174	.0174	.0181	2,1,0	.0668	.0668	.0668	.0846
0,1,1	.0566	.0566	.0566	.0113	0,1,1	-.0656	-.0656	-.0656	-.2188
1,1,1	.0667	.0667	.0667	N.M.	1,1,1	.0419	.0419	.0419	N.M.
2,1,1	.0742	.0742	.0742	.0214	2,1,1	-.0267	-.0267	-.0267	.0256
0,1,2	.0504	.0504	.0504	.1117	0,1,2	.1356	.1356	.1356	.2445
1,1,2	.0239	.0239	.0239	N.M.	1,1,2	-.0545	-.0545	-.0545	N.M.
2,1,2	.0834	.0834	.0834	-.0469	2,1,2	-.0413	-.0413	-.0413	.1066

MODEL (P,D,Q)	ρ_3 FIRM	ρ_3 INDUSTRY GROUP FOUR	ρ_3 INDUSTRY GROUP THREE	ρ_3 INDUSTRY GROUP TWO	MODEL (P,D,Q)	ρ_4 FIRM	ρ_4 INDUSTRY GROUP FOUR	ρ_4 INDUSTRY GROUP THREE	ρ_4 INDUSTRY GROUP TWO
1,0,0	-.1284	-.1284	-.1284	-.0026	1,0,0	-.0731	-.0731	-.0731	-.0435
2,0,0	-.1635	-.1635	-.1635	-.0211	2,0,0	-.1023	-.1023	-.1023	-.0431
0,0,1	.3984	.3984	.3984	.4554	0,0,1	.4024	.4024	.4024	.4842
1,0,1	-.1326	-.1326	-.1326	.0249	1,0,1	-.0299	-.0299	-.0299	-.0442
2,0,1	-.1851	-.1851	-.1851	-.0215	2,0,1	-.0520	-.0520	-.0520	-.0730
0,0,2	.4739	.4739	.4739	.4507	0,0,2	.2849	.2849	.2849	.2063
1,0,2	.0897	.0897	.0897	.0192	1,0,2	.0096	.0096	.0096	.0588
2,0,2	.0246	.0246	.0246	.0367	2,0,2	-.0103	-.0103	-.0103	-.0946
0,1,0	-.0697	-.0697	-.0697	-.0517	0,1,0	-.0610	-.0610	-.0610	-.0825
1,1,0	-.1193	-.1193	-.1193	-.0581	1,1,0	-.0681	-.0681	-.0681	-.0852
2,1,0	-.1239	-.1239	-.1239	-.1217	2,1,0	-.0992	-.0992	-.0992	-.2082
0,1,1	-.1324	-.1324	-.1324	-.0642	0,1,1	-.0414	-.0414	-.0414	-.0882
1,1,1	-.1755	-.1755	-.1755	N.M.	1,1,1	-.0908	-.0908	-.0908	N.M.
2,1,1	-.0004	-.0004	-.0004	.0861	2,1,1	-.1390	-.1390	-.1390	-.0670
0,1,2	-.0425	-.0425	-.0425	-.0153	0,1,2	-.0612	-.0612	-.0612	-.0449
1,1,2	-.0399	-.0399	-.0399	N.M.	1,1,2	-.1652	-.1652	-.1652	N.M.
2,1,2	-.0305	-.0305	-.0305	.0580	2,1,2	-.0902	-.0902	-.0902	-.0666

TABLE B-3

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 28 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

$\bar{R}^2$					Q(6)			
	INDUSTRY GROUP			MODEL		INDUSTRY GROUP		
FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT	(P,D,Q)	FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT
.7383	.8024	.8716	.8675	1,0,0	7.027	5.872	5.359	2.232
.7457	.8036	.8721	.8526	2,0,0	4.053	4.265	3.676	2.277
.5441	.6002	.6310	N.M.	0,0,1	30.60	30.69	33.85	N.M.
.7730	.8078	.8749	.8628	1,0,1	3.876	3.570	3.587	2.004
.7873	.7978	.8730	.8498	2,0,1	3.722	3.741	3.896	1.625
.6477	.7008	.7580	.7665	0,0,2	19.79	23.16	25.19	10.15
.7746	.8036	.8715	.8555	1,0,2	3.206	2.502	2.200	1.960
.7878	.7942	.9257	.8452	2,0,2	3.086	2.599	2.656	1.723
.6788	.6968	.8437	.8519	0,1,0	8.471	5.525	6.300	1.702
.6940	.6937	.8449	.8492	1,1,0	3.924	2.989	3.148	1.395
.7218	.7141	.8439	.8468	2,1,0	3.029	2.437	1.739	1.880
.7164	.7013	.8484	.8509	0,1,1	4.196	3.085	3.500	1.674
.7499	.8761	.8261	.8716	1,1,1	3.617	2.274	2.184	1.780
.7758	.6699	.8337	.8664	2,1,1	2.375	2.213	1.991	1.553
.7601	.7363	.9234	.8736	0,1,2	2.800	3.309	1.650	2.487
.7987	.8798	.8949	.8675	1,1,2	3.002	1.536	1.273	2.024
.7412	.7455	.9179	.8737	2,1,2	2.839	1.868	1.142	2.036

TABLE B-4

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 28 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

ρ_1						ρ_2			
ODEL		INDUSTRY GROUP			MODEL		INDUSTRY GROUP		
,D,Q)	FIRM	FOUR	THREE	TWO	(P,D,Q)	FIRM	FOUR	THREE	TWO
,0,0	.0688	.0739	.0600	-.1823	1,0,0	-.0337	-.0595	-.0088	-.1113
,0,0	-.0100	.0134	-.0055	.0850	2,0,0	-.1039	-.0898	-.0620	-.1779
,0,1	.4576	.4831	.5605	.4257	0,0,1	.5457	.5858	.6320	.6775
,0,1	-.1178	-.1182	-.1484	-.1483	1,0,1	.0161	.0240	.0443	-.1202
,0,1	-.0740	-.0444	-.0876	-.0694	2,0,1	-.0142	-.0181	+.0037	-.1355
,0,2	.2431	.3010	.3285	.0339	0,0,2	.4827	.5250	.5590	.3418
,0,2	-.0897	-.1184	-.1173	-.1333	1,0,2	-.0627	-.0712	-.0937	-.1484
0,2	-.0873	-.0809	-.0526	-.0884	2,0,2	-.0565	-.0653	-.0896	-.0850
1,0	.0676	.1205	.1433	-.1617	0,1,0	-.0162	.0017	.0914	-.1033
1,0	-.0350	-.0037	-.0066	-.0179	1,1,0	-.1429	-.0624	.0114	-.1328
1,0	-.0122	.0135	-.0013	.0039	2,1,0	-.0167	-.0189	.0201	-.0278
1,1	-.0023	.0315	.0237	.0451	0,1,1	.0123	.0262	.1072	-.1101
1,1	-.0141	-.0295	-.0151	.0576	1,1,1	-.0199	.0453	.0052	-.0391
1,1	.0022	.0473	.0830	-.0099	2,1,1	-.0527	-.0128	.0257	.0450
1,2	.0022	.0336	-.0011	.0339	0,1,2	.0302	.0959	.0255	.1293
1,2	-.0189	.0195	-.0212	.0119	1,1,2	-.0563	.0063	.0143	.0925
1,2	-.0127	.0195	.0072	.0657	2,1,2	-.0736	.0227	.0125	.0891

ρ_3						ρ_4			
DEL		INDUSTRY GROUP			MODEL		INDUSTRY GROUP		
D,Q)	FIRM	FOUR	THREE	TWO	(P,D,Q)	FIRM	FOUR	THREE	TWO
0,0	.0174	-.0193	-.0186	.0279	1,0,0	-.0119	-.1026	-.1120	-.1908
0,0	.0207	-.0256	-.0495	-.0735	2,0,0	-.0233	-.0960	-.1353	-.2058
0,1	.3602	.4134	.4469	.4445	0,0,1	.3159	.3268	.3631	.4011
0,1	.0177	-.0313	-.0458	.0165	1,0,1	-.0213	-.0581	-.0933	-.1949
0,1	-.0180	-.0880	-.1025	-.0174	2,0,1	-.0426	-.0860	-.1419	-.1943
),2	.2971	.3597	.3812	.4185	0,0,2	.2409	.2525	.2679	.1707
),2	.0387	.0174	.0011	.0130	1,0,2	-.0286	-.0653	-.0780	-.1826
),2	-.0130	-.0312	-.0476	-.0181	2,0,2	-.0488	-.0815	-.1294	-.2177
1,0	.0246	.0334	.0427	.0013	0,1,0	.0284	-.0168	-.0099	-.1665
1,0	-.0183	-.0420	-.0376	-.0498	1,1,0	-.0236	-.0320	-.0420	-.1741
1,0	-.0310	-.0337	-.0098	-.0944	2,1,0	-.0672	-.0591	-.0754	-.2152
1,1	.0147	-.0115	-.0063	-.0739	0,1,1	.0033	-.0098	-.0188	-.1912
1,1	-.0268	-.1108	-.0604	-.0244	1,1,1	-.0471	-.0761	-.0720	-.1837
1,1	-.0257	-.0474	.0211	.0318	2,1,1	-.0439	-.0365	-.0660	-.1618
1,2	.0039	.0195	.0159	-.0282	0,1,2	-.0070	.0114	-.0336	-.1689
1,2	-.0342	-.0481	-.0383	-.0093	1,1,2	-.0629	-.0832	-.0988	-.1700
1,2	-.0594	-.0099	-.0333	-.0633	2,1,2	-.0273	-.0524	-.0678	-.1311

TABLE B-5

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 29 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

$\bar{R}^2$					Q(6)			
	INDUSTRY GROUP					INDUSTRY GROUP		
FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT	MODEL (P,D,Q)	FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT
.7949	.5319	.5319	.8977	1,0,0	4.534	3.093	3.093	2.584
.7908	.5093	.5093	.8829	2,0,0	3.663	3.009	3.009	3.051
.5661	.4474	.4474	.6590	0,0,1	24.45	21.70	21.70	34.99
.7932	.5136	.5136	.8925	1,0,1	3.296	3.102	3.102	3.192
.7819	.4898	.4898	.8827	2,0,1	2.856	2.813	2.813	2.528
.7140	.5037	.5037	.8021	0,0,2	13.96	10.29	10.29	17.15
.8005	.6029	.6029	.8879	1,0,2	2.552	2.755	2.755	3.334
.7852	.5537	.5537	.8803	2,0,2	2.106	2.486	2.486	2.885
.7478	.3605	.3605	.8881	0,1,0	4.593	4.252	4.252	1.949
.7679	.4764	.4764	.8832	1,1,0	2.601	3.380	3.380	1.957
.7888	.6181	.6181	.8790	2,1,0	3.454	9.955	9.955	2.044
.8094	.6986	.6986	.8832	0,1,1	3.160	3.617	3.617	1.959
.8220	.9082	.9082	N.M.	1,1,1	2.521	1.005	1.005	N.M.
.8185	.9084	.9084	.8932	2,1,1	1.784	1.598	1.598	2.109
.8380	.9009	.9009	.8817	0,1,2	2.101	1.858	1.858	2.095
.8273	.9078	.9078	N.M.	1,1,2	2.051	1.372	1.372	N.M.
.8298	.9010	.9010	N.M.	2,1,2	1.698	1.611	1.611	N.M.

TABLE B-6

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 29 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

DEL	ρ_1				MODEL	ρ_2			
		INDUSTRY GROUP					INDUSTRY GROUP		
D,Q)	FIRM	FOUR	THREE	TWO	(P,D,Q)	FIRM	FOUR	THREE	TWO
0,0	-.0337	-.0047	-.0047	-.0132	1,0,0	-.0333	-.0227	-.0227	-.0959
0,0	.0108	.0156	.0156	.1110	2,0,0	-.0921	-.0514	-.0514	-.1086
0,1	.4204	.1942	.1942	.5846	0,0,1	.5906	.4954	.4954	.6764
0,1	-.1152	-.0748	-.0748	-.1536	1,0,1	-.0361	-.0388	-.0388	-.0767
0,1	-.0667	-.0273	-.0273	-.0788	2,0,1	-.0552	-.0512	-.0512	-.0924
0,2	.1816	-.0192	-.0192	.0619	0,0,2	.4396	.4739	.4739	.5011
0,2	-.0837	.0183	.0183	-.1680	1,0,2	-.1194	-.1912	-.1912	-.0542
0,2	-.0702	.0188	.0188	-.1314	2,0,2	-.1023	-.1412	-.1412	-.0088
1,0	-.0359	-.1019	-.1019	.0171	0,1,0	-.0196	-.0964	-.0964	-.0647
1,0	.0002	.0209	.0209	-.0010	1,1,0	-.0755	-.1041	-.1041	-.0682
1,0	.0368	.1985	.1985	.0294	2,1,0	.0259	.0220	.0220	.0125
1,1	.0295	.0911	.0911	-.0040	0,1,1	.0136	.0139	.0139	-.0684
1,1	.0328	.1008	.1008	N.M.	1,1,1	.0051	.0880	.0880	N.M.
1,1	.0124	.2093	.2093	.1199	2,1,1	.0152	.1315	.1315	.1284
1,2	-.0104	-.1078	-.1078	-.0128	0,1,2	.0058	.0361	.0361	.1196
1,2	-.0130	-.0345	-.0345	N.M.	1,1,2	-.0580	.0432	.0432	N.M.
1,2	.0056	.1198	.1198	N.M.	2,1,2	.0091	.0658	.0658	N.M.

DEL	ρ_3				MODEL	ρ_4			
		INDUSTRY GROUP					INDUSTRY GROUP		
D,Q)	FIRM	FOUR	THREE	TWO	(P,D,Q)	FIRM	FOUR	THREE	TWO
0,0	.0972	.2386	.2386	.2362	1,0,0	-.0587	-.1814	-.1814	-.1468
0,0	.0719	.2100	.2100	.1544	2,0,0	-.0578	-.1941	-.1941	-.1657
0,1	.3934	.3541	.3541	.5347	0,0,1	.3082	.1443	.1443	.3965
0,1	.0965	.2190	.2190	.2456	1,0,1	-.0630	-.2121	-.2121	-.1687
0,1	.0563	.1842	.1842	.1899	2,0,1	-.0596	-.2195	-.2195	-.1794
0,2	.4195	.2566	.2566	.4763	0,0,2	.1193	.0338	.0338	.0045
0,2	.0692	.1038	.1038	.2471	1,0,2	-.0144	-.0711	-.0711	-.1771
0,2	.0592	.1424	.1424	.1850	2,0,2	-.0303	-.0597	-.0597	-.2085
,0	.0653	.2099	.2099	.1739	0,1,0	-.0674	-.2130	-.2130	-.1487
,0	.0475	.1190	.1190	.1782	1,1,0	-.0705	-.2289	-.2289	-.1507
,0	.0025	-.1450	-.1450	.1681	2,1,0	-.1084	-.3583	-.3583	-.1691
,1	.0439	.1029	.1029	.1789	0,1,1	-.0827	-.2370	-.2370	-.1512
,1	.0145	-.0041	-.0044	N.M.	1,1,1	-.0997	-.2116	-.2116	N.M.
,1	-.0360	-.0207	-.0207	-.0150	2,1,1	-.0693	-.1862	-.1862	-.0277
,2	.0509	.1850	.1850	.1424	0,1,2	-.0479	-.2071	-.2071	-.1505
,2	-.0039	.1286	.1286	N.M.	1,1,2	-.1074	-.1462	-.1462	N.M.
,2	-.0308	.1037	.1037	N.M.	2,1,2	-.0387	-.1644	-.1644	N.M.

TABLE B-7

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 30 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

	$\bar{R}^2$			MODEL	Q(6)			
	INDUSTRY GROUP					INDUSTRY GROUP		
FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT	(P,D,Q)	FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT
.4391	.3127	.3127	.3127	1,0,0	2.772	3.573	3.573	3.573
.4236	.3235	.3235	.3235	2,0,0	2.546	2.495	2.495	2.495
.3229	.2410	.2410	.2410	0,0,1	13.03	5.196	5.196	5.196
.4572	.3624	.3624	.3624	1,0,1	2.154	2.152	2.152	2.152
.4402	.3398	.3398	.3398	2,0,1	2.372	2.625	2.625	2.625
.3740	.2218	.2218	.2218	0,0,2	7.303	5.721	5.721	5.721
.4576	.3330	.3330	.3330	1,0,2	2.291	2.138	2.138	2.138
.5792	.4022	.4022	.4022	2,0,2	1.712	1.779	1.779	1.779
.2147	.1393	.1393	.1393	0,1,0	5.178	6.104	6.104	6.104
.3013	.2305	.2305	.2305	1,1,0	3.223	3.640	3.640	3.640
.3873	.3468	.3468	.3468	2,1,0	2.112	2,355	2.355	2.355
.4576	.4690	.4690	.4690	0,1,1	3.770	3.247	3.247	3.247
.4593	.4474	.4474	.4474	1,1,1	1.894	2.846	2.846	2.846
.4492	.4734	.4734	.4734	2,1,1	2.214	2.923	2.923	2.923
.4823	.4686	.4686	.4686	0,1,2	1.988	2.617	2.617	2.617
.9207	N.M.	N.M.	N.M.	1,1,2	3.070	N.M.	N.M.	N.M.
.3680	.5124	.5124	.5124	2,1,2	1.978	2.080	2.080	2.080

TABLE B-8

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 30 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

ρ_1					ρ_2			
	INDUSTRY GROUP			MODEL		INDUSTRY GROUP		
FIRM	FOUR	THREE	TWO	(P,D,Q)	FIRM	FOUR	THREE	TWO
-.1183	-.1566	-.1566	-.1566	1,0,0	-.0669	-.0500	-.0500	-.0500
-.0204	-.1043	-.1043	-.1043	2,0,0	-.1290	-.1628	-.1628	-.1628
.1738	-.0508	-.0508	-.0508	0,0,1	.3353	.2565	.2565	.2565
-.0564	-.0627	-.0627	-.0627	1,0,1	-.0638	-.1587	-.1587	-.1587
-.0291	-.0277	-.0277	-.0277	2,0,1	-.0947	-.2066	-.2066	-.2066
.0647	-.0842	-.0842	-.0842	0,0,2	.2499	.3849	.3849	.3849
-.0271	-.0596	-.0596	-.0596	1,0,2	-.1029	-.1602	-.1602	-.1602
-.0735	-.1752	-.1752	-.1752	2,0,2	-.1216	-.0509	-.0509	-.0509
-.3033	-.3524	-.3524	-.3524	0,1,0	-.1754	-.2392	-.2392	-.2392
-.0708	-.1473	-.1473	-.1473	1,1,0	-.2132	-.3026	-.3026	-.3026
.0065	-.0279	-.0279	-.0279	2,1,0	-.0331	-.0970	-.0970	-.0970
.1645	.0743	.0743	.0743	0,1,1	-.0512	-.2115	-.2115	-.2115
.0235	.0168	.0168	.0168	1,1,1	-.0573	-.2155	-.2155	-.2155
.0150	.0420	.0420	.0420	2,1,1	-.0248	-.0541	-.0541	-.0541
-.0448	-.0858	-.0858	-.0858	0,1,2	-.0842	-.1978	-.1978	-.1978
-.0363	-.0683	-.0683	-.0683	1,1,2	-.0856	-.1944	-.1944	-.1944
.0011	-.0315	-.0315	-.0315	2,1,2	-.0619	-.0493	-.0493	-.0493

ρ_3					ρ_4			
	INDUSTRY GROUP			MODEL		INDUSTRY GROUP		
FIRM	FOUR	THREE	TWO	(P,D,Q)	FIRM	FOUR	THREE	TWO
.1689	.2995	.2995	.2995	1,0,0	-.0798	-.1075	-.1075	-.1075
.1036	.1995	.1995	.1995	2,0,0	-.0940	-.1301	-.1301	-.1301
.2979	.3164	.3164	.3164	0,0,1	.1204	-.0026	-.0026	-.0026
.1029	.1316	.1316	.1316	1,0,1	-.0902	-.1755	-.1755	-.1755
.0722	.0594	.0594	.0594	2,0,1	-.1156	-.1958	-.1958	-.1958
.2939	.2005	.2005	.2005	0,0,2	.0363	.0914	.0914	.0914
.0715	.1297	.1297	.1297	1,0,2	-.0922	-.1748	-.1748	-.1748
.0251	.0346	.0346	.0346	2,0,2	-.0563	-.1531	-.1531	-.1531
.1379	.1912	.1912	.1912	0,1,0	-.0726	-.1342	-.1342	-.1342
.0861	.0984	.0984	.0984	1,1,0	-.0660	-.1099	-.1099	-.1099
-.0658	-.1283	-.1283	-.1283	2,1,0	-.1383	-.1954	-.1954	-.1954
.0171	-.0265	-.0265	-.0265	0,1,1	-.1154	-.1977	-.1977	-.1977
.0727	.0032	.0032	.0032	1,1,1	-.1015	-.1892	-.1892	-.1892
.0644	-.0153	-.0153	-.0153	2 1,1	-.1293	-.2530	-.2530	-.2530
.0484	.0467	.0467	.0467	0,1,2	-.1010	-.1859	-.1859	-.1859
.0062	.0285	.0285	.0285	1,1,2	-.0906	-.1888	-.1888	-.1888
-.0303	-.1209	-.1209	-.1209	2,1,2	-.0873	-.1468	-.1468	-.1468

TABLE B-9

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 33 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

$\bar{R}^2$					Q(6)			
	INDUSTRY GROUP			MODEL		INDUSTRY GROUP		
FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT	(P,D,Q)	FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT
.3400	.4372	.4874	.3813	1,0,0	3.072	2.033	1.840	1.634
.3413	.4280	.4796	.3552	2,0,0	2.861	1.919	1.311	1.661
.2843	.3133	.3269	.2773	0,0,1	5,527	6.884	8.988	2.101
.4191	.4278	.4825	.3554	1,0,1	2.473	1.718	1.169	1.675
.4333	.4928	.6086	.3550	2,0,1	2.296	1.547	.7939	1.617
.3293	.3662	.3906	.3279	0,0,2	3.328	4.095	4.825	1.966
.4102	.4079	.4617	.3323	1,0,2	2.155	1.713	1.122	1.561
.4092	.4998	.4424	.3161	2,0,2	1.902	1.727	.9921	1.275
.0150	.2288	.3258	.0994	0,1,0	4.908	2.424	2.487	1.191
.0892	.2239	.3298	.0785	1,1,0	3.660	1.708	1.460	1.016
.1883	.2067	.3130	.0377	2,1,0	2.661	1.326	1.031	1.081
.2097	.2353	.3411	.0794	0,1,1	3.148	1.525	1.241	1.068
.2081	.0173	N.M.	N.M.	1,1,1	2.589	2.050	N.M.	N.M.
.1946	.3024	.6368	.1537	2,1,1	1.767	1.350	1.166	1.890
.3113	.3101	.3260	.0382	0,1,2	2.641	2.006	1.658	1.112
.3337	.3769	.6362	N.M.	1,1,2	1.929	1.809	1.191	N.M.
.3533	.3119	.3705	.0457	2,1,2	1.640	1.475	1.458	.7982

TABLE B-10

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 33 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

	ρ_1				ρ_2			
		Industry Group				Industry Group		
Model (P,D,Q)	Firm	Four	Three	Two	Firm	Four	Three	Two
,0,0	-.0718	-.1132	-.1523	-.1008	-.0771	-.0407	-.0111	-.0174
,0,0	-.0659	-.1054	-.0903	-.1118	-.0804	-.0598	-.0632	-.0113
,0,1	.0812	.0974	.1436	.0364	.2201	.3136	.3861	.2379
,0,1	-.0644	-.0922	-.0867	-.1156	-.0565	-.0432	-.0334	-.0090
,0,1	-.0367	-.0616	-.0247	-.1004	-.0665	-.0484	-.0622	.0084
,0,2	.0089	-.0002	.0211	-.0744	.1731	.0633	.1424	.0592
,0,2	-.0199	-.0823	-.0713	-.1081	-.0508	-.0852	-.0794	-.0743
,0,2	-.0299	-.0955	-.0427	.0082	-.0513	-.0074	-.0788	-.1491
,1,0	-.2129	-.1824	-.2293	-.1287	-.1021	-.0569	-.0463	.0136
,1,0	-.0511	-.0302	-.0382	.0071	-.1889	-.1061	-.1107	-.0100
,1,0	-.0183	.0092	.0086	.0114	-.0277	.0047	-.0025	.0080
,1,1	.0263	.0281	.0278	.0121	-.0655	-.0453	-.0327	.0040
,1,1	-.0306	-.0934	-.0716	-.1152	-.0038	-.0030	.0011	-.0031
,1,1	-.0256	-.0281	-.0142	-.0667	-.0152	.0359	-.0059	.0823
,1,2	-.0479	.0104	.0169	.0123	.0038	.1299	.1026	.0173
,1,2	-.0331	-.0763	-.0278	N.M.	-.0370	.0656	.0119	N.M.
,1,2	-.0434	-.0358	-.1167	.0129	-.0307	-.0265	.0394	-.0037

	ρ_3				ρ_4			
		Industry Group				Industry Group		
odel ,D,Q)	Firm	Four	Three	Two	Firm	Four	Three	Two
,0,0	.0755	.0616	.0891	.0130	-.0477	-.0987	-.0788	-.1589
,0,0	.0976	.0678	.0739	.0158	-.0543	-.1035	-.0854	-.1583
,0,1	.0955	.0994	.1601	.0112	.0392	.0198	.0861	-.0976
,0,1	.0610	.0525	.0643	.0165	-.0597	-.1142	-.0995	-.1582
,0,1	.0517	.1064	.0750	-.0035	-.0447	-.0950	-.1195	-.1516
,0,2	.1261	.2282	.2729	.1414	-.0006	-.0772	-.0359	-.1996
0,2	.0688	.0716	.0765	.0514	-.0645	-.1032	-.0817	-.1326
0,2	.0465	.0947	.0549	.0055	-.0563	-.1006	-.0142	.0317
1,0	.0600	.0461	.0624	.0038	-.0227	-.0673	-.0667	-.0720
1,0	.0602	.0301	.0414	-.0079	-.0112	-.0617	-.0618	-.0760
1,0	-.0478	-.0307	-.0249	-.0154	-.0735	-.0996	-.0986	-.0808
1,1	.0235	.0165	.0262	-.0123	-.0556	-.0884	-.0940	-.0808
1,1	.0579	.0249	.0407	-.0643	-.0369	-.0843	-.1011	-.0957
1,1	.0099	-.0109	.1575	-.0651	-.0620	-.0819	-.0678	-.1094
1,2	.0256	.0081	.0650	-.0147	-.0332	-.0761	-.0741	-.0852
1,2	.0737	-.0081	.1590	N.M.	-.0255	-.0778	-.0708	N.M.
1,2	.0089	.0134	.0614	-.0438	-.0267	-.0453	-.0491	-.0272

TABLE B-11

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 34 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

$\bar{R}^2$					Q(6)			
	INDUSTRY GROUP			MODEL		INDUSTRY GROUP		
FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT	(P,D,Q)	FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT
.7421	.7421	.7421	.8218	1,0,0	3.288	3.288	3.288	2.499
.7373	.7373	.7373	.8183	2,0,0	3.030	3.030	3.030	1.410
.5038	.5038	.5038	.5279	0,0,1	27.41	27.41	27.41	23.54
.7372	.7372	.7372	.8196	1,0,1	3.031	3.031	3.031	1.601
.7250	.7250	.7250	.8139	2,0,1	2.880	2.880	2.880	1.415
.6342	.6342	.6342	.6278	0,0,2	13.61	13.61	13.61	14.57
.7284	.7284	.7284	.8107	1,0,2	1.593	1.593	1.593	1.372
.7170	.7170	.7170	.8047	2,0,2	1.332	1.332	1.332	1.399
.7303	.7303	.7303	.8218	0,1,0	2.783	2.783	2.783	2.044
.7362	.7362	.7362	.8225	1,1,0	1.979	1.979	1.979	.6375
.7300	.7300	.7300	.8164	2,1,0	1.085	1.085	1.085	.4780
.7395	.7395	.7395	.8234	0,1,1	1.856	1.856	1.856	.5491
.5159	.5159	.5159	.8154	1,1,1	.3504	.3504	.3504	.5522
.7323	.7323	.7323	.8142	2,1,1	.6599	.6599	.6599	.1640
.7311	.7311	.7311	.8154	0,1,2	.7316	.7316	.7316	.5555
.4933	.4933	.4933	N.M.	1,1,2	.3746	.3746	.3746	N.M.
.9468	.9468	.9468	.8022	2,1,2	1.267	1.267	1.267	.9991

TABLE B-12

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 34 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

Model (P,D,Q)	ρ_1 Firm	ρ_1 Industry Group Four	Three	Two	ρ_2 Firm	ρ_2 Industry Group Four	Three	Two
,0,0	-.1011	-.1011	-.1011	-.1880	-.1515	-.1515	-.1515	-.0275
2,0,0	-.0608	-.0608	-.0608	.0476	-.1952	-.1952	-.1952	-.1338
0,0,1	.4875	.4875	.4875	.4047	.5940	.5940	.5940	.6317
,0,1	-.0779	-.0779	-.0779	-.1016	-.1716	-.1716	-.1716	-.0334
,0,1	-.0982	-.0982	-.0982	-.0765	-.1722	-.1722	-.1722	-.0901
0,0,2	.2511	.2511	.2511	.1604	.3440	.3440	.3440	.4510
,0,2	-.1171	-.1171	-.1171	-.0683	-.0719	-.0719	-.0719	-.1137
,0,2	-.0752	-.0752	-.0752	-.0706	-.0657	-.0657	-.0657	-.1018
,1,0	-.1284	-.1284	-.1284	-.2062	-.1514	-.1514	-.1514	-.0493
,1,0	-.0100	-.0100	-.0100	-.0164	-.1813	-.1813	-.1813	-.0627
,1,0	.0391	.0391	.0391	.0184	.0056	.0056	.0056	.0222
,1,1	.0135	.0135	.0135	.0055	-.1438	-.1438	-.1438	-.0181
,1,1	.0037	.0037	.0037	.0048	.0385	.0385	.0385	-.0159
,1,1	.0231	.0231	.0231	.0408	-.0150	-.0150	-.0150	.0560
,1,2	-.0229	-.0229	-.0229	.0039	.0287	.0287	.0287	-.0138
,1,2	.0136	.0136	.0136	N.M.	.0297	.0297	.0297	N.M.
,1,2	-.0248	-.0248	-.0248	-.0343	-.1150	-.1150	-.1150	.0008

Model (P,D,Q)	ρ_3 Firm	ρ_3 Industry Group Four	Three	Two	ρ_4 Firm	ρ_4 Industry Group Four	Three	Two
,0,0	.1397	.1397	.1397	.1804	-.0145	-.0145	-.0145	-.1362
,0,0	.1240	.1240	.1240	.0695	-.0233	-.0233	-.0233	-.1661
,0,1	.4131	.4131	.4131	.3918	.2972	.2972	.2972	.3242
,0,1	.1346	.1346	.1346	.1635	-.0272	-.0272	-.0272	-.1322
,0,1	.1214	.1214	.1214	.1057	-.0334	-.0334	-.0334	-.1710
,0,2	.4410	.4410	.4410	.4627	.1578	.1578	.1578	.0721
,0,2	.0959	.0959	.0959	.1377	-.0454	-.0454	-.0454	-.1066
0,2	.0392	.0392	.0392	.1020	-.0558	-.0558	-.0558	-.1673
1,0	.1093	.1093	.1093	.1301	-.0225	-.0225	-.0225	-.1336
1,0	.0854	.0854	.0854	.0949	-.0168	-.0168	-.0168	-.1051
1,0	.0764	.0764	.0764	.0769	-.0396	-.0396	-.0396	-.1064
1,1	.0845	.0845	.0845	.0961	-.0151	-.0151	-.0151	-.1061
1,1	.0035	.0035	.0035	.0971	-.0936	-.0936	-.0936	-.1062
1,1	.0335	.0335	.0335	-.0298	.0320	.0320	.0320	-.0173
1,2	.0749	.0749	.0749	.0980	-.0222	-.0222	-.0222	-.1064
1,2	-.0425	-.0425	-.0425	N.M.	-.0936	-.0936	-.0936	N.M.
1,2	.1290	.1290	.1290	.1696	-.0405	-.0405	-.0405	-.0787

TABLE B-13

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 35 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

EL ,Q)	$\bar{R}^2$ FIRM	INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT	MODEL (P,D,Q)	Q(6) FIRM	INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT
,0	.6802	.7388	.7046	.8512	1,0,0	6.380	5.544	5.648	6.410
,0	.6981	.7515	.7163	.8521	2,0,0	4.550	3.305	3.234	4.525
,1	.5317	.5739	.5673	.6752	0,0,1	19.93	23.41	21.81	26.82
,1	.7036	.7549	.7203	.8507	1,0,1	3.627	2.711	2.476	4.491
,1	.7135	.7495	.7173	.8531	2,0,1	3.561	2.777	2.286	4.433
,2	.6272	.6698	.6453	.7378	0,0,2	12.12	12.38	11.09	13.62
,2	.7250	.7497	.7156	.8438	1,0,2	2.733	2.238	1.898	4.198
,2	.7476	.7541	.7028	.8466	2,0,2	2.569	2.493	2.527	4.789
,0	.6136	.6852	.6387	.8265	0,1,0	6.931	5.531	5.629	6.361
,0	.6238	.6918	.6435	.8228	1,1,0	3.912	3.694	3.839	4.328
,0	.6458	.7074	.6615	.8147	2,1,0	2.666	2.165	2.247	4.333
,1	.6381	.7094	.6621	.8228	0,1,1	4.011	2.496	2.758	4.411
,1	.7351	.7734	.7270	.8303	1,1,1	2.520	2.510	2.665	4.208
,1	.6728	.7228	.6833	.8323	2,1,1	3.002	3.794	4.478	6.942
,2	.7088	.7672	.7025	.8151	0,1,2	2.957	2.725	3.538	4.894
,2	.8027	.8069	.7150	.8319	1,1,2	2.365	1.350	2.524	6.384
,2	.6803	.7673	.7040	.8218	2,1,2	2.447	1.869	1.612	9.211

TABLE B-14

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 35 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

Model (P,D,Q)	ρ_1 Firm	ρ_1 Industry Group Four	ρ_1 Industry Group Three	ρ_1 Industry Group Two	ρ_2 Firm	ρ_2 Industry Group Four	ρ_2 Industry Group Three	ρ_2 Industry Group Two
,0,0	.0891	.0544	.1401	.0982	-.1135	-.1562	-.1615	-.0213
,0,0	-.0126	-.0209	-.0048	-.0509	-.1217	-.1706	-.1510	-.0258
,0,1	.3897	.3932	.3884	.5294	.4858	.5443	.5043	.6443
,0,1	-.0686	-.0771	-.0770	-.1070	-.0381	-.0861	-.0631	-.0016
,0,1	-.0414	-.0376	-.0614	-.1178	-.0653	-.0941	-.0775	.0736
,0,2	.1440	.1021	.0695	.0766	.3712	.4020	.4116	.5854
,0,2	-.0594	-.0932	-.0859	-.0925	-.0599	-.0780	-.0376	-.0509
,0,2	-.0596	-.0718	-.0633	-.0852	-.0658	-.1073	-.0616	.0890
,1,0	.0773	.0480	.1302	.1310	-.1153	-.1608	-.1655	-.0073
,1,0	.0014	.0141	.0379	-.0088	-.1786	-.2031	-.1927	-.0218
,1,0	-.0053	-.0288	-.0213	-.0089	-.0061	-.0187	-.0074	-.0213
1,1	.0186	.0437	.0057	-.0122	-.0705	-.1056	-.1201	-.0098
1,1	.0087	.0085	.0080	-.0443	-.0523	-.0478	-.0068	.0708
1,1	-.0183	.0194	.0146	.1049	-.0543	-.0606	-.0582	.0692
1,2	.0218	-.0050	-.0084	-.0121	.0312	-.0064	-.0158	.0368
1,2	-.0298	.0636	.0006	.0759	-.0419	.0048	.0358	.0601
1,2	-.0048	-.0096	-.0091	.1167	-.0285	-.1002	-.0734	.1505

Model (P,D,Q)	ρ_3 Firm	ρ_3 Industry Group Four	ρ_3 Industry Group Three	ρ_3 Industry Group Two	ρ_4 Firm	ρ_4 Industry Group Four	ρ_4 Industry Group Three	ρ_4 Industry Group Two
0,0	.0272	-.0518	-.0805	.1259	-.0129	-.0848	-.1128	-.2149
0,0	.0634	.0059	-.0030	.1594	.0192	-.0262	-.0623	-.1851
0,1	.2538	.2875	.2601	.4535	.2217	.2662	.2341	.2731
0,1	.0247	-.0350	-.0291	.1511	.0017	-.0352	-.0688	-.1888
0,1	.0145	-.0610	-.0268	.0730	.0275	-.0157	-.0439	-.1769
0,2	.2339	.2675	.1855	.2779	.1051	.1229	.1290	.1385
0,2	.0319	.0154	.0146	.1752	-.0046	-.0329	-.0495	-.1659
0,2	.0186	-.0182	-.0422	.0568	.0101	-.0223	-.0571	-.1879
1,0	.0229	-.0709	-.1025	.1060	.0010	-.0773	-.1067	-.1996
1,0	.0091	-.0553	-.0694	.1355	.0065	-.0491	-.0856	-.1749
1,0	-.0205	-.0558	-.0374	.1353	-.0688	-.0937	-.1274	-.1752
1,1	.0128	-.0705	-.0762	.1299	.0046	-.0490	-.0823	-.1807
1,1	.0019	-.0404	-.0715	.0553	-.0287	-.1022	-.1475	-.1567
1,1	-.0128	-.0849	-.1186	.0571	-.0199	-.0807	-.0978	-.2331
1,2	-.0064	-.0943	-.1163	.1011	-.0103	-.0816	-.1005	-.2004
1,2	.0177	-.0909	-.0854	.0712	-.0389	-.1758	-.1662	-.2307
1,2	-.0473	-.0523	-.0618	-.0295	-.0154	-.0574	-.0986	-.2595

TABLE B-15

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 36 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

$\bar{R}^2$					Q(6)			
	INDUSTRY GROUP					INDUSTRY GROUP		
FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT	MODEL (P,D,Q)	FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT
.5814	.6129	.5973	.6985	1,0,0	3.315	2.883	2.285	3.201
.5761	.6019	.5831	.6862	2,0,0	3.064	2.782	2.453	2.587
.4335	.4711	.4731	.5002	0,0,1	18.22	15.63	15.33	12.36
.5750	.6030	.5854	.6873	1,0,1	3.164	2.660	2.313	2.729
.5984	.5926	.5678	.6717	2,0,1	2.805	2.311	1.800	2.489
.5107	.5202	.5184	.5752	0,0,2	10.77	9.031	8.568	6.563
.5634	.6168	.5900	.6836	1,0,2	3.073	3.197	2.698	1.337
.6934	.6630	.6408	.6682	2,0,2	2.555	3.178	2.317	1.357
.4406	.5139	.4813	.6230	0,1,0	3.643	3.436	2.844	2.974
.4566	.5336	.4905	.6206	1,1,0	3.023	2.493	2.217	2.915
.4610	.5285	.4827	.6033	2,1,0	2.977	2.560	2.505	2.795
.5479	.5314	.4921	.6202	0,1,1	3.613	2.946	2.777	3.123
.4312	.5363	.4057	N.M.	1,1,1	2.247	1.911	1.346	N.M.
.6038	.5820	.5473	.6119	2,1,1	2.712	2.357	2.456	4.090
.6195	.5980	.5612	.6043	0,1,2	2.565	2.762	2.771	2.157
.4395	.4192	.3804	.5856	1,1,2	1.052	1.008	1.341	2.205
.5824	.5716	.5381	.6021	2,1,2	2.295	2.322	2.079	2.673

TABLE B-16

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 36 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

Model	ρ_1				ρ_2			
		Industry Group				Industry Group		
(P,D,Q)	Firm	Four	Three	Two	Firm	Four	Three	Two
1,0,0	-.0891	-.0913	-.0581	-.2075	-.0604	-.0644	-.0854	.0427
2,0,0	-.0583	-.0394	-.0380	-.0605	-.0735	-.0651	-.0795	.0097
0,0,1	.2429	.2197	.2166	.1400	.4463	.4664	.4401	.5165
1,0,1	-.1104	-.1003	-.0994	-.1285	-.0414	-.0410	-.0551	.0289
2,0,1	-.0862	-.0588	-.0588	-.0884	-.0474	-.0070	-.0024	-.0028
0,0,2	.0844	.0376	.0249	.0231	.3159	.3130	.3031	.2698
1,0,2	-.0598	-.0840	-.0960	-.0841	-.1214	-.1036	-.0678	-.1344
2,0,2	-.0432	-.0843	-.0779	-.0829	-.1131	-.0648	-.0127	-.1340
0,1,0	-.1392	-.1459	-.1076	-.1709	-.0765	-.0871	-.1124	.0347
1,1,0	-.0098	.0030	.0029	.0181	-.1217	-.0970	-.1146	.0235
2,1,0	.0023	.0045	.0012	.0148	-.0180	-.0060	-.0044	.0157
0,1,1	.0344	.0366	.0455	.0128	-.0600	-.0704	-.0934	.0405
1,1,1	.0212	.0191	.0265	N.M.	-.0194	.0413	.0568	N.M.
2,1,1	-.0207	-.0105	-.0011	.0912	.0067	.0192	.0237	.0836
0,1,2	-.0162	-.0145	-.0147	.0081	.0442	.0911	.0788	-.0343
1,1,2	.0358	.0097	.0228	.0111	.0147	.0811	.0074	-.0318
2,1,2	.0229	-.0017	.0002	.1219	-.0275	-.0211	-.0369	-.0946

Model	ρ_3				ρ_4			
		Industry Group				Industry Group		
(P,D,Q)	Firm	Four	Three	Two	Firm	Four	Three	Two
1,0,0	.0410	.0438	.0188	.0575	-.1459	-.1490	-.1228	-.2377
2,0,0	.0291	.0224	.0064	.0111	-.1644	-.1636	-.1350	-.2604
0,0,1	.2249	.2360	.2365	.3016	.1633	.1452	.1336	.1449
1,0,1	.0431	.0358	.0231	.0315	-.1653	-.1619	-.1330	-.2532
2,0,1	.0540	.0254	-.0046	.0258	-.1500	-.1480	-.1158	-.2477
0,0,2	.2287	.2572	.2199	.3970	.0513	.0247	.0211	.0350
1,0,2	.0451	.0331	.0043	.0363	-.1170	-.1073	-.1262	-.1316
2,0,2	.0341	-.0055	-.0482	.0359	-.1042	-.0996	-.1065	-.1341
0,1,0	.0339	.0191	-.0015	.0353	-.1201	-.1436	-.1215	-.2395
1,1,0	.0040	-.0125	-.0319	-.0080	-.1336	-.1520	-.1264	-.2543
2,1,0	-.0263	-.0277	-.0390	-.0051	-.1744	-.1941	-.1853	-.2488
0,1,1	-.0041	-.0426	-.0589	-.0082	-.1511	-.1699	-.1468	-.2640
1,1,1	.0188	.0731	.0563	N.M.	-.1893	-.1849	-.1659	N.M.
2,1,1	.0188	.0405	.0010	-.1074	-.1589	-.1509	-.1514	-.2839
0,1,2	-.0006	-.0133	-.0133	-.0160	-.1155	-.1483	-.1334	-.2194
1,1,2	-.0810	-.0492	-.0391	-.0121	-.1266	-.1555	-.1607	-.2203

TABLE B-17

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 37 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

$\bar{R}^2$					Q(6)			
	INDUSTRY GROUP			MODEL		INDUSTRY GROUP		
FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT	(P,D,Q)	FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT
.4521	.4812	.5142	.5431	1,0,0	4.454	3.458	3.826	4.408
.4595	.4927	.5158	.5626	2,0,0	2.987	2.769	3.060	3.427
.2951	.3436	.4014	.3419	0,0,1	7.600	6.694	7.020	9.008
.4623	.4948	.5208	.5600	1,0,1	2.965	2.400	2.657	3.270
.4439	.4772	.5427	.5439	2,0,1	2.537	2.384	2.846	3.349
.3370	.4204	.4224	.3846	0,0,2	5.745	4.142	4.650	6.099
.4750	.4921	.5250	.5704	1,0,2	2.475	2.217	1.945	2.178
.4936	.4896	.6280	.6313	2,0,2	2.010	1.898	.5871	.6776
.2498	.2561	.2036	.4072	0,1,0	5.516	4.055	4.133	5.009
.3241	.3036	.2176	.4732	1,1,0	3.220	2.682	3.057	3.386
.3465	.3113	.2403	.4736	2,1,0	2.305	3.000	3.510	3.909
.4015	.3460	.2257	.4860	0,1,1	3.700	4.813	3.267	3.653
.3637	.4609	.5267	.5246	1,1,1	2.768	3.146	3.976	4.353
.2885	.3310	.2389	.5127	2,1,1	2.503	3.340	3.710	4.467
.3838	.3200	.2756	.4705	0,1,2	3.469	2.887	2.497	2.479
.2996	.2326	.4906	.4846	1,1,2	2.608	1.121	1.639	2.014
.3029	.3349	.0009	N.M.	2,1,2	2.009	2.780	2.066	N.M.

TABLE B-18

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 37 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

el	ρ_1				ρ_2			
		Industry Group				Industry Group		
,Q)	Firm	Four	Three	Two	Firm	Four	Three	Two
0	-.1983	-.1884	-.1348	-.2815	.0136	-.0255	-.0774	-.0260
0	-.0890	-.0691	-.0581	-.1020	-.0781	-.0929	-.1166	-.0801
1	.0551	.1102	.1319	.1005	.3799	.3539	.3631	.4338
1	-.1152	-.1123	-.1071	-.1210	-.0167	-.0200	-.0250	-.0428
1	-.0677	-.0595	-.0698	-.0853	-.0616	-.0425	-.0508	-.0699
2	-.0043	.0388	.0186	.0090	.2014	.1586	.1635	.2350
2	-.0590	-.0422	-.0266	.0174	-.1323	-.1117	-.0994	-.1814
2	-.0884	-.0495	-.0192	-.0274	-.0996	-.0744	-.0746	-.1428
0	-.2912	-.2713	-.2058	-.3171	-.0412	-.0777	-.1236	-.0746
0	-.0331	-.0360	-.0293	-.0431	-.1099	-.1038	-.1342	-.0757
0	.0308	.0451	.0725	.0593	.0232	.0242	.0254	.0589
1	.0566	.1035	.0213	.0167	.0292	-.0028	-.0839	-.0117
1	-.0139	.0101	.0149	.0193	.0533	.0311	.0286	-.0151
1	.0380	.0360	.0253	.0125	.0275	.0081	-.0508	.0004
2	.0173	-.0107	.0622	.0596	.0596	.0201	-.0231	-.1178
2	.0092	.0192	.0482	.0786	-.0005	.0058	-.1619	-.1804
2	-.0093	.0122	-.0754	N.M.	-.0022	.0165	.0278	N.M.

el	ρ_3				ρ_4			
		Industry Group				Industry Group		
.Q)	Firm	Four	Three	Two	Firm	Four	Three	Two
0	.1238	.1660	.2129	.2483	-.0624	-.0679	-.0739	-.1231
0	.1010	.1400	.2079	.2023	-.0773	-.1138	-.0873	-.1552
	.1646	.2328	.2347	.3183	.1078	.1271	.1466	.1530
	.0801	.1265	.1941	.1866	-.0877	-.1073	-.0779	-.1689
	.0739	.0914	.1399	.1889	-.0956	-.1158	-.0715	-.1631
2	.2503	.2959	.3289	.4059	.0567	.0507	.0610	.0476
2	.0569	.0659	.1051	.1164	-.0545	-.0744	-.0381	-.0657
2	.0515	.0681	.0644	.0449	-.0433	-.0843	-.0211	-.0473
0	.0861	.1455	.2024	.2157	-.0703	-.0770	-.0817	-.1293
0	.0759	.1303	.1906	.1894	-.0827	-.1066	-.0847	-.1346
0	-.0305	.0269	.0799	.0766	-.1294	-.1527	-.1469	-.1903
	.0491	.0819	.1603	.1487	-.1063	-.1522	-.1060	-.1676
	.0731	.0644	.0979	.1234	-.1108	-.1467	-.1726	-.1878
	.0779	.0725	.1508	.1116	-.0968	-.1219	-.1140	-.1935
2	.0607	.0437	.0444	.1170	-.0555	-.0729	-.0512	-.0903
2	.0419	-.0283	-.0904	-.0861	-.0417	-.0746	-.1214	-.1380

TABLE B-19

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 38 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

DEL D,Q)	$\bar{R}^2$ FIRM	INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT	MODEL (P,D,Q)	Q(6) FIRM	INDUSTRY GROUP FOUR DIGIT	THREE DIGIT	TWO DIGIT
,0	.9045	.7734	.7734	.9574	1,0,0	6.121	4.605	4.605	2.813
,0	.9021	.7640	.7640	.9540	2,0,0	3.378	3.586	3.586	3.828
,1	.5994	.5030	.5030	.6526	0,0,1	39.95	25.11	25.11	33.54
,1	.9008	.7653	.7653	.9556	1,0,1	7.749	3.644	3.644	2.882
,1	.8920	.7463	.7463	.9526	2,0,1	4.617	5.415	5.415	3.269
,2	.8057	.6621	.6621	.8406	0,0,2	30.01	18.08	18.08	16.17
,2	.9010	.7890	.7890	.9530	1,0,2	2.099	2.526	2.526	2.811
,2	.8957	.7788	.7788	.9505	2,0,2	2.759	2.777	2.777	3.446
,0	.8899	.5629	.5629	.9558	0,1,0	8.699	6.224	6.224	1.967
,0	.8901	.5736	.5736	.9529	1,1,0	2.207	2.986	2.986	2.216
,0	.8915	.5633	.5633	.9506	2,1,0	2.135	3.003	3.003	2.301
,1	.8908	.5800	.5800	.9527	0,1,1	3.746	4.228	4.228	2.273
,1	.9876	.6075	.6075	.9477	1,1,1	2.593	3.339	3.339	1.634
,1	.9118	.6699	.6699	.9460	2,1,1	2.910	2.715	2.715	1.096
,2	.9128	.8770	.8770	.9487	0,1,2	3.668	4.121	4.121	2.609
,2	.9874	.9874	.9874	N.M.	1,1,2	1.865	.4785	.4785	N.M.
,2	.9072	.3225	.3225	.9433	2,1,2	2.386	3.972	3.972	1.372

TABLE B-20

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 38 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

Model	ρ_1				ρ_2			
		Industry Group				Industry Group		
(P,D,Q)	Firm	Four	Three	Two	Firm	Four	Three	Two
1,0,0	.0482	-.0041	-.0041	-.0971	-.0216	-.0221	-.0221	-.0624
2,0,0	.0049	.0029	.0029	.0116	-.0715	-.0785	-.0785	-.0847
0,0,1	.4359	.3075	.3075	.5193	.6435	.6064	.6064	.7124
1,0,1	-.2159	-.1252	-.1252	-.0986	.0725	-.0213	-.0213	-.0634
2,0,1	-.1391	-.1517	-.1517	-.0447	-.0191	-.0253	-.0253	-.0744
0,0,2	.3208	.2078	.2078	.1826	.4899	.4080	.4080	.4883
1,0,2	-.0820	-.0587	-.0587	-.0816	-.1690	-.1889	-.1889	-.1065
2,0,2	-.0359	-.0211	-.0211	-.0439	-.1470	-.1581	-.1581	-.0495
0,1,0	.1468	.0594	.0594	-.0772	.0936	.0470	.0470	-.0346
1,1,0	-.0108	-.0187	-.0187	-.0010	-.0424	-.0698	-.0698	-.0441
2,1,0	-.0151	-.0029	-.0029	-.0003	-.0025	.0020	.0020	-.0129
0,1,1	.0778	.0847	.0847	.0071	.0678	.0245	.0245	-.0396
1,1,1	-.0068	.0188	.0188	.0759	-.0301	.0294	.0294	.0586
2,1,1	-.0122	-.0106	-.0106	-.0158	-.0215	.0352	.0352	.0890
0,1,2	-.0240	-.0317	-.0317	.0311	.1399	.1711	.1711	.0746
1,1,2	-.0308	-.0037	-.0037	N.M.	-.1260	-.0305	-.0305	N.M.
2,1,2	.0251	.0353	.0353	.0392	-.0674	.0624	.0624	.0777

Model	ρ_3				ρ_4			
		Industry Group				Industry Group		
(P,D,Q)	Firm	Four	Three	Two	Firm	Four	Three	Two
1,0,0	-.0385	-.0374	-.0374	-.0624	-.1352	-.1494	-.1494	-.2680
2,0,0	-.0648	-.0775	-.0775	-.1030	-.1679	-.1909	-.1909	-.3120
0,0,1	.3644	.2845	.2845	.4170	.3557	.3078	.3078	.4434
1,0,1	-.0707	-.0591	-.0591	-.0635	-.1718	-.1743	-.1743	-.2701
2,0,1	-.0983	-.1009	-.1009	-.0800	-.1928	-.2024	-.2024	-.2909
0,0,2	.4408	.4105	.4105	.4675	.2105	.1325	.1325	.1337
1,0,2	.0049	-.0148	-.0148	-.0537	-.0538	-.0444	-.0444	-.2575
2,0,2	-.0563	-.0485	-.0485	-.0931	-.1078	-.0951	-.0951	-.3018
0,1,0	.0602	.0271	.0271	-.0585	-.0142	-.0531	-.0531	-.2242
1,1,0	-.0473	-.0751	-.0751	-.0811	-.1150	-.1471	-.1471	-.2405
2,1,0	-.0908	-.1301	-.1301	-.0906	-.1406	-.1867	-.1867	-.2452
0,1,1	-.0252	-.0661	-.0661	-.0846	-.0970	-.1385	-.1385	-.2431
1,1,1	-.0902	-.0643	-.0643	-.0184	-.2003	-.2439	-.2439	-.1917
2,1,1	-.1255	-.0872	-.0872	.0214	-.1700	-.1672	-.1672	-.1556
0,1,2	-.0396	-.0766	-.0766	-.0913	-.0931	-.1396	-.1396	-.2432
1,1,2	-.0686	.0049	.0049	N.M.	-.0763	-.0593	-.0593	N.M.
2,1,2	-.0612	.0076	.0076	-.0306	-.1124	-.1452	-.1452	-.1697

TABLE B-21

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION

(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 39 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

ODEL	$\bar{R}^2$				MODEL	Q(6)			
		INDUSTRY GROUP					INDUSTRY GROUP		
,D,Q)	FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT	(P,D,Q)	FIRM	FOUR DIGIT	THREE DIGIT	TWO DIGIT
),0	.5851	.6473	.6473	.6514	1,0,0	4.073	2.995	2.995	5.134
),0	.5684	.6325	.6325	.6456	2,0,0	3.953	2.688	2.688	5.921
),1	.4328	.4786	.4786	.4616	0,0,1	16.41	18.20	18.20	19.32
),1	.5768	.6350	.6350	.6771	1,0,1	3.920	2.469	2.469	3.932
),1	.5990	.6214	.6214	.6644	2,0,1	4.509	2.906	2.906	3.907
),2	.6028	.5788	.5788	.5241	0,0,2	6.316	6.887	6.887	9.812
),2	.6437	.6356	.6356	.6760	1,0,2	2.597	2.331	2.331	3.414
),2	.7382	.6293	.6293	.6705	2,0,2	2.041	1.807	1.807	2.784
,0	.5110	.5733	.5733	.5827	0,1,0	5.024	3.736	3.736	5.028
,0	.5099	.5757	.5757	.6010	1,1,0	4.875	3.248	3.248	5.728
,0	.5738	.6323	.6323	.7041	2,1,0	3.226	2.318	2.318	2.530
,1	.5487	.6143	.6143	.7150	0,1,1	3.559	2.466	2.466	4.832
,1	.9264	.9264	.9264	N.M.	1,1,1	1.101	1.101	1.101	N.M.
,1	.5529	.6140	.6140	N.M.	2,1,1	2.850	2.040	2.040	N.M.
,2	.6087	.7864	.7864	N.M.	0,1,2	2.809	2.237	2.237	N.M.
,2	.9215	.9215	.9215	N.M.	1,1,2	1.338	1.338	1.338	N.M.
,2	.6351	.7818	.7818	N.M.	2,1,2	1.841	1.231	1.231	N.M.

TABLE B-22

MEANS OF ESTIMATED VALUES BASED ON DATA FOR DIFFERENT LEVELS OF AGGREGATION
(MEANS COMPUTED FOR TWO DIGIT INDUSTRY NUMBER 39 OVER ALL ESTIMATES FOR A GIVEN MODEL (P,D,Q))

Model (P,D,Q)	ρ_1 Firm	ρ_1 Industry Group Four	Three	Two	ρ_2 Firm	ρ_2 Industry Group Four	Three	Two
,0,0	.0241	.0198	.0198	-.2559	-.0637	-.1589	-.1589	-.2791
,0,0	-.0199	-.0098	-.0098	-.1641	-.0746	-.1868	-.1868	-.3876
,0,1	.2741	.3467	.3467	.2220	.4567	.4772	.4772	.5311
,0,1	-.0359	-.0499	-.0499	-.1044	-.0755	-.1745	-.1745	-.3156
,0,1	-.1488	-.1075	-.1075	-.0621	-.0168	-.1043	-.1043	-.3345
,0,2	.0606	.0274	.0274	-.0197	.3110	.3276	.3276	.3244
,0,2	-.0974	-.0992	-.0992	-.2243	.0087	-.0091	-.0091	-.2077
,0,2	-.0832	-.0374	-.0374	-.2141	.0223	-.0118	-.0118	-.1892
,1,0	-.0530	-.0241	-.0241	-.2442	-.1220	-.2073	-.2073	-.3367
,1,0	-.0090	-.0092	-.0092	-.0854	-.1715	-.2473	-.2473	-.4152
,1,0	.0046	.0190	.0190	-.0027	.0168	.0233	.0233	.0113
,1,1	.0217	.0350	.0350	.2314	-.0788	-.0148	-.0148	-.1445
,1,1	.0258	.0258	.0258	N.M.	-.0940	-.0940	-.0940	N.M.
,1,1	.0186	.0196	.0196	.0197	.0291	-.0255	-.0255	.0208
,1,2	-.1182	-.0273	-.0273	-.1415	-.0036	.0570	.0570	-.0583
,1,2	.0387	.0387	.0387	N.M.	.0332	.0332	.0332	N.M.
,1,2	.0345	.0321	.0321	-.0373	-.0905	-.0482	-.0482	.0573

Model (P,D,Q)	ρ_3 Firm	ρ_3 Industry Group Four	Three	Two	ρ_4 Firm	ρ_4 Industry Group Four	Three	Two
,0,0	-.0070	.0873	.0873	.2181	.0231	.0754	.0754	.0310
,0,0	.0070	.1017	.1017	.1763	.0452	.0877	.0877	.0716
,0,1	.1875	.3123	.3123	.4037	.1581	.2868	.2868	.3636
,0,1	.0005	.0971	.0971	.1631	.0384	.0781	.0781	.0420
,0,1	.0038	.0945	.0945	.1132	.0682	.0596	.0596	.0266
,0,2	.1574	.2461	.2461	.4153	.0632	.1417	.1417	.1282
,0,2	.0360	.0753	.0753	.1802	-.0020	.0360	.0360	-.0151
,0,2	.0229	.0354	.0354	.1252	-.0112	.0668	.0668	-.0360
,1,0	-.0627	.0371	.0371	.1199	.0312	.0576	.0576	.0374
,1,0	-.0587	.0440	.0440	.0469	.0449	.0832	.0832	.0867
,1,0	-.0882	.0022	.0022	-.1985	-.0495	-.0089	-.0089	-.0566
,1,1	-.0499	.0446	.0446	-.0224	.0307	.0565	.0565	-.0491
,1,1	.0429	.0429	.0429	N.M.	-.1029	-.1029	-.1029	N.M.
,1,1	-.0740	-.0310	-.0310	.0726	-.0485	.0242	.0242	-.1092
1,2	-.0010	.0263	.0263	.0481	.0625	.0573	.0573	.0046
1,2	-.0442	-.0442	-.0442	N.M.	-.0816	-.0816	-.0816	N.M.
1,2	-.0441	-.0037	-.0037	.0674	.0070	.0546	.0546	-.0643

TABLE B-23

MEANS OF ESTIMATED VALUES FOR TWO-DIGIT INDUSTRIES CONTAINING ONE FIRM

$\bar{R}^2$ INDUSTRY GROUP						MODEL	Q(6) INDUSTRY GROUP					
D #10	IND #13	IND #21	IND #22	IND #26	IND #32	(P,D,Q)	IND #10	IND #13	IND #21	IND #22	IND #26	IND #32
658	.2354	.7686	.7946	.8410	.0332	1,0,0	5.668	5.647	1.179	2.688	7.282	1.356
927	.2510	.7589	.7884	.8854	.0839	2,0,0	4.028	6.874	1.134	2.519	8.880	1.294
894	.3756	.6320	.5270	N.M.	.0019	0,0,1	8.293	2.151	20.48	28.13	N.M.	1.432
944	.3494	.7583	.7879	.9037	N.M.	1,0,1	3.573	2.365	1.196	2.516	3.999	N.M.
787	.3202	N.M.	.7792	.9085	.0496	2,0,1	3.390	2.341	N.M.	2.529	4.464	2.394
790	.3495	.7025	.6692	.8818	.0857	0,0,2	6.185	2.365	4.375	9.671	16.45	.4851
033	.3202	.7485	.7794	.9284	N.M.	1,0,2	2.021	2.386	.7387	2.405	1.764	N.M.
952	.3336	.7375	.7726	.9254	.0083	2,0,2	2.513	1.197	.6444	2.133	1.620	.6896
378	-.0529	.7619	.8047	.8121	-.6044	0,1,0	8.326	6.774	1.553	2.633	6.841	4.965
311	-.0965	.7569	.8018	.8537	-.2527	1,1,0	4.063	6.477	1.159	2.446	9.505	1.965
643	.1150	.7465	.8061	.9100	-.2405	2,1,0	2.811	3.757	1.343	2.395	2.146	2.677
534	-.0654	.7572	.8066	.8834	.0749	0,1,1	3.284	5.294	1.248	2.508	3.767	1.399
.M.	N.M.	.7725	N.M.	.8839	.0336	1,1,1	N.M.	N.M.	1.599	N.M.	4.320	1.396
606	N.M.	.7738	N.M.	.9114	N.M.	2,1,1	3.855	N.M.	1.582	N.M.	2.371	N.M.
386	N.M.	N.M.	.7996	.9135	.0911	0,1,2	2.611	N.M.	N.M.	2.341	1.672	1.397
436	N.M.	N.M.	N.M.	.9104	N.M.	1,1,2	4.029	N.M.	N.M.	N.M.	2.030	N.M.
383	N.M.	N.M.	.8115	.9092	-.0427	2,1,2	3.856	N.M.	N.M.	1.518	3.385	1.927

TABLE B-24

MEANS OF ESTIMATED VALUES FOR TWO-DIGIT INDUSTRIES CONTAINING ONE FIRM

	ρ_1 INDUSTRY DATA				
IND #10	IND #13	IND #21	IND #22	IND #26	IND #32
-.1587	.0688	-.0416	-.0609	.2917	-.1162
-.0670	.0183	-.0235	-.0221	.2355	-.0891
.1640	-.0081	.5279	.4631	.7392	-.0066
-.0588	-.0362	-.0467	-.0144	-.0002	N.M.
-.0695	-.0300	N.M.	-.0246	.0193	-.0625
.0489	-.0364	.0519	.0432	.4902	-.0553
.0569	-.0397	-.0204	-.0327	-.0513	N.M.
-.0493	-.0148	-.0218	-.0374	-.0727	-.0780
-.3391	-.0428	-.1212	-.1208	.3185	-.4065
-.0143	-.0187	-.0054	.0106	.2725	-.0739
.2013	.0588	.0072	.0612	.2221	.0250
.0790	.2258	.0027	.0858	.1007	.0247
-.1742	N.M.	.0536	N.M.	.0668	.0261
.0777	.0007	-.0216	-.1125	.0614	.0051
.1277	-.0774	-.0702	.0232	-.0850	-.0711
.0100	N.M.	N.M.	N.M.	-.0491	N.M.
.0732	-.1109	.1871	.0640	.0000	.0373

	ρ_2 INDUSTRY DATA				
IND #10	IND #13	IND #21	IND #22	IND #26	IND #32
-.0132	-.3279	-.0071	-.1121	-.3154	.1297
-.0986	-.2035	-.0024	-.1218	-.3763	-.0800
.4093	-.0216	.5085	.6299	.5654	.1843
-.0188	-.0372	-.0084	-.1078	-.0559	N.M.
-.0443	-.0146	N.M.	-.1350	-.1484	-.0255
.3298	-.0363	.3197	.3507	.3822	-.0898
-.1680	-.0359	-.0598	-.0446	-.0977	N.M.
.0767	.0346	-.0662	-.0194	-.0976	-.1049
-.1498	-.4072	-.0555	-.1514	-.2764	-.0041
-.2065	-.4059	-.0212	-.1633	-.3739	-.1405
.0920	-.1436	.0025	.0841	.0897	-.0643
-.0212	-.2696	-.0095	-.1042	-.0864	.0428
-.1240	N.M.	.0469	N.M.	-.1306	.0433
-.0736	-.2633	.0242	-.2178	.2044	-.0767
-.1213	-.0476	.0589	-.0049	-.0627	.0325
-.0107	N.M.	N.M.	N.M.	-.0324	N.M.
-.0736	-.1031	-.0065	-.1306	-.0929	.0363

	ρ_3 INDUSTRY DATA				
IND #10	IND #13	IND #21	IND #22	IND #26	IND #32
.4198	.1387	.1245	.1434	-.1340	.0736
.3394	.3378	.1159	.1311	-.2565	-.0479
.3261	.1133	.4035	.3747	.4487	.0888
.3223	.1247	.1270	.1363	-.2832	N.M.
.2804	.1377	N.M.	.1263	-.2842	-.1135
.3471	.1253	.2226	.3961	.2161	.0523
.1843	.1273	.0924	.1369	-.1666	N.M.
.2509	.0777	.0820	.0946	-.1528	-.0085
.3763	.1329	.0829	.1128	-.0988	.0713
.2940	.1092	.0478	.1056	-.2399	-.0629
.1141	-.0329	.0509	.0703	-.0870	-.1751
.2966	-.1020	.0508	.1140	-.2321	-.0329
.3792	N.M.	.0996	N.M.	-.2610	-.0326
.3348	.1488	.1161	.0906	-.1381	-.1068
.1882	-.0143	.1125	.1405	-.1503	-.0149
.3682	N.M.	N.M.	N.M.	-.1902	N.M.
.3363	-.0043	-.0018	-.0011	-.2460	-.0744

	ρ_4 INDUSTRY DATA				
IND #10	IND #13	IND #21	IND #22	IND #26	IND #32
-.1208	-.1176	-.1409	.0780	.2045	-.0951
-.1432	-.0847	-.1432	.0811	.2017	-.1733
.1335	-.0436	.2398	.4433	.4705	-.0689
-.1623	-.0514	-.1402	.0847	.2311	N.M.
-.1985	-.0523	N.M.	.0787	.2461	-.2658
.0729	-.0515	.0751	.1466	.3688	-.0211
-.0940	-.0526	-.1105	.0914	.1008	N.M.
-.0899	-.0208	-.1045	.1009	.0962	-.0475
-.2231	-.1051	-.1722	.0696	.2266	-.1653
-.1134	-.1088	-.1746	.0760	.2291	-.2149
-.1131	-.2670	-.1819	.1073	.1262	-.2515
-.1138	-.2018	-.1777	.0904	.2558	-.2018
-.1226	N.M.	-.1573	N.M.	.2643	-.2014
-.0556	-.1781	-.1617	.0149	.1576	-.2373
-.1098	-.0901	-.1872	.1080	.1332	-.1972
-.0847	N.M.	N.M.	N.M.	.1483	N.M.
-.0571	-.1023	-.2072	-.0684	.2313	-.2263

Appendix C
TABLE C-1

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO-DIGIT INDUSTRY 20 (FOR FORECAST ERRORS)
$(\text{Forecast Error})^2$/Variance of EPS

ty for Which 1972 S Was Forecast	Entity Model	Entity Forecasts from Aggregate Models: Level of Aggregation			Aggregate Forecasts from Entity Models: Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
e Digit Industry	.3458	.1683					.3458	.3458
	.0056	.1038					.0056	.0056
	.5931	.1121					.5931	.5931
	.4566	.0863					.4566	.4566
	3	3					3	3
Digit Industry	.3458	.1683	.3458					.3458
	.0056	.1038	.0056					.0056
	.5931	.1121	.5931					.5931
	.4566	.0863	.4566					.4566
	3	3	3					3
	.3458	.1683	.3458	.3458				
	.0056	.1038	.0056	.0056				
	.5931	.1121	.5931	.5931				
	.4566	.0863	.4566	.4566				
	3	3	3	3				

: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE C-2

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 20 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

ity for Which 1972 PS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation: Two	Three	Four	Aggregate Forecasts from Entity Models — Entities Aggregated: Two	Three	Four	Firm
ee Digit Industry	.5773	.5773					.5773	.5773
	-2.000	-2.000					-2.000	-2.000
	1.736	1.735					1.736	1.736
	1.031	.2977					1.031	1.031
	.0012	.1032					.0012	.0012
	20	14					27	85
r Digit Industry	.5773	.5773	.5773					.5773
	-2.000	-2.000	-2.000					-2.000
	1.736	1.736	1.736					1.736
	1.031	.2977	1.031					1.031
	.0012	.1032	.0012					.0012
	27	15	23					85
m	.5773	.5773	.5773	.5773				
	-2.000	-2.000	-2.000	-2.000				
	1.736	1.735	1.736	1.736				
	1.031	.2977	1.031	1.031				
	.0012	.1032	.0012	.0012				
	85	25	57	65				

e: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE C-3

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 28 (FOR FORECAST ERRORS)
$(\text{Forecast Error})^2/\text{Variance of EPS}$

Entity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation			Aggregate Forecasts from Entity Models — Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
Three Digit Industry	.5881 .3049 .5574 .4553 5	.5990 .4644 .4493 .3210 5					.5828 .3049 .5493 .4500 5	.4984 .5273 .3356 .2571 5
Four Digit Industry	.5078 .3523 .4913 .3679 8	.8705 .5113 .9046 .7151 8	.7869 .2920 .7923 .6197 8					.5576 .4278 .4566 .3825 8
Firm	.7207 .2611 1.145 .7224 30	1.170 .3100 2.749 1.269 31	.9520 .5954 1.780 .9843 31	.8105 .4815 1.265 .7880 31				

Note: **Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.**

TABLE C-4

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 28 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

Entity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models: Level of Aggregation			Aggregate Forecasts from Entity Models: Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
Three Digit Industry	.5198	.7675					.4986	-.1245
	-1.558	-.9924					-1.584	-1.571
	2.442	2.640					2.439	2.566
	1.4031	1.327					1.379	.9114
	.0420	.1408					.0393	.0501
	20	14					27	85
Four Digit Industry	.9736	.9628	.6408					.2560
	-.3361	-.9879	-1.310					-1.650
	3.025	2.544	2.551					2.572
	1.497	2.428	2.035					1.203
	.0108	.1262	.0144					.0290
	27	15	23					85
Firm	2.637	4.436	3.397	2.555				
	7.053	19.58	12.15	6.429				
	4.646	5.523	5.118	4.539				
	5.321	15.19	9.108	5.740				
	.0028	.0017	.0004	.0001				
	85	25	57	65				

Note: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE C-5

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 29 (FOR FORECAST ERRORS)
$(\text{Forecast Error})^2/\text{Variance of EPS}$

ity for Which 1972 PS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation			Aggregate Forecasts from Entity Models — Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
ee Digit Industry	.9309	.4008					.9309	.9421
	.9309	.4008					.9309	.9421
	1.300	.4752					1.300	1.284
	.9191	.3360					.9191	.9078
	2	2					2	2
r Digit Industry	.9309	.4008	.9309					.9421
	.9309	.4008	.9309					.9421
	1.300	.4752	1.300					1.284
	.9191	.3360	.9191					.9078
	2	2	2					2
n	.5858	.4493	.4678	.4678				
	.0567	.1073	.0898	.0898				
	1.313	.9726	.9164	.9164				
	.7872	.5429	.5853	.5853				
	14	14	14	14				

: **Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.**

TABLE C-6

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 29 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

ity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models: Level of Aggregation			Aggregate Forecasts from Entity Models: Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
ee Digit Industry	.0000	.0000					.0000	.0000
	-2.500	-2.500					-2.500	-2.500
	1.414	1.414					1.414	1.414
	1.850	.7368					1.850	1.850
	.0118	.0648					.0118	.0343
	20	14					27	85
r Digit Industry	.0000	.0000	.0000					.0000
	-2.500	-2.500	-2.500					-2.500
	1.414	1.414	1.414					1.414
	1.850	.7368	1.850					1.850
	.0118	.0648	.0118					.0343
	27	15	23					85
m	2.619	2.913	2.198	2.198				
	5.496	6.987	3.359	3.359				
	3.679	3.832	3.472	3.472				
	4.832	3.731	3.183	3.183				
	.0006	.0034	.0015	.0015				
	85	25	57	65				

e: **Entries in a given cell are**, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE C-7

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 30 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

ity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation			Aggregate Forecasts from Entity Models — Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
ee Digit Industry	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
r Digit Industry	X	X	X					X
	X	X	X					X
	X	X	X					X
	X	X	X					X
	X	X	X					X
m	1.244	1.326	1.326	1.326				
	1.178	.8051	.8051	.8051				
	.7497	1.207	1.207	1.207				
	.4862	1.037	1.038	1.038				
	5	5	5	5				

e: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

Redundant.

TABLE C-8

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 30 (FOR FORECAST ERRORS)
$(\text{Forecast Error})^2/\text{Variance of EPS}$

ity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models: Level of Aggregation Two	Three	Four	Aggregate Forecasts from Entity Models: Entities Aggregated Two	Three	Four	Firm
ee Digit Industry	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
r Digit Industry	X	X	X					X
	X	X	X					X
	X	X	X					X
	X	X	X					X
	X	X	X					X
	X	X	X					X
m	.7119	.2680	.2680	.2680				
	-.8876	-2.016	-2.016	-2.016				
	2.732	2.094	2.094	2.094				
	2.460	2.674	2.674	2.674				
	.4113	.1459	.1459	.1459				
	85	25	57	65				

e: **Entries in a given cell are, respectively**, skewness, kurtosis, studentized range, **maximum, minimum**, and the number of entities for which a d=1 model was best.

= Redundant.

TABLE C-9

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 33 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

ntity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models: Level of Aggregation			Aggregate Forecasts from Entity Models: Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
hree Digit Industry	1.536	1.523					.8396	.3407
	1.536	1.523					.8396	.3407
	1.125	1.311					.1411	3.772
	.7957	.9268					.0998	2.667
	2	2					2	2
our Digit Industry	1.245	1.625	1.605					.3724
	.7398	1.656	1.586					1.369
	1.267	1.013	.8746					4.635
	.9613	.6857	.5893					3.560
	3	3	3					3
irm	2.832	1.355	1.334	1.118				
	1.182	1.243	1.157	.8093				
	3.758	1.006	.9903	.9237				
	2.676	.8026	.7961	.7065				
	14	14	14	14				

ote: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE C-10

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 33 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

Entity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation			Aggregate Forecasts from Entity Models — Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
Three Digit Industry	.0000	.0000					.0000	.0000
	-2.500	-2.500					-2.500	-2.500
	1.414	1.414					1.414	1.414
	2.331	2.450					.9394	6.074
	.7398	.5966					.7398	.7398
	20	14					27	85
Four Digit Industry	.5028	-.0462	.0327					.5654
	-2.000	-2.000	-2.000					-2.000
	1.877	1.999	2.000					1.796
	2.687	2.623	2.489					9.065
	.3077	.5966	.7398					.7398
	27	15	23					85
Firm	1.841	.3568	.3363	.9688				
	2.489	-.8715	-.9545	-.2021				
	3.629	3.322	3.277	3.267				
	13.64	3.416	3.312	3.198				
	.0045	.0749	.0664	.1805				
	85	25	57	65				

Note: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE C-11

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 34 (FOR FORECAST ERRORS)
$(\text{Forecast Error})^2/\text{Variance of EPS}$

ty for Which 1972 S Was Forecast	Entity Model	Entity Forecasts from Aggregate Models: Level of Aggregation			Aggregate Forecasts from Entity Models: Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
e Digit Industry	.8690	.7336					.8690	.8690
	.8690	.7336					.8690	.8690
	.2461	.1991					.2461	.2461
	.1741	.1408					.1741	.1741
	2	2					2	2
Digit Industry	.8690	.7336	.8690					.8690
	.8690	.7336	.8690					.8690
	.2641	.1991	.2461					.2461
	.1741	.1408	.1741					.1741
	2	2	2					2
	.8690	.7336	.8690	.8690				
	.8690	.7336	.8690	.8690				
	.2461	.1991	.2461	.2461				
	.1741	.1408	.1741	.1741				
	2	2	2	2				

Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE C-12

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 34 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

tity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation: Two	Three	Four	Aggregate Forecasts from Entity Models — Entities Aggregated: Two	Three	Four	Firm
ree Digit Industry	.0000 -2.500 1.414 1.043 .6949 20	.0000 -2.500 1.414 .8744 .5928 14					.0000 -2.500 1.414 1.043 .6949 27	.0000 -2.500 1.414 1.043 .6949 85
ur Digit Industry	.0000 -2.500 1.414 1.043 .6949 27	.0000 -2.500 1.414 .8744 .5928 15	.0000 -2.500 1.414 1.043 .6949 23					.0000 -2.500 1.414 1.043 .6949 85
rm	.0000 -2.500 1.414 1.043 .6949 85	.0000 -2.500 1.414 .8744 .5928 25	.0000 -2.500 1.414 1.043 .6949 57	.0000 -2.500 1.414 1.043 .6949 65				

e: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE C-13

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 35 (FOR FORECAST ERRORS)
$(\text{Forecast Error})^2/\text{Variance of EPS}$

ity for Which 1972 PS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation: Two	Three	Four	Aggregate Forecasts from Entity Models — Entities Aggregated: Two	Three	Four	Firm
e Digit Industry	.4005 .1040 .5383 .4402 7	.5794 .2372 .5387 .4808 7					.3541 .1239 .4514 .3091 7	.4449 .2542 .4713 .3920 7
Digit Industry	.3381 .1040 .4650 .3419 10	.5325 .2271 .6750 .5302 10	.4044 .1040 .5083 .3916 10					.4145 .1618 .4559 .3951 10
	2.399 .3754 6.551 3.139 33	1.941 .4119 5.386 2.389 33	1.618 .4541 4.434 1.968 33	1.409 .3117 3.142 1.681 33				

: **Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.**

Appendix C
TABLE C-14

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 35 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

tity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation			Aggregate Forecasts from Entity Models — Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
ree Digit Industry	.8970	.3205					1.481	.5268
	-1.174	-1.894					.5567	-1.549
	2.394	2.240					2.855	2.446
	1.318	1.250					1.318	1.155
	.0290	.0437					.0290	.0027
	20	14					27	85
ur Digit Industry	1.294	1.325	1.036					.5622
	-.0835	.3024	-.6534					-1.504
	2.822	3.067	2.576					2.523
	1.318	2.078	1.317					1.155
	.0051	.0081	.0080					.0051
	27	15	23					85
rm	4.017	4.853	4.880	3.991				
	15.80	23.15	23.38	16.59				
	5.261	5.738	5.755	5.437				
	34.47	30.91	25.52	17.08				
	.0051	.0001	.0001	.0001				
	85	25	57	65				

te: **Entries in a given cell are, respectively,** skewness, kurtosis, studentized range, **maximum, minimum,** and the number of entities for which a d=1 model was best.

TABLE C-15

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 36 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

ity for Which 1972 PS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models, Level of Aggregation: Two	Three	Four	Aggregate Forecasts from Entity Models, Entities Aggregated: Two	Three	Four	Firm
ee Digit Industry	2.860 .8366 4.833 3.436 5	1.874 1.185 2.559 1.774 5					2.734 .8366 4.553 3.234 5	2.908 1.052 4.446 3.165 5
Digit Industry	2.817 .6512 5.530 3.743 6	1.700 .8304 2.500 1.654 6	2.632 .8626 4.642 3.140 6					2.962 .9878 5.457 3.695 6
	1.948 .5401 3.680 2.173 14	1.565 .4398 2.482 1.794 14	1.886 .4506 3.471 2.240 14	1.965 .4175 3.957 2.502 14				

: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE C-16

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 36 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

Entity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models: Level of Aggregation			Aggregate Forecasts from Entity Models: Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
Three Digit Industry	1.300	1.141					1.294	1.307
	-.4512	-.6375					-.4576	-.4396
	2.363	2.461					2.370	2.378
	11.45	6.309					10.82	10.82
	.0296	.0114					.0296	.2466
	20	14					27	85
Four Digit Industry	1.596	1.443	1.592					1.596
	.4371	.1826	.4327					.4406
	2.539	2.661	2.590					2.573
	14.05	6.663	12.05					14.05
	.0060	.0114	.0296					.0060
	27	15	23					85
Firm	2.679	1.685	2.175	2.328				
	6.023	1.169	3.180	3.979				
	3.815	3.071	3.472	3.549				
	14.05	7.628	12.05	14.04				
	.0060	.0069	.0024	.0024				
	85	25	57	65				

Note: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE C-17

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 37 (FOR FORECAST ERRORS)
$(\text{Forecast Error})^2/\text{Variance of EPS}$

tity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models: Level of Aggregation			Aggregate Forecasts from Entity Models: Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
ree Digit Industry	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
ur Digit Industry	1.910	4.425	4.446					5.126
	.9313	4.444	4.225					3.932
	1.751	2.907	3.175					4.465
	1.348	1.945	2.187					3.294
	3	3	3					3
rm	3.204	2.869	2.861	1.599				
	1.474	1.799	1.384	1.261				
	4.551	2.609	2.816	1.500				
	2.735	2.057	2.223	1.210				
	10	10	10	10				

te: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

= Data not available for prediction year.

TABLE C-18

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 37 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

ity for Which 1972 PS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation: Two	Three	Four	Aggregate Forecasts from Entity Models — Entities Aggregated: Two	Three	Four	Firm
ee Digit Industry	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
	X	X					X	X
r Digit Industry	.5765	-.0100	.1043					.3724
	-2.000	-2.000	-2.000					-2.000
	1.750	2.000	1.996					1.946
	3.932	7.322	7.227					10.07
	.8666	1.508	1.388					1.379
	27	15	23					85
m	2.218	.8753	.9905	.4227				
	3.353	-.7308	-.6515	-1.432				
	3.385	3.042	2.945	2.620				
	15.70	7.961	8.311	3.932				
	.2907	.0237	.0169	.0002				
	85	25	57	65				

e: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

Data not available for prediction year.

TABLE C-19

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 38 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

tity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation: Two	Three	Four	Aggregate Forecasts from Entity Models — Entities Aggregated: Two	Three	Four	Firm
ree Digit Industry	.1934 .1934 .2555 .1806 2	.2339 .2339 .3180 .2249 2					.1934 .1934 .2555 .1806 2	.2030 .2030 .2691 .1903 2
ur Digit Industry	1.934 1.934 .2555 .1806 2	.2339 .2339 .3180 .2249 2	1.934 1.934 .2555 .1806 2					.2030 .2030 .2691 .1903 2
rm	.2739 .0894 .3880 .2972 3	.3068 .1478 .4017 .3046 3	.2685 .0641 .3994 .3068 3	2.685 .0641 .3994 .3068 3				

te: **Entries in a given cell are, respectively,** mean, median, **standard deviation, mean absolute deviation,** and the number of entities for which a forecast was obtained.

TABLE C-20

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 38 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

ity for Which 1972 PS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation: Two	Three	Four	Aggregate Forecasts from Entity Models — Entities Aggregated: Two	Three	Four	Firm
ee Digit Industry	.0000 -2.500 1.414 .3740 .0127 20	.0000 -2.500 1.414 .4588 .0090 14					.0000 -2.500 1.414 .3740 .0127 27	.0000 -2.500 1.414 .3933 .0127 85
t Digit Industry	.0000 -2.500 1.414 .3740 .0127 27	.0000 -2.500 1.414 .4588 .0090 15	.0000 -2.500 1.414 .3740 .0127 23					.0000 -2.500 1.414 .3933 .0127 85
n	.5521 -2.000 1.822 .7198 .0127 85	.5007 -2.000 1.879 .7637 .0090 25	.5666 -2.000 1.793 .7288 .0127 57	.5666 -2.000 1.793 .7288 .0127 65				

: **Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum,** **and the number of entities for which a d=1 model was best.**

Appendix C

TABLE C-21

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 39 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

ty for Which 1972 S Was Forecast	Entity Model	Entity Forecasts from Aggregate Models			Aggregate Forecasts from Entity Models			
		Level of Aggregation			Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
e Digit Industry	.5726	1.744					.5726	.4882
	.3321	.9489					.3321	.3321
	.4599	2.200					.4599	.3139
	.3535	1.658					.3535	.2409
	3	3					3	3
Digit Industry	.5726	1.744	.5726					.4882
	.3321	.9489	.3321					.3321
	.4599	2.200	.4599					.3139
	.3535	1.658	.3535					.2409
	3	3	3					3
	.6877	2.048	.7099	.7099				
	.3075	1.179	.3075	.3075				
	.8547	1.481	.9620	.9620				
	.6390	1.091	.7169	.7169				
	4	4	4	4				

Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation and the number of entities for which a forecast was obtained.

TABLE C-22

CROSS-SECTIONAL SUMMARY STATISTICS FOR TWO DIGIT INDUSTRY 39 (FOR FORECAST ERRORS)
(Forecast Error)^2/Variance of EPS

Entity for Which 1972 EPS Was Forecast	Entity Model	Entity Forecasts from Aggregate Models — Level of Aggregation			Aggregate Forecasts from Entity Models — Entities Aggregated			
		Two	Three	Four	Two	Three	Four	Firm
Three Digit Industry	.5699 -2.000 1.783 1.103 .2829 20	.4713 -2.000 1.900 4.231 .0522 14					.5699 -2.000 1.783 1.103 .2899 27	.5614 -2.000 1.805 .8495 .2829 85
Four Digit Industry	.5699 -2.000 1.783 1.103 .2829 27	.4713 -2.000 1.900 4.230 .0522 15	.5699 -2.000 1.783 1.103 .2829 23					.5614 -2.000 1.805 .8495 .2829 85
Firm	.9809 -1.262 2.101 1.966 .1700 85	.8949 -1.311 2.216 4.231 .9489 25	.9611 -1.274 2.144 2.144 .0810 57	.9611 -1.274 2.144 2.144 .0810 65				

Note: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

APPENDIX D
TABLE D-1

ADJUSTED R^2 SUMMARY STATISTICS FOR THE "BEST" MODELS FIT TO THE EPS SERIES

(MODELS WERE CHOSEN FIRST ON Q-STATISTICS, THEN ON R^2-STATISTICS)

ENTITY FOR ICH 1972 EPS AS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS — ENTITIES AGGREGATED: THREE	FOUR	FIRM
-DIGIT INDUSTRY	.6776 .7686 .2469 .1972 17				.6563 .6793 .2275 .1734 17	.6208 .6793 .2529 .2152 17	.5647 .6632 .2989 .2492 17
E-DIGIT INDUSTRY	.6822 .7231 .2590 .2104 39	.6401 .6770 .2977 .2334 39				.6741 .7384 .2676 .2230 39	.6432 .7231 .2877 .2350 39
-DIGIT INDUSTRY	.6818 .7231 .2526 .2100 49	.6404 .7048 .2877 .2331 49	.6676 .7322 .2598 .2189 49				.6520 .7231 .2758 .2267 49
	.6572 .7241 .2839 .2386 138	.5752 .6699 .3735 .3032 139	.5932 .7070 .3438 .2826 139	.6094 .7126 .3269 .2656 139			

: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE D-2

ADJUSTED R^2 SUMMARY STATISTICS FOR THE "BEST" MODELS FIT TO THE EPS SERIES

(MODELS WERE CHOSEN FIRST ON Q-STATISTICS, THEN ON R^2 STATISTICS)

FOR '72 EPS CAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS: LEVEL OF AGGREGATION TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS: ENTITIES AGGREGATED THREE	FOUR	FIRM
INDUSTRY	-.9284				-.8907	-.5569	-.5175
	-.2269				.1959	-.9174	-1.0677
	3.5237				3.7043	3.3318	3.1854
	.9558				.9284	.9284	.9520
	.0857				.0857	.0857	.0000
	5				12	14	56
T INDUSTRY	-.7215	-.9332				-.6642	-.6840
	-.5689	.1243				-.8166	-.7134
	3.5082	3.8361				3.3953	3.4450
	.9944	.9844				.9942	.9910
	.0857	-.1575				.0857	.0000
	12	9				14	56
INDUSTRY	-.6540	-.8607	-.5861				-.7143
	-.6847	-.0008	-.8408				-.5916
	3.5928	3.9670	3.4851				3.5918
	.9934	.9839	.9913				.9907
	.0857	-.1575	.0857				.0000
	14	9	14				56
	-.7036	-.9828	-.9889	-1.0302			
	-.6355	.1328	.4903	.7292			
	3.6541	4.0237	4.3694	4.5919			
	.9971	.9869	.9922	.9911			
	-.0404	-.5157	-.5098	-.5098			
	56	11	29	25			

ies in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for
h a d=1 model was best.

TABLE D-3

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON Q-STATISTICS, THEN ON R^2 - STATISTICS)

(Forecast Error)^2/Variance of EPS

ITY FOR 1972 EPS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS — ENTITIES AGGREGATED: THREE	FOUR	FIRM
IGIT INDUSTRY	2.6466				2.5407	2.3988	2.1885
	.7861				.8786	.7368	.7956
	4.1999				4.1940	4.2016	4.2067
	2.6989				2.7400	2.6511	2.5356
	17				17	17	17
-DIGIT INDUSTRY	1.4508	1.7082				1.3743	1.2933
	.4657	.4644				.4657	.4987
	2.9397	3.2927				2.9182	2.8912
	1.5611	1.9304				1.5018	1.4103
	39	39				39	39
DIGIT INDUSTRY	1.3122	1.7215	1.5098				1.2449
	.4657	.5928	.4987				.4987
	2.6583	3.0784	2.8076				2.6410
	1.3946	1.8290	1.5803				1.3372
	49	49	49				49
	1.4545	1.6067	1.5163	1.3133			
	.3700	.5792	.5484	.4846			
	3.5784	3.3501	3.3914	2.4290			
	1.6606	1.7299	1.6482	1.3743			
	138	139	139	139			

Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE D-4

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON Q-STATISTICS, THEN ON R^2 - STATISTICS)
(Forecast Error)^2/Variance of EPS

TY FOR 1972 EPS ORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS: LEVEL OF AGGREGATION TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS: ENTITIES AGGREGATED THREE	FOUR	FIRM
GIT INDUSTRY	2.3302				2.4230	2.5000	2.6285
	4.8200				5.0985	5.3753	5.8497
	3.9461				3.9517	3.9445	3.9398
	16.5756				16.5756	16.5756	16.5756
	.0021				.0021	.0021	.0021
	5				12	14	56
IGIT INDUSTRY	3.9047	3.1280				4.0529	4.2304
	16.2512	9.8563				17.2312	18.4481
	5.6378	5.0334				5.6800	5.7327
	16.5756	16.5756				16.5756	16.5756
	.0021	.0021				.0000	.0009
	12	9				14	56
GIT INDUSTRY	4.3229	3.1344	3.7157				4.4624
	20.6784	10.4848	15.5332				21.7353
	6.2347	5.3844	5.9031				6.2754
	16.5756	16.5756	16.5756				16.5756
	.0021	.0003	.0021				.0021
	14	9	14				56
	6.5338	4.9846	6.1028	4.2674			
	52.7425	30.7517	46.8552	22.4460			
	9.6322	8.3775	9.3942	7.0332			
	34.4692	28.0676	31.8599	17.0840			
	.0016	.0017	.0004	.0001			
	56	11	29	25			

Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which d=1 model was best.

TABLE D-5

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON Q-STATISTICS, THEN ON R^2 - STATISTICS)
ABS (Forecast Error)/Standard Deviation of EPS

NTITY FOR CH 1972 EPS S FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS — ENTITIES AGGREGATED: THREE	FOUR	FIPM
)-DIGIT INDUSTRY	1.2647 .8866 1.0548 .8370 17				1.2497 .9373 1.0198 .7614 17	1.1875 .8583 1.0249 .7501 17	1.0965 .8920 1.0236 .7065 17
EE-DIGIT INDUSTRY	.8999 .6825 .8111 .5745 39	.9600 .6814 .8985 .6500 39				.8667 .6825 .7997 .5453 39	.8367 .7062 .7803 .5181 39
R-DIGIT INDUSTRY	.8696 .6825 .7534 .5267 49	.9956 .7699 .8634 .6410 49	.9333 .7062 .8075 .5921 49				.8336 .7062 .7493 .5182 49
M	.8727 .6083 .8355 .5819 138	.9561 .7610 .8352 .5910 139	.9141 .7406 .8281 .5867 139	.8703 .6961 .7483 .5596 139			

E: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE D-6

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON Q-STATISTICS, THEN ON R^2 - STATISTICS)
ABS(Forecast Error)/Standard Deviation of EPS

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FOR AGGREGATE MODELS: LEVEL OF AGGREGATION			AGGREGATE FORECASTS FROM ENTITY MODELS: ENTITIES AGGREGATED		
		TWO	THREE	FOUR	THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	1.1864 .7507 3.8160 4.0713 .0462 5				1.4016 1.3249 3.9468 4.0713 .0462 12	1.5047 1.5982 3.9274 4.0713 .0462 14	1.6989 2.1896 3.9321 4.0713 .0462 56
THREE-DIGIT INDUSTRY	1.9174 4.5110 4.9627 4.0713 .0462 12	1.6978 2.7880 4.4799 4.0713 .0462 9				2.0483 5.2176 5.0824 4.0713 .0068 14	2.2484 6.2811 5.1784 4.0713 .0307 56
FOUR-DIGIT INDUSTRY	1.9988 5.3582 5.3428 4.0713 .0462 14	1.5657 2.4906 4.6938 4.0713 .0186 9	1.6692 3.4587 4.9846 4.0713 .0462 14				2.0875 5.8659 5.3717 4.0713 .0462 56
FIRM	2.4857 9.5236 6.9795 5.8710 .0399 56	2.0973 6.2120 6.2938 5.2979 .0412 11	2.2096 7.8252 6.7935 5.6445 .0190 29	1.6371 3.7850 5.5092 4.1333 .0109 25			

NOTE: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE D-7

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON Q-STATISTICS, THEN ON R^2 - STATISTICS)
Forecast Error/Standard Deviation of EPS

ENTITY FOR HICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS — ENTITIES AGGREGATED: THREE	FOUR	FIRM
O-DIGIT INDUSTRY	-1.1348				-1.1199	-1.0576	-.9666
	- .8866				-.9373	-.8583	-.8920
	1.2016				1.1692	1.1663	1.1544
	.9440				.8378	.8274	.7982
	17				17	17	17
REE-DIGIT INDUSTRY	-.8346	-.8953				-.7943	-.7505
	-.6825	-.6814				-.6825	-.7062
	.8799	.9647				.8734	.8656
	.6248	.6985				.5997	.5821
	39	39				39	39
UR-DIGIT INDUSTRY	-.8176	-.9433	-.8813				-.7527
	-.6825	-.7699	-.7062				-.7062
	.8106	.9214	.8651				.8321
	.5649	.6815	.6327				.5793
	49	49	49				49
RM	-.6173	-.7685	-.7120	-.6721			
	-.5392	-.6780	-.7062	-.6247			
	1.0399	1.0116	1.0083	.9316			
	.6738	.6601	.6617	.6421			
	138	139	139	139			

TE: Entries in a given cell are, respectively, mean, median standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE D-8

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON Q-STATISTICS, THEN ON R^2 - STATISTICS)
Forecast Error/Standard Deviation of EPS

Y FOR .972 EPS RECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS: LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS: ENTITIES AGGREGATED: THREE	FOUR	FIRM
IT INDUSTRY	-.7222				-.8339	-.9621	-1.1728
	.1073				.4887	.7036	1.1743
	3.8519				3.9584	3.9684	4.0094
	.5569				.5569	.5569	.5569
	-4.0713				-4.0713	-4.0713	-4.0713
	5				12	14	56
IGIT INDUSTRY	-1.4595	-1.3490				-1.5432	-1.6312
	3.2579	2.0414				3.6861	4.1990
	5.2602	4.7978				5.2991	5.3468
	.5569	.5569				.5569	.5569
	-4.0713	-4.0713				-4.0713	-4.0713
	12	9				14	56
IT INDUSTRY	-1.5442	-1.2379	-1.3018				-1.4875
	4.0442	1.8652	2.5972				3.8717
	5.7093	5.0230	5.3499				5.5619
	.5569	.5569	.5569				.5569
	-4.0713	-4.0713	-4.0713				-4.0713
	14	9	14				56
	1.3847	1.0271	1.3902	.6068			
	10.8228	9.5216	11.0524	5.4967			
	9.5613	9.2615	9.6358	8.8074			
	5.8710	5.2979	5.6445	4.1333			
	-4.0713	-4.0713	-4.0713	-4.0713			
	56	11	29	25			

ntries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for
hich d=1 model was best.

APPENDIX E

TABLE E-1

ADJUSTED R^2 SUMMARY STATISTICS FOR THF "BEST" MODELS FIT TO THE EPS SERIES
(MODELS WERE CHOSEN FIRST ON R^2 THEN ON Q-STATISTICS, AND FINALLY ON R^2)

TITY FOR H 1972 EPS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS LEVEL OF AGGREGATION TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS ENTITIES AGGREGATED THREE	FOUR	FIRM
IGIT INDUSTRY	.6926 .7738 .2366 .1846 17				.6701 .6539 .2231 .1735 17	.6371 .6813 .2493 .2073 17	.6082 .7006 .2854 .2311 17
-DIGIT INDUSTRY	.7080 .7472 .2299 .1855 39	.6082 .6431 .3085 .2347 39				.6991 .7472 .2394 .1949 39	.6777 .7231 .2545 .2045 39
IGIT INDUSTRY	.7046 .7482 .2287 .1893 49	.6050 .6686 .3059 .2378 49	.6908 .7472 .2351 .1965 49				.6821 .7482 .2457 .2017 49
	.6809 .7499 .2617 .2182 138	.5270 .6686 .4420 .3240 139	.5926 .6799 .3520 .2841 139	.5879 .7070 .3769 .2914 139			

Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE E-2

ADJUSTED R^2 SUMMARY STATISTICS FOR THE "BEST" MODELS FIT TO THE EPS SERIES
(MODELS WERE CHOSEN FIRST ON R^2, THEN ON Q-STATISTICS, AND FINALLY $\bar{R}^2$)

ENTITY FOR ICH 1972 EPS AS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS LEVEL OF AGGREGATION TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS ENTITIES AGGREGATED THREE	FOUR	FIRM
-DIGIT INDUSTRY	-1.0745 .2743 3.6541 .9558 .0911 9				- .9346 .4436 3.7621 .9305 .0911 19	-.6406 -.7526 3.3675 .9305 .0911 22	- .7597 - .5852 3.3326 .9510 .0000 71
EE-DIGIT INDUSTRY	- .7157 - .2892 3.9296 .9944 .0911 19	- .9732 .1399 3.7082 .9839 - .1600 19				- .6890 - .5260 3.7729 .9942 .0911 22	-.8385 - .0089 3.8935 .9909 .0000 71
R-DIGIT INDUSTRY	- .6426 - .5334 3.9454 .9934 .0911 22	- .9553 .0691 3.7390 .9839 .1600 22	- .5750 - .6930 3.8285 .9913 .0911 21				- .7937 - .0540 4.0349 .9912 .0000 71
I	- .7610 - .3545 3.9652 .9971 - .0404 71	-2.2660 9.0936 7.1800 .9869 -2.1866 51	-1.1064 .8886 4.6458 .9922 - .6432 42	-1.4668 2.6068 5.5133 .9911 -1.0868 44			

: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE E-3

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON R^2 THEN ON Q-STATISTICS, AND FINALLY ON R^2)
(Forecast Error)^2/Variance of EPS

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS — ENTITIES AGGREGATED: THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	1.5304 .4509 1.8656 1.5306 17				1.6319 1.1792 1.7477 1.3191 17	1.4577 1.0405 1.7094 1.2683 17	1.5174 .5404 1.8105 1.4389 17
THREE-DIGIT INDUSTRY	1.1779 .4657 1.5109 1.1286 39	1.1990 .5928 1.6315 1.2083 39				1.0592 .4657 1.3814 .9940 39	1.1573 .4604 1.4619 1.0918 39
FOUR-DIGIT INDUSTRY	1.0414 .4657 1.3388 .9791 49	1.2426 .5928 1.7547 1.2703 49	1.2790 .5524 1.6468 1.1827 49				1.1806 .5837 1.5329 1.1195 49
FIRM	1.4872 .4605 3.5473 1.6495 138	1.3675 .5391 2.9853 1.4242 139	1.3653 .5857 2.6640 1.3921 139	1.2189 .4846 2.0187 1.2180 139			

NOTE: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE E-4

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON $\bar{R}^2$ THEN ON Q-STATISTICS, AND FINALLY ON R^2)
$(\text{Forecast Error})^2/\text{Variance of EPS}$

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS — ENTITIES AGGREGATED: THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	1.0408				1.1594	1.3491	1.1202
	-.4074				-.0256	.5558	-.1673
	2.9968				3.1941	3.2655	3.0832
	5.5936				5.5936	5.5936	5.5936
	.0028				.0114	.0114	.0114
	9				19	22	71
THREE-DIGIT INDUSTRY	1.5511	1.6157				1.8483	1.5595
	1.3358	1.3758				2.7292	1.4987
	3.7013	3.4625				4.0483	3.8255
	5.5936	5.6542				5.5936	5.5936
	.0012	.0052				.0012	.0012
	19	19				22	71
FOUR-DIGIT INDUSTRY	1.7703	1.8496	1.9602				1.7294
	2.5491	2.5603	3.9144				2.2277
	4.1773	4.1701	4.6910				4.0286
	5.5936	7.3223	7.7266				6.1766
	.0012	.0052	.0012				.0012
	22	22	21				71
FIRM	6.5981	7.2904	5.9423	4.2790			
	53.9702	67.0165	47.3670	26.7369			
	9.7170	10.3530	9.5781	8.4627			
	34.4692	30.9073	25.5161	17.0840			
	.0000	.0001	.0004	.0001			
	71	51	42	44			

NOTE: Entities in a given vell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE E-5

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON $R,^2$ THEN ON Q-STATISTICS, AND FINALLY ON R^2)
ABS(Forecast Error)/Standard Deviation of EPS

ENTITY FOR [W]HICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS: LEVEL OF AGGREGATION TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS: ENTITIES AGGREGATED THREE	FOUR	FIRM
[TWO]-DIGIT INDUSTRY	.9924 .6715 .7613 .6531 17				1.0960 1.0859 .6765 .5100 17	1.0152 1.0201 .6735 .5288 17	1.0113 .7351 .7251 .6080 17
[THR]EE-DIGIT INDUSTRY	.8687 .6825 .6591 .5402 39	.8636 .7699 .6821 .5394 39				.8343 .6825 .6106 .4846 39	.8652 .6785 .6477 .5318 39
[FOU]R-DIGIT INDUSTRY	.8231 .6825 .6095 .4934 49	.8760 .7699 .6965 .5490 49	.9121 .7432 .6755 .5515 49				.8722 .7640 .6547 .5253 49
[FIR]M	.8845 .6786 .8426 .6002 138	.8915 .7342 .7596 .5512 139	.8942 .7653 .7549 .5645 139	.8597 .6961 .6953 .5406 139			

[NOT]E: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE E-6

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON $R,^2$ THEN ON Q-STATISTICS, AND FINALLY ON R^2)
ABS(Forecast Error)/Standard Deviation of EPS

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS — LEVEL OF AGGREGATION: TWO	THREE	FOUR	AGGREGATE FORECASTS FROM ENTITY MODELS — ENTITIES AGGREGATED: THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	.5197				.4462	.6243	.5557
	-1.2047				-.8672	-.7114	-1.0795
	3.0373				3.3380	3.3529	3.1146
	2.3651				2.3651	2.3651	2.3651
	.0528				.1068	.1068	.1068
	9				19	22	71
THREE-DIGIT INDUSTRY	.6906	.8338				.7902	.6563
	-.5183	-.3614				-.0800	-.5246
	3.5368	3.3802				3.8181	3.5993
	2.3651	2.3779				2.3651	2.3651
	.0340	.0723				.0340	.0340
	19	19				22	71
FOUR-DIGIT INDUSTRY	.7275	.9456	.7116				.7417
	-.2564	-.0221	-.1334				-.2840
	3.8248	3.7813	4.0645				3.7440
	2.3651	2.7060	2.7797				2.4853
	.0340	.0723	.0340				.0340
	22	22	21				71
FIRM	2.3178	2.1824	1.7891	1.3386			
	8.8153	9.0115	5.7598	2.6965			
	6.9608	7.3060	6.6665	5.9283			
	5.8710	5.5594	5.0513	4.1333			
	.0058	.0100	.0190	.0114			
	71	51	42	44			

NOTE: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.

TABLE E-7

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON $\bar{R}^2$ THEN ON Q-STATISTICS, AND FINALLY ON R^2)
Forecast Error/Standard Deviation of EPS

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY MODEL	ENTITY FORECASTS FROM AGGREGATE MODELS: LEVEL OF AGGREGATION			AGGREGATE FORECASTS FROM ENTITY MODELS: ENTITIES AGGREGATED		
		TWO	THREE	FOUR	THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	-.8620 -.6715 .9146 .7661 17				-.9656 -1.0859 .8622 .6603 17	-.8848 -1.0201 .8467 .6668 17	-.8809 -.7351 .8876 .7307 17
THREE-DIGIT INDUSTRY	-.8022 -.6825 .7406 .5998 39	-.6592 -.6773 .8858 .7099 39				-.7301 -.6825 .7349 .5810 39	-.7469 -.6785 .7844 .6403 39
FOUR-DIGIT INDUSTRY	-.7672 -.6825 .6798 .5413 49	-.6966 -.6773 .8793 .6973 49	-.8592 -.7432 .7430 .6002 49				-.7680 -.7640 .7766 .6214 49
FIRM	-.6107 -.5279 1.0594 .7256 138	-.5714 -.5639 1.0240 .7007 139	-.7028 -.7069 .9368 .6467 139	-.6184 -.6087 .9179 .6620 139			

NOTE: Entries in a given cell are, respectively, mean, median, standard deviation, mean absolute deviation, and the number of entities for which a forecast was obtained.

TABLE E-8

CROSS-SECTIONAL SUMMARY STATISTICS FOR FORECAST ERRORS
(MODELS WERE CHOSEN FIRST ON $R,^2$ THEN ON Q-STATISTICS, AND FINALLY ON R^2)
Forecast Error/Standard Deviation of EPS

ENTITY FOR WHICH 1972 EPS WAS FORECAST	ENTITY FORECASTS FROM AGGREGATE MODELS				AGGREGATE FORECASTS FROM ENTITY MODELS		
	ENTITY MODEL	LEVEL OF AGGREGATION			ENTITIES AGGREGATED		
		TWO	THREE	FOUR	THREE	FOUR	FIRM
TWO-DIGIT INDUSTRY	-.1531 -1.2155 3.1841 .5471 -2.3651 9				.1565 -.8468 3.3778 .5471 -2.3651 19	-.0211 -.8295 3.4395 .5471 -2.3651 22	-.0929 -1.0861 3.2809 .5471 -2.3651 71
THREE-DIGIT INDUSTRY	-.3426 -.6145 3.9321 .5471 -2.3651 19	-.2465 -.6510 3.7841 .9741 -2.3779 19				-.2654 -.4856 3.9626 .5471 -2.3651 22	-.2033 -.7809 3.7854 .6042 -2.3651 71
FOUR-DIGIT INDUSTRY	-.3677 -.3834 4.2837 .5471 -2.3651 22	-.3348 -.4410 4.1854 .9741 -2.7060 22	-.3935 -.2909 4.4773 .5471 -2.7797 21				-.2722 -.5488 4.1155 .7108 -2.4853 71
FIRM	1.3491 9.7635 9.1038 5.8710 -3.7736 71	1.5273 8.2615 8.1844 5.5594 -2.8215 51	1.5037 9.4680 8.6135 5.0513 -3.0179 42	.9766 4.5490 7.5567 4.1333 -2.8033 44			

NOTE: Entries in a given cell are, respectively, skewness, kurtosis, studentized range, maximum, minimum, and the number of entities for which a d=1 model was best.