FINANCIAL RATIO ADJUSTMENT PROCESS: CASE OF UKRAINE

by

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Abstract

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Financial ratios are important economic indicators, which are influenced by market forces as well as in-firm factors. Financial ratio analysis is not well studied in transition countries. This thesis examines the behavior of financial ratios of the Ukrainian firms in the framework of the partial adjustment model and test the hypothesis of the financial ratio adjustment process toward the past industry mean. The empirical results of this study support the evidence of some finite financial ratio adjustment process; however, the past industry mean was not found to be an appropriate benchmark for the Ukrainian firms. Estimated model also indicates considerable differences in the speed of adjustment across industries due to the industry-specific factors.

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ABBREVIATIONS

CTS	Costs to Sales ratio
FAT	Fixed Assets Turnover ratio
FGLS	Feasible Generalized Least Squares
FRA	Financial Ratio Adjustment
GLS	Generalized Least Squares
OLS	Ordinary Least Squares
ROA	Return to Assets ratio
ROS	Return to Sales ratio
SBC	Soft Budget Constraints

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All the errors remain author's responsibility.

Chapter 1

INTRODUCTION

Having obtained independence, Ukraine started its long journey to a market economy. As a part of its transition process, Ukraine has stated determinedly that it is seeking to attract high levels of foreign investment and in recent years the interest of Western investors in the region is rising. Amongst other, this increases the importance of estimating the attractiveness of particular industries and enterprises to investors. Hence, the financial performance of the Ukrainian firms becoming increasingly important to assess.

A useful tool for estimating the firms' performance is the analysis of financial ratios, though it should not be seen as the sole means of performance measurement. Financial ratios should be considered as important economic indicator, which influences the managers' decisions. Financial ratio analysis is the calculation and comparison of ratios, which are derived from the information in a company's financial statements. The level and historical trends of these ratios allow making inferences about a company's financial condition, its operations and attractiveness as an investment.

In particular, the adjustment of financial ratios is a question of interest: "The ratios measuring performance, which are influenced by market forces as well as in-firm factors, approach their target at a rate of change that can be rapid or slow, reflecting the nature of those market forces" (Peles and Schneller, 1989). The behavior of financial ratios, the speed and dimension of their change over time are important issues in the bankruptcy prediction, credit rating, security analysis and audit evaluation.

Financial ratio analysis is well studied in Western economies but less attention has been paid on this in transition economies. Previous empirical studies have found that the financial ratios of firms in the same industry have a tendency to converge to the average value of this industry. If the firm's financial ratios differ a lot from the average industry level, it can be regarded by potential investor as a signal about company quality. Differences in the speed of adjustment occur due to the different micro- and macroeconomic factors.

The purpose of this paper is to examine whether the financial ratios of the Ukrainian firms converge to the past industry mean as it is predicted by the financial ratio adjustment theory and how the speed of adjustment differs across industries.

This paper is organized as follows. The Chapter 2 contains literature review. Then, empirical methodology is introduced in Chapter 3 and data description is given in Chapter 4. The main results of the study are summarized in Chapter 5. Finally, the concluding remarks are presented in Chapter 6.

Chapter 2

LITERATURE REVIEW

Traditionally, financial ratios were used for a company's performance evaluation, as well as for bankruptcy prediction, security analysis and credit rating. It is a common practice to compare a firm's financial ratios with those of industry peer group. The simplest theory of the firm is to assume that there is an optimal level for all the items in the balance sheet, and that "any disturbances of this structure immediately sets in motion forces which will restore the status quo" (Boulding, 1950). Since the theory assumes that the optimal (target) levels of financial ratios exist, the deviation from these optimal levels and subsequent adjustment toward the targets is an important issue of financial ratio analysis.

Salmi and Martikainen (1994) provided a critical review of the different areas of financial ratio analysis, having paid attention both to the theoretical and empirical literatures. Two points of their study are most important. Firstly, the numbers of studies on distributional characteristics of financial ratios reported non-normality, hence, in order to apply standard parametric statistical analyses one should use appropriate transformations. Secondly, Salmi and Martikainen surveyed some different approaches to the classification of financial ratios (Pragmatical Empiricism, Deductive, Inductive and Confirmatory approaches) and concluded that for the most purposes the number of essential financial ratios can be reduced to about 4-6 essential ratios. The most common ratios for the analyzing firm's financial performance are profitability, solvency, liquidity, and turnover ratios.

The study of adjustment of the financial ratios toward industry means constitutes a distinct area of FRA research. "As early as 1923 Bliss (1923) suggested that, for any financial ratio, the industry average should serve as a target level for individual firms" (Peles and Schneller, 1989). Nevertheless, the number of studies conducted in this area is still quite limited.

To understand why the industry mean is used as a benchmark, it is useful to consider the cases of the following generalized financial ratios: liquidity, solvency and profitability ratios. To begin with, we should note that, since the firms operate in the same industry, they, probably, face the same market conditions. Besides, the industry average level could be just treated as the simplest benchmark by the managers while establishing firm's targets.

Liquidity ratios are all designed to measure a company's ability to cover its short-term obligations. Liquidity level below the mean is a bad indicator of the firm's financial health. At the same time, too high level of liquidity assets is not desirable because of higher opportunity costs involved.

In case of solvency, it is clear, that too much debt results in higher financial risk and increases the probability of bankruptcy. From the other hand, it is not rational to decrease indebtedness too much, since debt is a cheaper financial source than equity capital. Thus, is reasonable that firms would smooth their liquidity and solvency ratios treating the industry mean value as a target.

For the profitability ratios let's consider the behavior of firms in a competitive environment. The possibility of bankruptcy or takeover forces firms, which have relatively low level of profitability ratios, to allocate resources to more productive uses. From the other hand, competitors can eventually mimic the innovation and technology which allows firm to have higher than average level of profitability. This results in mean reverting behavior of profitability ratios within the industries and also across the industries.

The most common model, which allows testing for ratio convergence toward industry mean is partial adjustment model where the hypothesis is tested that in each period *t*, a firm's financial ratio moves closer to its target value. This model has been developed in the study by Lev (1969) in the following form:

$$\log Y_{i,t} - \log Y_{i,t-1} = \lambda(\log Y_t^* - \log Y_{i,t-1}) + \varepsilon_{i,t} \qquad (2.1)$$

where Y's represent firm's i financial ratio at time t and t-1; Y^* is a target level proxied by the past industry mean and $0<\lambda<1$ represents the speed of adjustment toward the past industry mean.

Faced with a choice between linear and log-linear forms, Lev chose the latter, because of its ability to capture the "relative" yearly change in financial ratio. Lev tested the model empirically and his findings confirmed the hypothesis of financial ratio adjustment toward industry average.

Since then, Frecka and Lee (1983) have examined Lev's log-linear partial adjustment model and attempted to improve it by using the generalized functional form technique initially developed by Box and Cox (1964). Their motivation was that Lev's model may be misspecified. Their results indicated that, while a single functional form (linear or log-linear) is not appropriate as a general rule, nevertheless, the Lev's method is a reasonable approximation.

In a more recent study, Lee and Wu (1998) extended Lev's partial adjustment model to consider explicitly the formation of desired financial targets. They suggested that, since the true target ratios are unobservable, a measure of the desired target ratio could be developed in accordance with the theory of expectation formation. An adaptive expectation model was used by the authors and their specification resulted in the marginally higher coefficient of adjustment than those had estimated by Lev.

Chen and Ainina (1994) enriched the partial adjustment model by allowing for differences in the speed of adjustment according to different micro and macro economic factors. They criticized the above mentioned studies, because they are static in nature, while the adjustment process seemed to be dynamic as the state of the economy, industry participants, firms' objectives and other firm-specific factors may vary. Chen and Ainina also suggested that joint estimation of equations involving firms in particular industry would produce efficiency gains in comparison with traditional OLS procedure.

Peles and Schneller (1989) successfully developed a methodology that does not require an a priori knowledge of the level toward which ratios are adjusted. In contrast with the previous studies, which assigned the same target to all firm, they set up and tested an adjustment model that allowed for a variety of targets and was valid even in case when each firm has its own individual target level per ratio. Peles and Schneller also have made the useful comment concerning the duration of the adjustment process. They noted, that "the duration is a function of (a) the benefit and cost to the firm of making the adjustment, and (b) the time needed for a response to the adjustment by market forces operating on the industry and the firm" (Peles and Schneller, 1989). Thus, the adjustment is costly and is not likely to be immediate. Such financial ratios, as current ratio (current assets divided by current liabilities) and quick ratio (current assets minus inventory to current liabilities) would be adjusted faster, because they are to a large extent under the firm control and easier to manipulate. In contrast, the equity to debt ratio would be adjusted slowly, because of problems and costs involved in its adjustment process.

In contrast with the above mentioned papers, there are also studies, which claim that financial ratios do not adjust, but rather have a tendency to be relatively stable within the industries (Buijink and Jegers, 1986; Lau, Hing-Ling and Gribbin, 1995; Rees, 1994). Konings and Roodhooft (1997) noted that methodology developed by Lev (1969) could be biased, subject to the Galton's classical fallacy of regressions toward the mean. To solve this problem they used nonparametric methods and their empirical results did not prove the hypothesis of adjustment process. Muñoz M.I. (2001) studied the behaviour of six financial ratios, with the data on the 81 Spanish firms for 1991-1999. His methodology, based on the Kernel estimator, allowed him to report relative stability and even some divergence of financial ratios in the industry.

Finally, there is only one paper studied the financial ratio adjustment process in emerging economy. Konings and Vandenbussche (2003) looked for evidence that the behavior of financial ratios of Bulgarian firms is consistent with the existence of some finite adjustment process and suggested that firms characterized by soft budget constraints should have significantly lower rates of financial ratio adjustment. Besides, they investigated the differences in the speed of adjustment between Bulgarian and Western firms as well as between listed and non-listed Bulgarian firms. Moreover, the influence of the Bulgarian financial crisis in 1997 on the adjustment process was analyzed.

Having tested five financial ratios for the period 1993-1998, they confirmed the existence of the financial ratio adjustment process; however, the past industry mean was not the target toward which the Bulgarian firms adjusted their financial ratios. The possible explanation is that the past industry mean is a good target for market economy, however, the industry mean for TE in the 1990's can be not a good estimate of the targets to which firms are adjusted now. The hypothesis linked the speed of adjustment with the presence of SBCs was proved: the speed of the financial ratio adjustment for the Bulgarian firms with SBCs was found to be lower than for firms without SBCs.

Financial crisis was found to result in higher speed of adjustment and, thus, in stronger financial discipline after 1997. However, this difference corresponded mainly with the firms faced soft budget constraints. Similarly, the "listed/non-listed" factor did matter only for the firms with soft budget constraints: in this case "listed" nature was an extra disciplining force speeded up the financial ratio adjustment. Those firms, which initially faced hard budget constraints, did not exhibit the significant changes in the speed of adjustment due to the financial crisis occurrence or their "listed/non-listed" nature.

To sum up, we can conclude that there is still discussion and no agreement in the literature whether financial ratios adjust toward the mean or they are stable within industries. The current work is the attempt to fill the gap in the literature on the financial ratio analysis in transition looking for the empirical evidence for Ukraine.

Chapter 3

METHODOLOGY

In this chapter we will present the empirical methodology allowing testing the financial ratios for the adjustment. There are basically three main stages in the empirical part of the research. The first stage is the calculation of the financial ratios chosen for analysis on the basis of the balance-sheet and data on the Ukrainian firms.

Theoretically, financial ratios can be extended to include market-based data. Despite the fact, that such ratios could be interesting for the potential investors, in this work we concentrate on "pure" financial ratios with both the numerator and denominator originated from the income statement and/or the balance sheet. We have two main reasons forced us to do so: the first one is data availability and reliability; the second is the Ukrainian equity market imperfection making the market-based data to be of low usefulness.

The financial ratios for consideration were chosen as follows:

Table 1 - Financial ratios to be analyzed

Ratio	**Formula**
Return on Sales (ROS)	Profit/ Sales
Return on Assets (ROA)	Profit/ Assets*
Fixed Assets Turnover (FAT)	Sales/ Fixed Assets
Costs to Sales (CTS)	Production Costs/ Sales

*The value of total assets should be used here. However, since such a data is unavailable, the annual average value of fixed assets including production fixed assets was used instead.

Most of these ratios are profitability ratios, which are the most informative for the potential investor and, arguably therefore, the most important ratios. With regard to the profitability ratios, there is a strong presumption in economics that profitability is mean reverting. The theory suggests that, in the competitive environment the rates of return tend toward equality in all industries.

Fixed assets turnover ratio is a volume indicator that is used to measure how efficiently firms generate sales on each dollar of assets. For a given level of investment the stockholders would like to maximize this ratio. However, high return on assets may encourages the new firms to enter the industry, thereby decreasing the original firm's return until some equilibrium level would be achieved.

Analyzing the costs-to-sales ratio, financial analysts look for a steady (or decreasing) percentage and compare these figures against competitors. Keeping costs under control is absolutely essential if the profit margin is to be maintained. Since stability of CTS ratio is desirable, it is reasonable to expect that deviation from the past level should be adjusted by firm in the next periods.

It should be noted that the ratios we chose for analysis differ from those used in the previous FRA studies. Before both Lev (1969), Peles and Schneller (1989), Lee and Wu (1998), Chen and Ainina (1994), Konings and Vandenbussche (2003) used the same financial ratios represented common measurement of liquidity, solvency, turnover and investment returns (i.e. Current ratio, Quick ratio, Leverage, Solvency, Return on assets and Inventory turnover ratios). The intuition behind their choice is quite clear: they used the standard "structural" ratios related to the structure of the balance-sheet and most commonly used for the basic financial analysis.

Such transition countries as Russia and Ukraine still do not have a clear, one-meaning methodology allowing for firms' financial performance evaluation. Thus, effective financial analysis is problematic both for the firms' managers and state organizations, which should control the performance of economic agents. Nevertheless, the ratios represented in the Table 1 were chosen from the ratios recommended and most commonly used for financial analysis in Ukraine.

Having grouped firms in the data set by industries, all four ratios for every firm and every year of analysis should be calculated. Then the average values of particular financial ratios should be computed across the industries using the arithmetic mean of each industry group.

The second stage is based on testing the partial adjustment model looking for evidence that the Ukrainian firms adjust their financial ratios to the particular target level, that is, by assumption, the past industry mean of these ratios.

The partial adjustment model methodology was introduced by Lev (1969):

$$Y_{i,t} - Y_{i,t-1} = \lambda(Y_t^* - Y_{i,t-1}) + \varepsilon_{i,t} \qquad (3.1)$$

The model suggested by Lev should be improving by allowing for the possibility that firms are adjusting their ratios to a target that is different from the industry mean. Following Konings and Vanderbussche (2003), we added a constant term λd, where d would represent the deviation of the target ratio from the industry average:

$$Y_t^* = X_{k,t-1} + d \qquad (3.2)$$

Plugging 3.2 into the 3.1, we obtain the basic testable equation:

$$Y_{k,i,t} - Y_{k,i,t-1} = \lambda d + \lambda(X_{k,i,t-1} - Y_{k,t,i-1}) + v_t \qquad (3.3)$$

where $Y_{k,\,i,\,t}$ = a firm's *i* financial ratio within the *k*th industry in period t;

$Y_{k,\,i,\,t-1}$= a firm's *i* financial ratio within the *k*th industry in period t-1;

$X_{k,t-1}$= *k*th industry average in period t-1;

λ= the partial adjustment coefficient;

ν_t= a disturbance term.

This equation postulates that when a firm realizes a deviation between its financial ratio and the industry average, the ratio will adjust in the next period, so that observed deviation will be partially eliminated. The fraction of deviation to be eliminated is represented by the term λ, that is the speed of adjustment. If λ is bounded between zero and one, that imply the existence of some finite adjustment process. When λ is equal to one, adjustment to the target ratio is instantaneous. The smaller the value of λ, the greater the adjustment lag. For example, if the firm's ratio is above the industry average and λ=0.333, it will take a firm approximately three years to decrease the value of the ratio down to the desired level. The closer λ is to 1, the faster the adjustment process is.

The value of *d* could be found by dividing the constant term λ*d* by estimated λ:

$$d = \frac{\hat{\lambda d}}{\hat{\lambda}} \qquad (3.3)$$

The interpretation of the value of *d* is as follows: *d*>0 would mean that firms are adjusting their financial ratios to the target level, which is higher than the respective industry mean; otherwise, if $d<0$ the financial ratios converge to something lower value than industry mean. Thus, statistically significant constant term λd would mean that the hypothesis of financial ratio adjustment toward the *past industry mean* is not confirmed in case of Ukraine.

At the third stage of the empirical work we are going to investigate, how the speed of adjustment varies across industries. It is reasonable to expect significant differences in the adjustment process due to the industry-specific factors, such as the industry structure, production characteristics, competition, assets composition and so on.

The values of financial ratios vary across firms and time and these points on the necessity to employ panel data estimation. Applying the econometric techniques developed for panel data estimation would give some efficiency gains. Recently the use of panel data rather than cross-section or time series estimations became very popular due to advantages that these technique offer. The main of them are discussed in Baltagi (1995). The benefits, which are worth to be mentioned here are as follows:

1. Control for heterogeneity in the micro units. Firms are heterogeneous and multidimensional agents. If some of their characteristics are unobservable or immeasurable this could results in the omission of important variable and, hence, the estimated parameters will be biased. Fortunately, if these factors are time invariant it is possible to get unbiased estimators by applying panel data estimation techniques.

2. Panel data may be referred to as "more informative data", reducing the severity of multicollinearity. In addition, the use of panel data increases the degree of freedom and raises the efficiency of estimates.

3. Panel data allows for a better analysis of the dynamics of adjustment. Many variables may be relatively stable at the macro level, while at the micro level there are considerable changes. Looking at the micro level and using the panel data, where the cross-section features of data are complemented by time dimension, we can consistently capture the adjustment process.

The limitations of using panel data should also be noted:

1. Selectivity problems: some units may be systematically over-represented in panel. For example, only efficient firms are likely to remain in the sample over the long period of time, because bankrupts disappear from the sample.

2. Measurement errors at the micro level are likely to happen in a systematic pattern making series inappropriate for applying econometrics.

3. Data collection problems: it is quite difficult to construct a representative sample and collect information without distortions. It is also difficult to collect panel data about a large sample of economic agents for relatively long time interval, as a result, the time dimension of most panel data sets is not more than 3-5 time periods.

Now let us briefly describe different techniques developed nowadays for estimation panel data models.

The simplest way to estimate panel data model is just to ignore the panel structure of the data by rejecting the heterogeneity of cross-section units. The efficient estimates for this pooled model could be found with the help of the OLS estimation procedure. However, this method should be applied only in the case of sufficient theoretical and econometric rationale for it, since otherwise the rejecting of the existing individual heterogeneity of cross-section units will result in unbiased, consistent, but inefficient estimators of the model parameters.

The more complicated methods that allow for existence of heterogeneity among cross-sections could yield the consistent and efficient estimators of models based on the panel data. Two types of models are commonly used: the fixed and the random effects models. Each of these models has advantages and disadvantages depending on the peculiarities of data in hand and of estimated models.

The heterogeneities of the cross-sections in the fixed effects model are assumed to be captured by the distinct intercepts (i.e. the intercept varies over cross-section units), which are correlated with the explanatory variables. The crucial assumption made for the appropriateness of the fixed effects estimators is a strict exogeneity of the explanatory variables, i.e. the explanatory variables should be uncorrelated with the error term of any period. It worth noting, that the fixed effects model concentrates on the differences within cross-sections rather than between them.

In the random effects the crucial assumption is that the heterogeneous intercepts are obtained by the independent of the explanatory variables drawing from a distribution with mean μ and variance σ^2. The individual effect term, which in this case is treated as a random, is the part of the error term and has a zero mean.

This implies that the error term consists of the individual specific element, that does not vary over time and of the uncorrelated over time component. This composite nature of the error term yields a particular form of autocorrelation that makes the OLS estimators unbiased, consistent, but inefficient. To obtain the more efficient estimators we should use GLS rather than OLS. The GLS procedure produces more efficient estimators by minimising the weighted sum of squared composite residuals. However, GLS estimation requires the knowledge and the use of the variance-covariance matrix of disturbances. In theory, GLS produces the best linear unbiased estimates. Yet in practice, the true variance-covariance matrix is not known. Thus, it is the estimated variance-covariance matrix that is used in GLS, and the GLS procedure gains the name of feasible GLS (FGLS). Since it uses the estimated and not the true variance–covariance matrix of disturbances, it produces unbiased estimates, but they may be inefficient.

Finally, it should be noted, that since the heteroskedasticity is almost always found in the panel data it is desirable to obtain White heteroskedasticity consistent covariance matrix estimators. While the presence of the heteroskedasticity does not introduce bias into the estimation, it no longer allows to produce efficient estimators, and invalidates the inferences. Thus, the regressions with robust standard errors, that is, with "heteroskedasticity-consistent" variance-covariance matrix estimators is needed. This corrects for the influence of non-spherical errors and provides a more reliable inferences for OLS results. However, this correction should not be used for the random effects specification. "Since the random effects model is a generalized regression model with a known structure, robust estimation of the covariance matrix for the OLS estimator in this context is not the best use of the data." (Green, 2000)

How to make a decision which model - pooled, fixed or random effects - should be chosen in particular case? Taking into account the context of a data we can follow the advice given by Kennedy, 1998: "If the data exhaust the population (say observations on all firms producing automobiles), then the fixed effects approach, which produces results conditional on the units in the dataset, is reasonable. If the data are a drawing of observation from a large population (say a thousand individuals in a city many times that size) and we wish to draw inferences regarding other members of that population, the fixed effects is no longer reasonable; in this context, use of the random effects model has the advantage that is saves a lot of degrees of freedom".

The same way of reasoning is suggested by Green, 2000: "The fixed effects model is a reasonable approach when we can be confident that the differences between units can be viewed as parametric shifts of the regression function. This model might be viewed as applying only to the cross-sectional units in the study, not additional ones outside the sample. … In other settings, it might be more appropriate to view individual specific constant terms as randomly distributed across cross-sectional units. This view would be appropriate if we believed that sample cross-sectional units were drawn from a large population".

The choice between pooled, fixed or random effects models can be determined on a more formal basis using statistical tests. There are two main tests, which use the assumptions about the nature of the error term to determine the appropriateness of the pooled model estimator.

The first one is the F-test, which differentiates between the pooled and the fixed effects estimators, evaluating the significance of the individual effects by testing the null hypothesis that all intercepts are equal. The F-ratio used for the test could be calculated as:

$$F(N-1, NT-N-K) = \frac{(R_u^2 - R_r^2)/(N-1)}{(1-R_u^2)/(NT-N-K)} \qquad (3.3)$$

Where R^2u and R^2r denote the R-squared from the fixed effects model (unrestricted model), and the pooled model (restricted), respectively; N is a number of observation, T - number of time periods, K - number of explanatory variables. The decision rule is as follows: if the F-ratio exceeds the tabulated critical value of F-distribution with (N-1) and (NT-N-K) degrees of freedom of numerator and denominator respectively, this would imply that the fixed effects model, better explains the data peculiarities than the pooled model, which totally ignores the panel structure of the data.

To discriminate between the pooled and the random effects model the Breusch-Pagan Lagrange multiplier test should be used. Under the null hypothesis the variance of the individual specific components is equal to zero. If it is so, these models are identical and OLS estimator is the most appropriate. If null hypothesis can be rejected, we should estimate via the random effects model.

The null hypothesis for the test is that the variance of individual term is equal to zero, and test statistics, which is under the null hypothesis distributed as chi-squared with one degree of freedom, can be computed as follows:

$$LM = \frac{NT}{2(T-1)}\left\{\frac{\sum_{i=1}^{N}\left(\sum_{t=1}^{T}\varepsilon_{it}\right)^{2}}{\sum_{i=1}^{N}\sum_{t=1}^{T}\varepsilon_{it}^{2}} - 1\right\}^{2} \qquad (3.4)$$

where it ε_u denotes residuals obtained from running the pooled OLS regression.

The decision rule is as follows: if the calculated statistic exceeds the tabulated chi-squared value the null hypothesis could be rejected and the random effects estimator is the more appropriate one.

In order to discriminate between two panel estimators - fixed and random effects - the Hausman test should be applied. Under the null hypothesis of no correlation between the error and the regressor, the random effects model is suggested. If the correlation is found, the fixed effects model is applicable and random effects model is inconsistent.

The Hausman test statistics is distributed asymptotically as χ^2 (K) and could be computed as follows:

$$H = (\hat{\beta}^{RE} - \hat{\beta}^{FE})'(\Omega^{FE} - \Omega^{RE})^{-1}(\hat{\beta}^{RE} - \hat{\beta}^{FE}) \qquad (3.5)$$

If the test statistics exceed the critical value χ^2_α (K) we could reject the null hypothesis at α% significance level and the fixed effects estimator should be used.

Chapter 4

DATA DESCRIPTION

Our primary data set consists of the Ukrainian firms registry for 1993-1998 (excluding firms in financial sectors), coming from EROC. Some restrictions were imposed on the initial data set, which contained more than 10 000 firms:

- no missing data - only firms recorded all variables needed for the all six years were included;
- at least 15 firms in industry - in order to minimize the effect any individual firm may have on industry target.

This sampling process results in 5519 firms in 15 industries. This sample is sufficient enough for our research purposes in comparison with the previous studies in the field of financial ratio adjustment. For example, Frecka and Lee, (1983) worked with 93 firms in three industries; Chen and Ainina, (1994) used data on 85 firms in seven industries.

Table 2 gives an overview of the industries included in our data, the number of firms per industry and the percentage of particular industry in the whole sample.

Since we work with the firm-level balance-sheet data, it worth noting, that in the period of 1993-1998 there have been very little changes to the Ukrainian accounting standards (the accounting reform was implemented only in 2000).

Table 2 - Data description

#	Industry	Number of firms	%
1	Energy	26	0.47%
2	Petroleum and natural gas	19	0.34%
3	Coal	39	0.71%
4	Metals	132	2.39%
5	Chemicals	108	1.96%
6	Rubber and Plastic Products	35	0.63%
7	Machinery	1199	21.72%
8	Lumber, Wood and Paper	260	4.71%
9	Construction Materials	652	11.81%
10	Stone, Clay and Glass	65	1.18%
11	Light industry	548	9.93%
12	Food Products	1824	33.05%
13	Flour-milling and Groats	183	3.32%
14	Medical	43	0.78%
15	Printing and Publishing	251	4.55%
	Other industrial firms	135	2.45%
	Total	**5519**	**100%**

Chapter 5

EMPIRICAL RESULTS AND DISCUSSION

At the first stage of the empirical work we computed four financial ratios (ROS, ROA, FAT and CTS ratios) for all the firms in our sample separated by industries. The average of each ratio for each industry was computed to serve as a proxy of a desired (target) ratio in the framework of our model. The descriptive statistics is summarized in the tables represented in the Appendix A. These tables show significant variability of the financial ratios from year to year. This non-stability of financial ratios reflects considerable changes in industry conditions faced by the Ukrainian firms. The smoothing of the financial ratios could be explained due to both external shocks and strategic adjustment by managers, which attempt to move their financial ratios toward the long-run desirable targets.

At the second stage we made a panel data estimations for each ratio under consideration. These regressions, running for all the firms in our sample, allow us to prove (or reject) the hypothesis of the financial ratio adjustment process. The coefficient λ, which represents the speed of adjustment, is assumed to be shared by all firms.

After examining the descriptive statistics of the variables used we have imposed some restrictions on them in order to get rid of the potential outliers problem. Particularly, the 10% of the most extreme observations were dropped. Then, the partial adjustment model, described in Chapter 3, was estimated by pooled OLS, fixed and random effects specifications (the Stata8.0 outputs are shown in the Appendix B).

To make a choice between the pooled OLS and fixed effects estimators the F-test was applied. The F-statistics reported in the foot-notes of the fixed effects regression outputs (see Appendix B) imply that fixed effects are jointly insignificant for ROA, ROS and FAT. Thus, the pooled OLS estimator is suggested as the more appropriate one for these three financial ratios. In case of CTS, F-test suggests to use panel estimator, i.e. fixed effects.

We should also test the pooled OLS specification vs. the random effects one. The Breusch-Pagan LM test gives the following results:

Table 3 - Calculated Breusch-Pagan LM test statistics

Financial Ratio	**ROS**	**ROA**	**FAT**	**CTS**
LM-statistics	625.59 (0.0000)	895.79 (0.0000)	322.89 (0.0000)	910908.04 (0.0000)

Note: p-value in the brackets

Calculated statistics exceed the critical values for $\chi^2(1)$ at the virtually any level of significance level for all four ratios, thus the H_0: *zero variance of the individual specific components* could be rejected in favor of the random effects model.

Now it is necessary to distinguish between random and fixed effects specifications. The Hausman test rejects the null hypothesis of appropriateness of the random effects specification at 1% significance level for the ROS, FAT and CTS. For the ROA, however, the random effects estimator is justified.

Table 4 - Calculated Hausman test statistics

Financial Ratio	ROS	ROA	FAT	CTS
Test-statistics	625.59 (0.0000)	2.51 (0.1132)	322.89 (0.0000)	1849.53 (0.0000)

Note: p-value in the brackets

Having considered the results of the above mentioned tests, we ended up with the random effects for ROS and ROA; the fixed effects for CTS and pooled OLS estimator for FAT as the most efficient ones. Detailed Stata8.0 outputs of all tests and regressions are placed in the Appendix B. The pooled OLS regression for FAT was run with robust to heteroskedasticity standard errors. The results are summarized in the Table 5.3.

Table 5 - Estimation results

	ROS	**ROA**	**FAT**	**CTS**
λ	0.2075675* (0.0059412)	0.1650222* (0.0133075)	0.281241* (0.008285)	0.5635509* (0.0091058)
λd (constant)	-0.1858718* (0.0021974)	-0.0437903* (0.0091117)	1.188803* (0.0216153)	-0.3968262* (0.0080321)
d=λd/λ	-0.8954764	-0.26536	4.22699	-0.704153
R^2	0.0126	0.0044	0.0564	0.1965

*Note: * significant at 1% level* *Standard Errors in brackets*

All the estimated λ 's are highly significant and lie within theoretically predicted range (0; 1), supporting the existence of the adjustment process toward the target level. At the same time, significant constant terms and nonzero implied values of d's lead to the conclusion that the adjustment occurs toward the target level that does not coincide with the past industry mean. The possible explanations for this finding could be as follows. Firstly, as Ukraine is a transition country moving from the planned economic system to the market one, the past industry mean may not be an appropriate benchmark. The past level of financial ratios may just not be actual for the Ukrainian firms, because they are rather forward-looking having to response to the sharply changing economic conditions. Secondly, following Konings and Vandenbussche (2003), we can suppose that the Ukrainian firms believe that ratio convergence toward the industry average is not the signal financial markets are looking for. Thirdly, the Ukrainian firms could be not able to recognize what the past industry mean actually is because of the lack of information.

Statistically significant constants for ROS, ROA and CTS suggest that the Ukrainian firms adjust these ratios to the level that is somewhat lower than the past industry mean. The calculated value of d should be used for the correction in order to obtain the actual target level toward which the adjustment occurs. Negative signs of the d's also imply that ROS, ROA and CTS ratios have a tendency to decrease over the years. The ROS and ROA ratios are ones of the key profitability ratios and to some extent can represent the overall pattern of the profit levels in Ukraine. Decreasing profitability could be attributed to the specific features of the transition process, when at the beginning of transition it is possible to obtain abnormally high, excess profits. However, as the time passes, the economy faces considerable changes moving toward the market and forcing the profit levels to decrease toward the levels reported in Western, market economies.

With regard to the CTS ratio the explanation is that managers prefer decreasing percentage of cost to sales, and set the CTS target level lower than the industry mean was. It also could be considered as the improving of the Ukrainian firms' financial discipline.

Positive sign of d for FAT means that the target level for this ratio is generally higher than industry average. The reason should be the Ukrainian firms become more concerned about the productivity of their fixed assets than they were at the beginning of the transition process. Under the planned economy it was possible to hold fixed assets of low productivity, however the process of privatization and restructuring as well as substantial changes in the economic environment make firms to improve their financial discipline in order to be competitive. The implied value of d by itself, however, seems not to have any reasonable explanation as it is unexpectedly high.

Now let us to discuss the speed of adjustment for different financial ratios. The highest coefficient was reported for CTS ratio. The estimated value of λ=0.56 means that, when the Ukrainian firms realize a deviation between their CTS ratio and the industry mean, then slightly more than a half of this deviation is adjusted next year.

Significantly lower speed of adjustment was found for ROA and FAT ratios, which are the long-term by nature and should have the higher costs of adjustment. For example, it should take a firm more than three years to adjust its FAT and six years to smooth its ROA ratios.

The reasoning of why the speed of adjustment for ROS (λ=0.207) is lower than for FAT (λ=0.207), despite the fact that ROS ratio seems to be more under the managerial control, could be suggested as follows. The adjustment process consists of two "components" - passive adjustment, which is hard to be regulated by managers and is caused by external factors, and adjustment due to the managerial efforts. As we have mentioned above, the ROS ratio in Ukraine declines from year to year that is quite undesirable for the profitability ratio. In contrast, the adjustment of FAT ratio to the level that is somewhat higher than industry mean has positive impact on the operating characteristics of a firm. Thus, it is reasonable for managers to impede the adjustment of ROS and to contribute to the smoothing of the FAT ratio.

Now we should turn to the third stage of our empirical work. We run the separate regressions for every industry and for every ratio to investigate, how the speed of adjustment differs across industries. As Chen and Ainina,

(1994) suggested, theoretically, it is reasonable to expect that some groups of firms should be less concerned about being out of equilibrium ratio (due to the nature of industry), or, alternatively, have lower abilities to adjust their financial ratios - again, because of the industry-specific factors. Hence, the speed of adjustment should vary across industries and joint estimation for firms within the same industry is reasonable.

These 15x4 industry-specific regressions give us the estimated coefficients, which are summarized in the Table 5.4 (the Eviews4.0 outputs are given in the Appendix C).

Table 6 - Speed of adjustment across industries

Industry	**ROS**	**ROA**	**FAT**	**CTS**
Energy	**0.090466 (0.0075)**	**0.057252 (0.0000)**	*0.005874 (0.8917)*	*0.097633 (0.3814)*
Petroleum and Natural Gas	**0.987295 (0.0000)**	**0.266544 (0.0021)**	*0.009905 (0.8550)*	*0.23294 (0.6349)*
Coal	**0.526126 (0.0000)**	**0.229396 (0.0000)**	**0.458221 (0.0000)**	**0.766058 (0.0000)**
Metals	**0.880688 (0.0000)**	**0.426661 (0.0000)**	**0.189225 (0.0574)**	**0.071057 (0.0000)**
Chemicals	**0.683611 (0.0000)**	**0.298647 (0.0430)**	*-0.021616 (0.7290)*	**0.689462 (0.0000)**
Rubber and Plastic Products	*0.231271 (0.2445)*	**0.615065 (0.0000)**	**0.665142 (0.0000)**	**0.497980 (0.0000)**
Machinery	**0.887625 (0.0000)**	**0.526136 (0.0000)**	-0.028007 (0.7508)	**0.519978 (0.0004)**
Lumber, Wood and Paper	**0.956793 (0.0000)**	0.08889 (0.4036)	**0.774240 (0.0000)**	**0.615948 (0.0000)**
Construction Materials	**0.864069 (0.0000)**	**0.704054 (0.0000)**	**0.745815 (0.0000)**	**0.657320 (0.0000)**
Glass and Clay	**0.763786 (0.0000)**	**0.722199 (0.0000)**	**0.12229 (0.0000)**	*0.104611 (0.4499)*
Light industry	**0.165043 (0.0000)**	**0.451701 (0.0000)**	**0.787165 (0.0000)**	**0.525800 (0.0000)**
Food Products	**0.980851 (0.0000)**	-0.05747 (0.8825)	**0.177521 (0.0000)**	**0.374259 (0.0200)**
Flour-milling and Groats	**0.355028 (0.0002)**	**0.409774 (0.0000)**	**0.048542 (0.0421)**	**0.904998 (0.0000)**
Medical	*0.075802 (0.5605)*	*0.01966 (0.9122)*	*0.186635 (0.1710)*	*-0.304574 (0.2729)*
Printing and Publishing	**0.741111 *(0.0000)***	*0.171397 (0.3218)*	**0.109366 *(0.0000)***	**0.640501 *(0.0000)***

Note: p-value in the brackets

Bold numbers represent statistically significant estimated coefficient. As one can see the speed of adjustment varies from very slow 0.057252 (Energy, ROA) to almost instantaneous 0.987295 (Petroleum and Natural Gas, ROS). Low speed of adjustment for ROS and ROA ratios in the Energy industry could be related firstly, to the fact that prices in this industry are regulated by the Ukrainian government and secondly, to the high adjustment costs of assets because of their specific composition.

High values of the estimated λ's for ROS in the Petroleum and Natural Gas; Lumber, Wood and Paper; Food, as well as for CTS in the Flour-milling and Groats indicate that the financial ratios in these industries are only slightly different from their past industry means. Here we are discussing only the speed of adjustment; nevertheless also the values of d should be considered as in the framework of our model when λ approaches to one, $Y_t=d+X_{t-1}$. These results, however, could be driven by the potential outliers problem; hence one should be careful interpreting them.

Higher speed of adjustment was expected in the most homogeneous by their nature industries, i.e. in the industries within which firms face the most similar conditions. Our results for the Flour-milling and Groats, Coal and Construction Materials industries provide partial support for this prediction. However, it is difficult to make such inferences as we are working with two-digit industry classifiers and each of them could contains several higher-digit industries with quite different characteristics.

Gupta and Huefner (1972) stated that financial ratios correspond to sets of industry characteristics, which in themselves are extremely difficult to quantify. Following them, the main factors influenced the financial ratio behavior across industries are as follows:

- production characteristics;
- nature of production process (primary vs. secondary raw material);

- assets composition (presence of owned vs. leased assets; inclusion of assets not directly related to manufacturing operations; holdings of natural resources)
- assets specialization;
- plant size and level of mechanization;
- age of plant facilities;
- utilization of capacity;
- organization structure and presence of the vertical integration in the industry;
- industry and product life cycles;
- managerial efficiency.

Thus, differences in the speed of financial ratio adjustment reported in the Table 6 could be attributed to the differences in the factors listed above.

Chapter 6

CONCLUSIONS

In this study we examined the behavior of Return to Sales, Return to Assets, Fixed Assets Turnover and Costs to Sales financial ratios of the Ukrainian firms. The hypothesis of the financial ratio adjustment process toward the past industry mean was tested in the framework of the partial adjustment model. We estimated the model for all the ratios under consideration as well as separately for the every industry in our data set.

The empirical results of the study suggest the evidence of some finite financial ratio adjustment process; however, the past industry mean was not found to be an appropriate benchmark for the Ukrainian firms. Our empirical estimations also indicate considerable differences in the speed of adjustment across industries due to the industry-specific factors.

For the time period analyzed two profitability ratios (ROS and ROA) were found to be adjusted toward the level somewhat lower than the past industry mean was, indicating the decreasing pattern of the profit levels in Ukraine.

The policy implications of the results obtained could be as follows: as Ukraine claimed its intentions to attract the foreign investment and become a country with the market economy, the financial discipline of the Ukrainian firms should be improved and the principles of financial management should change to be in line with those common in the developed Western countries.

Now let us make some suggestions for further research of the financial ratio behavior in Ukraine. It should be useful to analyze the financial ratios used in the previous FRA studies (for example, quick ratio, current and solvency ratios), which were not examined in the current paper because of the data unavailability.

It would be also interesting to investigate how the pattern of adjustment process is influenced by the size and ownership effects - by prediction, large firms should adjust their financial ratios more quickly than small firms and, hypothetically, different forms of ownership should also result in different speed of adjustment. Besides, there could be found other both external and in-firm factors providing insight on the financial ratio behavior.

Finally, there are incentives to improve the methodology used for the financial ratio analysis by the further development of the partial adjustment model or introducing alternative ways of research. A chief drawback of the classical partial adjustment model is its static nature which assumes a constant speed of adjustment ignoring the exogenous influences on individual economic agents and the real adjustment process.

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APPENDIX A – Descriptive statistics

Appendix A.1 - Average values of Return on Sales (ROS) ratio

Industry	1993	1994	1995	1996	1997	1998
Energy	1.207952	1.331539	0.38572	0.226233	0.156796	0.129564
Petroleum and Natural Gas	1.144553	-2.07628	0.56046	0.246876	0.221091	0.207468
Coal	0.632916	1.189713	-0.11585	0.013465	-0.12365	-0.14322
Metals	1.485604	1.336626	0.313968	0.130475	0.04034	-0.10191
Chemicals	1.187416	1.192805	0.297521	0.147082	-0.07731	-0.43405
Rubber and Plastic Products	1.091622	0.980739	0.344339	2.775837	-0.04855	-0.26421
Machinery	1.318894	1.214488	0.312631	0.098232	-0.08196	-0.40693
Lumber, Wood and Paper	1.052969	1.132355	0.234082	0.011344	-0.21507	-0.53048
Construction Materials	1.270314	1.323343	0.358246	-0.04682	-0.22359	-0.60365
Glass and Clay	1.074824	1.090979	0.276858	0.017442	-0.12593	-0.50072
Light industry	1.196076	0.89851	0.312144	-0.03639	-0.45337	-0.74172
Food Products	1.260479	1.238242	0.264425	0.076357	-0.2567	-0.117
Flour-milling and Groats	1.314093	2.390552	0.258023	0.155136	-0.00402	-0.02678
Medical	1.077189	1.047054	0.373807	0.221873	-0.05073	-0.51166
Printing and Publishing	1.158379	1.147862	0.434077	0.171551	0.125662	0.086101

Source: EROC, author's computations

Appendix A.2 - Average values of Return on Assets (ROA) ratio

Industry	1993	1994	1995	1996	1997	1998
Energy	6.724206	1.830704	1.968808	0.146803	-15.1247	-8.86595
Petroleum and Natural Gas	1.287644	3.762881	0.804998	0.101367	1.147713	1.11651
Coal	-0.09298	1.00404	0.05445	0.008344	0.043499	-0.03039
Metals	0.768676	5.024804	0.733507	0.061158	0.521567	0.274616
Chemicals	1.201408	5.832172	1.101912	0.163477	0.71204	0.448404
Rubber and Plastic Products	0.637003	4.694617	0.805479	1.001475	0.199514	-0.09021
Machinery	1.03773	4.406011	0.53198	0.046589	0.37878	0.2521
Lumber, Wood and Paper	1.476602	5.681111	0.65751	0.0223	0.041901	-0.11801
Construction Materials	0.412278	2.484593	0.326412	0.017653	0.082474	-0.05642
Glass and Clay	1.254301	6.563439	0.941638	0.042742	0.106084	-0.09144
Light industry	2.538854	8.401094	0.798992	0.024049	0.055212	-0.02841
Food Products	1.725541	9.633719	1.300249	0.129215	0.762115	0.57732
Flour-milling and Groats	2.001649	9.84158	1.255885	0.251846	1.645814	0.570707
Medical	1.540656	12.27875	1.250873	0.229324	2.776893	2.336847
Printing and Publishing	0.753448	7.820064	0.814391	0.099942	0.875583	0.715004

Source: EROC, author's computations

Appendix A.3 - Average values of Fixed Assets Turnover (FAT) ratio

Industry	1993	1994	1995	1996	1997	1998
Energy	6.318638	-5.14219	55.5051	11.64312	150.5377	89.96304
Petroleum and Natural Gas	1.189	6.678903	2.950458	0.50748	6.197784	6.115005
Coal	-0.00122	1.242975	1.248276	0.199563	2.226463	2.245226
Metals	0.651834	4.858924	2.870703	0.536832	6.184168	5.28788
Chemicals	1.117995	5.938397	2.894721	0.877128	7.358893	6.118066
Rubber and Plastic Products	0.62895	5.105359	2.137417	0.344985	3.496985	2.714105
Machinery	1.066388	4.189285	1.861393	0.312774	2.801845	0.83475
Lumber, Wood and Paper	1.419975	5.424431	2.551011	0.35438	3.447957	3.314914
Construction Materials	0.461223	2.816082	1.469568	0.224765	2.428701	2.464111
Glass and Clay	1.188558	6.974387	2.838733	0.501456	5.187347	5.311337
Light industry	2.520528	8.589567	2.976983	0.405057	3.740355	3.700497
Food Products	1.705846	11.3702	6.73808	1.280586	4.34475	2.2355
Flour-milling and Groats	2.516983	16.78804	9.852804	2.427905	22.41636	15.09074
Medical	1.485412	13.80269	3.793252	0.795391	10.51689	10.91279
Printing and Publishing	0.721199	8.010923	2.584034	0.579612	6.071781	4.785

Source: EROC, author's computations

Appendix A.4 - Average values of Cost to Sales (CTS) ratio

Industry	1993	1994	1995	1996	1997	1998
Energy	-1.2399	5.991043	-0.11172	0.885078	0.067887	0.481328
Petroleum and Natural Gas	1.59994	3.715225	1.83525	0.556117	0.054044	0.561863
Coal	-12.289	-36.064	1.185332	1.359977	0.154264	1.495917
Metals	3.306068	-0.15003	1.45569	0.899851	0.091853	1.034677
Chemicals	2.495152	3.229993	1.547698	2.291951	0.111241	1.138413
Rubber and Plastic Products	2.233964	2.093838	2.138135	0.873665	0.096228	1.030292
Machinery	3.82697	4.321726	1.56923	2.881273	0.151818	1.233696
Lumber, Wood and Paper	3.35968	4.679558	1.614387	1.489264	0.112202	1.618628
Construction Materials	3.687378	17.46875	2.531887	1.218394	0.118639	1.705851
Glass and Clay	2.395727	2.183137	3.551623	1.175182	0.141509	1.358986
Light industry	2.636923	-4.35081	1.620111	1.182997	0.14647	1.568561
Food Products	7.291122	8.919762	1.651723	0.949056	0.110707	1.231424
Flour-milling and Groats	10.74305	13.57652	1.770188	0.98309	0.099345	1.313416
Medical	1.83587	2.198676	1.468864	1.013624	0.094535	1.387747
Printing and Publishing	2.79008	1.462542	1.652807	0.8367	0.080809	1.205712

Source: EROC, author's computations

APPENDIX B – Estimation results

The Partial Adjustment Model: $Y_{k,i,t} - Y_{k,i,t-1} = \lambda d + \lambda (X_{k,t-1} - Y_{k,t,i-1}) + v_t$

Variables used: Adj = ($Y_{i, k, t}$ - $Y_{i, k, t-1}$)
Dev = ($X_{k, t-1}$ - $Y_{i, k, t-1}$)

Appendix B.1 - Financial Ratio: ROS

adj

	Percentiles	Smallest		
1%	-4.082847	-391.0909		
5%	-1.308699	-169.8281		
10%	-.995241	-145.7223	Obs	27595
25%	-.482311	-119.6276	Sum of Wgt.	27595
50%	-.073079		Mean	-.3103946
		Largest	Std. Dev.	4.876009
75%	.007191	116.5519		
90%	.140446	118.3013	Variance	23.77547
95%	.410056	143.9516	Skewness	-1.502143
99%	2.068892	391.6488	Kurtosis	3230.013

dev

	Percentiles	Smallest		
1%	-2.194291	-169.715		
5%	-.691721	-143.5707		
10%	-.373031	-92.18071	Obs	27595
25%	-.131037	-90.75909	Sum of Wgt.	27595
50%	.065557		Mean	-.0011372
		Largest	Std. Dev.	3.500957
75%	.207693	90.62663		
90%	.307007	117.3985	Variance	12.2567
95%	.598887	119.3614	Skewness	45.25305
99%	1.827374	391.7433	Kurtosis	6180.156

Method:Pooled OLS

Source	SS	df	MS
Model	30.9804271	1	30.9804271
Residual	1860.89183	20318	.091588337
Total	1891.87226	20319	.093108532

Number of obs = 20320
F(1, 20318) = 338.26
Prob > F = 0.0000
R-squared = 0.0164
Adj R-squared = 0.0163
Root MSE = .30264

adj	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dev	-.2075675	.0112859	-18.39	0.000	-.2296888	-.1854463
_cons	-.1858718	.0021974	-84.59	0.000	-.1901789	-.1815646

Regression with robust standard errors

Number of obs = 20320
F(1, 5436) = 499.77
Prob > F = 0.0000
R-squared = 0.0164
Number of clusters (firm) = 5437
Root MSE = .30264

adj	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
dev	.2075675	.0092849	-22.36	0.000	-.2257696	-.1893655
_cons	-.1858718	.001622	-114.60	0.000	-.1890515	-.1826921

Fixed-effects (within) regression — Number of obs = 20320
Group variable (i): firm — Number of groups = 5437

R-sq: within = 0.0126 — Obs per group: min = 1
between = 0.0405 — avg = 3.7
overall = 0.0164 — max = 5

F(1,14882) = 190.16
corr(u_i, Xb) = 0.0177 — Prob > F = 0.0000

adj	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dev	.1958182	.0142	-13.79	0.000	-.223652	-.1679845
_cons	-.186462	.0023696	-78.69	0.000	-.1911068	-.1818173
sigma_u	.14413899					
sigma_e	.32211365					
rho	.16683134	(fraction of variance due to u_i)				

F test that all u_i=0: F(5436, 14882) = 0.56 Prob > F = 1.0000

Random-effects GLS regression — Number of obs = 20320
Group variable (i): firm — Number of groups = 5437

R-sq: within = 0.0126 — Obs per group: min = 1
between = 0.0405 — avg = 3.7
overall = 0.0164 — max = 5

Random effects u_i ~ Gaussian — Wald chi2(1) = 338.26
corr(u_i, X) = 0 (assumed) — Prob > chi2 = 0.0000

adj	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
dev	.2075675	.0112859	-18.39	0.000	-.2296875	-.1854476
_cons	-.1858718	.0021974	-84.59	0.000	-.1901787	-.1815649
sigma_u	0					
sigma_e	.32211365					
rho	0	(fraction of variance due to u_i)				

Breusch and Pagan Lagrangian multiplier test for random effects:

adj[firm,t] = Xb + u[firm] + e[firm,t]

Estimated results:

	Var	sd = sqrt(Var)
adj	.0931085	.3051369
e	.1037572	.3221136
u	0	0

Test: Var(u) = 0
chi2(1) = 625.59
Prob > chi2 = 0.0000

Hausman test

	(b) Consistent	(B) Efficient	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	---- Coefficients ----			
dev	.1958182	.2075675	-.0117493	.0086179

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 1.86
Prob>chi2 = 0.1728

Appendix B.2 - Financial Ratio: ROA

```
                        adj
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -18.49574      -2591.151
 5%    -7.337058      -413.1753
10%    -3.871591      -366.2614       Obs               27595
25%     -.851172      -346.5562       Sum of Wgt.       27595
50%     -.099292                      Mean           -.248646
                        Largest       Std. Dev.       23.4912
75%      .476495       166.9873
90%     3.410993       173.9607       Variance       551.8365
95%     6.658995        268.841       Skewness      -.4361114
99%     17.20252       2590.935       Kurtosis       10737.05

                        dev
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -14.97281      -2581.697
 5%    -3.448824      -366.6301
10%    -1.249537      -347.5732       Obs               27595
25%     -.039089      -263.1111       Sum of Wgt.       27595
50%      .226978                      Mean           .0112678
                        Largest       Std. Dev.      16.69361
75%      .866748       22.94734
90%     2.337169       37.21254       Variance       278.6766
95%     4.613308       98.02445       Skewness      -134.6133
99%     8.310914        395.391       Kurtosis       20761.57
```

Pooled OLS

```
      Source |       SS       df       MS              Number of obs =    1336
-------------+------------------------------           F(  1,  1334) =  103.39
       Model |  241.437858     1  241.437858           Prob > F      =  0.0000
    Residual |  3115.26731  1334  2.33528284           R-squared     =  0.0719
-------------+------------------------------           Adj R-squared =  0.0712
       Total |  3356.70517  1335   2.5143859           Root MSE      =  1.5282
------------------------------------------------------------------------------
         adj |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         dev |   1.490599    .146598   -10.17   0.000    -1.778187   -1.203011
       _cons |      2.496   .2501607     9.98   0.000     2.005248    2.986751
------------------------------------------------------------------------------
```

Regression with robust standard errors

```
                                                       Number of obs =   19066
                                                       F(  1,  5426) =   98.69
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0080
Number of clusters (firm) = 5427                       Root MSE      =  1.0697
------------------------------------------------------------------------------
             |               Robust
         adj |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         dev |   .1650222   .0166116     9.93   0.000     .1324568    .1975876
       _cons |  -.0437903   .0076786    -5.70   0.000    -.0588434   -.0287372
```

```
Fixed-effects (within) regression               Number of obs      =     19066
Group variable (i): firm                        Number of groups   =      5427

R-sq:  within  = 0.0044                         Obs per group: min =         1
       between = 0.0094                                        avg =       3.5
       overall = 0.0080                                        max =         5
                                                F(1,13638)         =     60.20
corr(u_i, Xb)  = 0.0273                         Prob > F           =    0.0000
------------------------------------------------------------------------------
         adj |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         dev |   .1444118   .0186119     7.76   0.000     .1079299    .1808937
       _cons |  -.0363613   .0107143    -3.39   0.001    -.0573627   -.0153598
-------------+----------------------------------------------------------------
     sigma_u |  .54712268
     sigma_e |  1.1535192
         rho |   .1836518   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(5426, 13638) =     0.51         Prob > F = 1.0000
```

```
Random-effects GLS regression                   Number of obs      =     19066
Group variable (i): firm                        Number of groups   =      5427

R-sq:  within  = 0.0044                         Obs per group: min =         1
       between = 0.0094                                        avg =       3.5
       overall = 0.0080                                        max =         5

Random effects u_i ~ Gaussian                   Wald chi2(1)       =    153.78
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
------------------------------------------------------------------------------
         adj |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         dev |   .1650222   .0133075    12.40   0.000       .13894    .1911044
       _cons |  -.0437903   .0091117    -4.81   0.000     -.061649   -.0259316
-------------+----------------------------------------------------------------
     sigma_u |          0
     sigma_e |  1.1535192
         rho |          0   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Breusch and Pagan Lagrangian multiplier test for random effects:

```
        adj[firm,t] = Xb + u[firm] + e[firm,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                     adj |   1.153421       1.073974
                       e |   1.330607       1.153519
                       u |          0              0

        Test:   Var(u) = 0
                             chi2(1) =   895.79
                         Prob > chi2 =     0.0000
```

Hausman test

```
              ---- Coefficients ----
          |    (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
          |  Consistent   Efficient      Difference          S.E.
-------------+----------------------------------------------------------------
       dev |   .1444118     .1650222       -.05058102         .013012
------------------------------------------------------------------------------
                 b = consistent under Ho and Ha; obtained from xtreg
         B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test:  Ho:  difference in coefficients not systematic

              chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =        2.51
            Prob>chi2 =      0.1132
```

Appendix B.3 - Financial Ratio: FAT

adj

	Percentiles	Smallest		
1%	-22.24735	-14417.16		
5%	-8.307287	-2553.243		
10%	-4.419586	-2023.117	Obs	22745
25%	-1.270071	-1097.029	Sum of Wgt.	22745
50%	.273101		Mean	1.468412
		Largest	Std. Dev.	140.7409
75%	2.859664	2058.806		
90%	7.960878	2202.223	Variance	19808.01
95%	13.72035	2555.503	Skewness	.1773131
99%	39.06949	14416.31	Kurtosis	9699.043

dev

	Percentiles	Smallest		
1%	-30.23173	-14299.47		
5%	-8.055251	-2544.446		
10%	-3.206281	-2051.339	Obs	27595
25%	-.138853	-1333.062	Sum of Wgt.	27595
50%	.759501		Mean	.031535
		Largest	Std. Dev.	89.66677
75%	2.362123	118.9811		
90%	6.239333	119.7712	Variance	8040.129
95%	9.000718	122.3427	Skewness	-148.3895
99%	14.854	177.691	Kurtosis	23475.45

Pooled OLS

Source	SS	df	MS		
Model	6247.26131	1	6247.26131	Number of obs =	17219
Residual	104446.948	17217	6.06650102	F(1, 17217) =	1029.80
Total	110694.209	17218	6.42898185	Prob > F =	0.0000
				R-squared =	0.0564
				Adj R-squared =	0.0564
				Root MSE =	2.463

adj	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dev	.281241	.008764	-32.09	0.000	-.2984194	-.2640626
_cons	1.188803	.0228656	51.99	0.000	1.143984	1.233622

Regression with robust standard errors

Number of obs = 17219
F(1, 5200) = 1152.31
Prob > F = 0.0000
R-squared = 0.0564
Number of clusters (firm) = 5201
Root MSE = 2.463

adj	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
dev	.281241	.008285	-33.95	0.000	-.2974832	-.2649988
_cons	1.188803	.0216153	55.00	0.000	1.146428	1.231178

Fixed-effects (within) regression

```
Fixed-effects (within) regression               Number of obs      =     17219
Group variable (i): firm                        Number of groups   =      5201

R-sq:  within  = 0.1018                         Obs per group: min =         1
       between = 0.0052                                        avg =       3.3
       overall = 0.0564                                        max =         5
                                                F(1,12017)         =   1361.86
corr(u_i, Xb)  = -0.2209                        Prob > F           =    0.0000
------------------------------------------------------------------------------
         adj |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         dev |   .4176224   .0113167   -36.90   0.000    -.4398049     -.39544
       _cons |   1.392013   .0255075    54.57   0.000     1.342014    1.442012
-------------+----------------------------------------------------------------
     sigma_u |  1.6677086
     sigma_e |  2.5114703
         rho |  .30601088   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(5200, 12017) =     0.87         Prob > F = 1.0000
```

Random-effects GLS regression

```
Random-effects GLS regression                   Number of obs      =     17219
Group variable (i): firm                        Number of groups   =      5201

R-sq:  within  = 0.1018                         Obs per group: min =         1
       between = 0.0052                                        avg =       3.3
       overall = 0.0564                                        max =         5

Random effects u_i ~ Gaussian                   Wald chi2(1)       =   1080.76
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
------------------------------------------------------------------------------
         adj |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         dev |   .2907659   .0088446   -32.87   0.000    -.3081011   -.2734307
       _cons |   1.217636   .0237335    51.30   0.000     1.171119    1.264153
-------------+----------------------------------------------------------------
     sigma_u |  .47628699
     sigma_e |  2.5114703
         rho |  .03471652   (fraction of variance due to u_i)
```

Breusch and Pagan Lagrangian multiplier test for random effects:

```
        adj[firm,t] = Xb + u[firm] + e[firm,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                     adj |   6.428982       2.535544
                       e |   6.307483       2.51147
                       u |   .2268493       .476287

        Test:   Var(u) = 0
                          chi2(1) =   343.58
                      Prob > chi2 =     0.0000
```

Hausman test

```
               ---- Coefficients ----
           |     (b)          (B)           (b-B)     sqrt(diag(V_b-V_B))
           |  Consistent   Efficient      Difference          S.E.
-------------+----------------------------------------------------------------
        dev |   .4176224    .2907659       .1268565        .0070597
------------------------------------------------------------------------------
                      b = consistent under Ho and Ha; obtained from xtreg
         B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test:  Ho:  difference in coefficients not systematic

              chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =      322.89
            Prob>chi2 =      0.0000
```

Appendix B.4 - Financial Ratio: CTS

```
                      adj
-------------------------------------------------------------
     Percentiles      Smallest
 1%    -31.71738     -5528.958
 5%    -7.272277     -4776.089
10%    -3.697723     -2718.839           Obs              27595
25%     -.934407     -1852.547           Sum of Wgt.      27595
50%     -.032722                         Mean          -.6878052
                      Largest       Std. Dev.      77.35063
75%      .685373      2530.862
90%     1.610338      2655.282      Variance        5983.12
95%     3.875892      4773.844      Skewness       .4543188
99%     23.46499      5526.333      Kurtosis       3141.405

                      dev
-------------------------------------------------------------
     Percentiles      Smallest
 1%    -23.06617     -5512.557
 5%    -6.105427     -2710.766
10%    -1.557208     -1854.712           Obs              27595
25%      .022068     -1681.126           Sum of Wgt.      27595
50%      .459696                         Mean           .0729668
                      Largest       Std. Dev.      57.22979
75%     1.735113      922.4094
90%     4.349312      1339.888      Variance       3275.249
95%     6.765905      2545.667      Skewness      -15.12672
99%      15.5546      4768.148      Kurtosis       5303.065
```

Pooled OLS

```
     Source |       SS       df       MS              Number of obs =   20467
-------------+------------------------------           F(  1, 20465) =    7.85
      Model |  8.34677512     1  8.34677512            Prob > F      =  0.0051
   Residual |  21746.9759 20465  1.06264236            R-squared     =  0.0004
-------------+------------------------------           Adj R-squared =  0.0003
      Total |  21755.3226 20466  1.06299827            Root MSE      =  1.0308
------------------------------------------------------------------------------
        adj |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        dev |   .0200856   .0071667     2.80   0.005     .0060383    .0341329
      _cons |    .007141   .0089609     0.80   0.426    -.0104232    .0247051
------------------------------------------------------------------------------
```

Regression with robust standard errors

```
                                                       Number of obs =   20467
                                                       F(  1,  4802) =    2.74
                                                       Prob > F      =  0.0981
                                                       R-squared     =  0.0004
Number of clusters (firm) = 4803                       Root MSE      =  1.0308
------------------------------------------------------------------------------
             |               Robust
        adj |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        dev |   .0200856   .0121395     1.65   0.098    -.0037134    .0438846
      _cons |    .007141   .0158319     0.45   0.652    -.0238969    .0381788
```

Fixed-effects (within) regression

```
Group variable (i): firm                  Number of obs      =     20467
                                          Number of groups   =      4803

R-sq:  within  = 0.1965                   Obs per group: min =         1
       between = 0.0062                                  avg =       4.3
       overall = 0.0004                                  max =         5
                                          F(1,15663)         =   3830.25
corr(u_i, Xb)  = -0.5287                  Prob > F           =    0.0000
------------------------------------------------------------------------------
         adj |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         dev |   .5635509   .0091058    61.89   0.000     .5457025    .5813994
       _cons |  -.3968262   .0080321   -49.40   0.000    -.4125702   -.3810823
-------------+----------------------------------------------------------------
     sigma_u |  1.1114452
     sigma_e |  .61869104
         rho |  .76343785   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(4802, 15663) =     8.57         Prob > F = 0.0000
```

Random-effects GLS regression

```
Group variable (i): firm                  Number of obs      =     20467
                                          Number of groups   =      4803

R-sq:  within  = 0.1965                   Obs per group: min =         1
       between = 0.0062                                  avg =       4.3
       overall = 0.0004                                  max =         5
Random effects u_i ~ Gaussian             Wald chi2(1)       =   2154.05
corr(u_i, X)       = 0 (assumed)          Prob > chi2        =    0.0000
------------------------------------------------------------------------------
         adj |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         dev |   .3629765   .0078208    46.41   0.000      .347648    .3783049
       _cons |  -.2742415   .0150369   -18.24   0.000    -.3037132   -.2447698
-------------+----------------------------------------------------------------
     sigma_u |  .85397567
     sigma_e |  .61869104
         rho |  .65579106   (fraction of variance due to u_i)
```

Breusch and Pagan Lagrangian multiplier test for random effects:

```
        adj[firm,t] = Xb + u[firm] + e[firm,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                     adj |   1.062998       1.031018
                       e |   .3827786        .618691
                       u |   .7292744       .8539757

        Test:   Var(u) = 0
                             chi2(1) =  9109.08
                         Prob > chi2 =     0.0000
```

Hausman test

```
              ---- Coefficients ----
           |      (b)          (B)          (b-B)     sqrt(diag(V_b-V_B))
           |   Consistent   Efficient     Difference         S.E.
-------------+----------------------------------------------------------------
       dev |    .5635509     .3629765        .2005745        .0046639
------------------------------------------------------------------------------
                     b = consistent under Ho and Ha; obtained from xtreg
          B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test:  Ho:  difference in coefficients not systematic

              chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =     1849.53
            Prob>chi2 =      0.0000
```

.

APPENDIX C - Industry-specific results

The Partial Adjustment Model: $Y_{k,i,t} - Y_{k,i,t-1} = \lambda d + \lambda(X_{k,t-1} - Y_{k,t,i-1}) + v_t$

Variables used: Adj = ($Y_{i, k, t}$ - $Y_{i, k, t-1}$)
Dev = ($X_{k, t-1}$ - $Y_{i, k, t-1}$)

Energy, ROS

Dependent Variable: ADJ?
Method: Pooled Least Squares

Sample: 1994 1998
Included observations: 5
Total panel observations 130
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.050929	0.068066	-0.748223	0.4557
DEV?	0.090466	0.033282	2.718175	0.0075

R-squared	0.083926	Mean dependent var	-1.754013
Adjusted R-squared	0.076769	S.D. dependent var	15.97013
S.E. of regression	15.34489	Sum squared resid	30139.60
F-statistic	11.72668	Durbin-Watson stat	2.173624
Prob(F-statistic)	0.000828		

Energy, ROA

Dependent Variable: ADJ?
Method: Pooled Least Squares

Sample(adjusted): 1994 1998
Included observations: 5 after adjusting endpoints
Total panel observations 130
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.118031	3.283208	-0.949690	0.3441
DEV?	0.057252	0.080634	6.290769	0.0000

R-squared	0.210465	Mean dependent var	-3.118031
Adjusted R-squared	0.204297	S.D. dependent var	41.96571
S.E. of regression	37.43433	Sum squared resid	179370.1
F-statistic	34.12078	Durbin-Watson stat	2.138700
Prob(F-statistic)	0.000000		

Energy, FAT

Dependent Variable: ADJ?
Method: Pooled Least Squares

Sample: 1994 1998
Included observations: 5
Total panel observations 130
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.155667	1.841139	0.627692	0.5313
DEV?	0.005874	0.043066	-0.136395	0.8917
R-squared	-0.006521	Mean dependent var		10.36148
Adjusted R-squared	-0.014384	S.D. dependent var		81.11649
S.E. of regression	81.69780	Sum squared resid		854339.9
Durbin-Watson stat	1.841838			

Energy, CTS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.097633	0.046754	2.088206	0.3814
Weighted Statistics				
R-squared	0.215901	Mean dependent var		-1.825180
Adjusted R-squared	0.017974	S.D. dependent var		17.23245
S.E. of regression	17.07688	Sum squared resid		30036.84
Durbin-Watson stat	2.065343			
Unweighted Statistics				
R-squared	0.215359	Mean dependent var		-3.118031
Adjusted R-squared	0.017294	S.D. dependent var		41.96571
S.E. of regression	41.60124	Sum squared resid		178258.3
Durbin-Watson stat	2.379801			

Petroleum and Natural Gas, ROS

Dependent Variable: ADJ?
Method: Pooled Least Squares

Sample(adjusted): 1994 1998
Included observations: 5 after adjusting endpoints
Total panel observations 95
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.187417	0.607445	-0.308533	0.7584
DEV?	0.987295	0.056005	17.62856	0.0000
R-squared	0.467271	Mean dependent var		-0.187417
Adjusted R-squared	0.461543	S.D. dependent var		8.068509
S.E. of regression	5.920641	Sum squared resid		3260.021
F-statistic	81.57297	Durbin-Watson stat		1.842897
Prob(F-statistic)	0.000000			

Petroleum and Natural Gas, ROA

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.034227	0.140873	-0.242962	0.8086
DEV?	0.266544	0.084091	3.169715	0.0021
GLS Transformed Regression				
R-squared	-0.004320	Mean dependent var		-0.034227
Adjusted R-squared	-0.015119	S.D. dependent var		4.045326
S.E. of regression	4.075792	Sum squared resid		1544.923
Durbin-Watson stat	2.234156			
Unweighted Statistics including Random Effects				
R-squared	-1.559435	Mean dependent var		-0.034227
Adjusted R-squared	-1.586956	S.D. dependent var		4.045326
S.E. of regression	6.506508	Sum squared resid		3937.122
Durbin-Watson stat	0.876681			

Petroleum and Natural Gas, FAT

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.985201	0.233173	4.225188	0.0001
DEV?	0.009905	0.054050	0.183263	0.8550
GLS Transformed Regression				
R-squared	-0.143400	Mean dependent var		0.985201
Adjusted R-squared	-0.155694	S.D. dependent var		8.930275
S.E. of regression	9.600333	Sum squared resid		8571.475
Durbin-Watson stat	2.265420			
Unweighted Statistics including Random Effects				
R-squared	-2.834905	Mean dependent var		0.985201
Adjusted R-squared	-2.876141	S.D. dependent var		8.930275
S.E. of regression	17.58185	Sum squared resid		28748.30
Durbin-Watson stat	0.705264			

Petroleum and Natural Gas, CTS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 95

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.232941	0.489250	0.476119	0.6349
Weighted Statistics				
R-squared	0.046796	Mean dependent var		1.280531
Adjusted R-squared	-0.194682	S.D. dependent var		5.764371
S.E. of regression	6.300544	Sum squared resid		2977.264
Durbin-Watson stat	2.076587			
Unweighted Statistics				
R-squared	0.175478	Mean dependent var		0.985201
Adjusted R-squared	-0.033401	S.D. dependent var		8.930275
S.E. of regression	9.078189	Sum squared resid		6181.014
Durbin-Watson stat	2.620551			

Coal, ROS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 195

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.180082	0.023565	-7.641931	0.0000
DEV?	0.526136	0.110874	4.745359	0.0000
Weighted Statistics				
R-squared	0.189141	Mean dependent var		-0.293457
Adjusted R-squared	0.184939	S.D. dependent var		1.108619
S.E. of regression	1.000869	Sum squared resid		193.3356
F-statistic	45.01911	Durbin-Watson stat		2.360768
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.312014	Mean dependent var		-0.155227
Adjusted R-squared	0.308449	S.D. dependent var		1.323326
S.E. of regression	1.100472	Sum squared resid		233.7304
Durbin-Watson stat	2.765846			

Coal, ROA

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 195

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.012519	0.031368	0.399106	0.6903
DEV?	0.229396	0.054614	4.200320	0.0000
GLS Transformed Regression				
R-squared	-0.023085	Mean dependent var		0.012519
Adjusted R-squared	-0.028386	S.D. dependent var		1.495833
S.E. of regression	1.516914	Sum squared resid		444.0986
Durbin-Watson stat	2.360364			
Unweighted Statistics including Random Effects				
R-squared	-2.136985	Mean dependent var		0.012519
Adjusted R-squared	-2.153239	S.D. dependent var		1.495833
S.E. of regression	2.656204	Sum squared resid		1361.696
Durbin-Watson stat	0.769800			

Coal, FAT

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 195

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.201395	0.072569	2.775213	0.0061
DEV?	0.458221	0.099477	4.606278	0.0000
Weighted Statistics				
R-squared	0.100196	Mean dependent var		0.587582
Adjusted R-squared	0.095534	S.D. dependent var		1.998794
S.E. of regression	1.900922	Sum squared resid		697.4061
F-statistic	21.49113	Durbin-Watson stat		2.829746
Prob(F-statistic)	0.000007			
Unweighted Statistics				
R-squared	0.188926	Mean dependent var		0.449288
Adjusted R-squared	0.184723	S.D. dependent var		2.256529
S.E. of regression	2.037481	Sum squared resid		801.2061
Durbin-Watson stat	2.892140			

Coal, CTS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 195

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.756977	4.381162	0.629280	0.5299
DEV?	0.766058	0.062219	12.31227	0.0000
GLS Transformed Regression				
R-squared	0.401567	Mean dependent var		2.756977
Adjusted R-squared	0.398466	S.D. dependent var		151.0968
S.E. of regression	117.1886	Sum squared resid		2650500.
Durbin-Watson stat	1.766151			
Unweighted Statistics including Random Effects				
R-squared	-0.094668	Mean dependent var		2.756977
Adjusted R-squared	-0.100340	S.D. dependent var		151.0968
S.E. of regression	158.4961	Sum squared resid		4848354.
Durbin-Watson stat	0.801516			

Metals, ROS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 660

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.252482	0.033811	-7.467512	0.0000
DEV?	0.880688	0.030833	28.56285	0.0000
GLS Transformed Regression				
R-squared	0.519240	Mean dependent var		-0.252482
Adjusted R-squared	0.518509	S.D. dependent var		1.819812
S.E. of regression	1.262759	Sum squared resid		1049.221
Durbin-Watson stat	1.957268			
Unweighted Statistics including Random Effects				
R-squared	0.384267	Mean dependent var		-0.252482
Adjusted R-squared	0.383332	S.D. dependent var		1.819812
S.E. of regression	1.429066	Sum squared resid		1343.787
Durbin-Watson stat	1.528224			

Metals, ROA

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 660

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.056653	0.046044	-1.230393	0.2190
DEV?	0.426661	0.026892	15.86570	0.0000
GLS Transformed Regression				
R-squared	0.241361	Mean dependent var		-0.098812
Adjusted R-squared	0.240208	S.D. dependent var		3.772060
S.E. of regression	3.287956	Sum squared resid		7113.411
Durbin-Watson stat	1.662676			
Unweighted Statistics including Random Effects				
R-squared	-1.653231	Mean dependent var		-0.098812
Adjusted R-squared	-1.657263	S.D. dependent var		3.772060
S.E. of regression	6.148878	Sum squared resid		24878.12
Durbin-Watson stat	0.475410			

Metals, FAT

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 660

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.189225	0.099444	1.902834	0.0574
Weighted Statistics				
R-squared	0.046127	Mean dependent var		1.427330
Adjusted R-squared	-0.192794	S.D. dependent var		6.431105
S.E. of regression	7.023739	Sum squared resid		25998.44
Durbin-Watson stat	3.092316			
Unweighted Statistics				
R-squared	0.187902	Mean dependent var		0.927209
Adjusted R-squared	-0.015508	S.D. dependent var		8.702477
S.E. of regression	8.769696	Sum squared resid		40530.29
Durbin-Watson stat	3.422153			

Metals, CTS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 660

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.454278	0.200190	-2.269229	0.0236
DEV?	0.071057	0.014120	5.032399	0.0000
GLS Transformed Regression				
R-squared	0.130882	Mean dependent var		-0.454278
Adjusted R-squared	0.082479	S.D. dependent var		43.80510
S.E. of regression	44.93982	Sum squared resid		1328889.
Durbin-Watson stat	2.608237			
Unweighted Statistics including Random Effects				
R-squared	0.191466	Mean dependent var		-0.454278
Adjusted R-squared	0.061955	S.D. dependent var		43.80510
S.E. of regression	139.9499	Sum squared resid		12887580
Durbin-Watson stat	1.279257			

Chemicals, ROS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.279281	0.006915	-40.38721	0.0000
DEV?	0.683611	0.044751	15.27584	0.0000
Weighted Statistics				
R-squared	0.270174	Mean dependent var		-0.647933
Adjusted R-squared	0.268818	S.D. dependent var		1.185103
S.E. of regression	1.013372	Sum squared resid		552.4846
F-statistic	199.1625	Durbin-Watson stat		2.383617
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.261320	Mean dependent var		-0.324293
Adjusted R-squared	0.259947	S.D. dependent var		1.202376
S.E. of regression	1.034360	Sum squared resid		575.6062
Durbin-Watson stat	1.846473			

Chemicals, ROA

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.298647	0.147277	2.027785	0.0430
Weighted Statistics				
R-squared	0.041951	Mean dependent var		-0.180623
Adjusted R-squared	-0.198117	S.D. dependent var		3.817037
S.E. of regression	4.178073	Sum squared resid		7523.664
Durbin-Watson stat	2.428450			
Unweighted Statistics				
R-squared	0.178913	Mean dependent var		-0.150601
Adjusted R-squared	-0.026834	S.D. dependent var		5.362815
S.E. of regression	5.434293	Sum squared resid		12728.09
Durbin-Watson stat	3.026239			

Chemicals, FAT

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	-0.021616	0.062374	-0.346549	0.7290
Weighted Statistics				
R-squared	0.035641	Mean dependent var		1.318686
Adjusted R-squared	-0.206008	S.D. dependent var		8.874185
S.E. of regression	9.745487	Sum squared resid		40934.02
Durbin-Watson stat	2.515578			
Unweighted Statistics				
R-squared	0.065297	Mean dependent var		1.000014
Adjusted R-squared	-0.168921	S.D. dependent var		12.82580
S.E. of regression	13.86682	Sum squared resid		82876.48
Durbin-Watson stat	3.155352			

Chemicals, CTS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.628313	0.026533	-23.68019	0.0000
DEV?	0.689462	0.038296	18.00340	0.0000
Weighted Statistics				
R-squared	0.345889	Mean dependent var		-1.094520
Adjusted R-squared	0.344673	S.D. dependent var		7.266096
S.E. of regression	5.882070	Sum squared resid		18614.13
F-statistic	284.4900	Durbin-Watson stat		2.816607
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.444346	Mean dependent var		-0.271348
Adjusted R-squared	0.443313	S.D. dependent var		9.056138
S.E. of regression	6.756918	Sum squared resid		24562.90
Durbin-Watson stat	3.137958			

Rubber and Plastic Products, ROS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 175

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.231271	0.198173	1.167012	0.2445

Weighted Statistics			
R-squared	0.176913	Mean dependent var	-0.163105
Adjusted R-squared	-0.030339	S.D. dependent var	3.426675
S.E. of regression	3.478268	Sum squared resid	1681.670
Durbin-Watson stat	2.259442		

Unweighted Statistics			
R-squared	0.203855	Mean dependent var	-0.028886
Adjusted R-squared	0.003386	S.D. dependent var	10.21997
S.E. of regression	10.20265	Sum squared resid	14469.07
Durbin-Watson stat	2.706714		

Rubber and Plastic Products, ROA

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 175

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.511106	0.074933	-6.820821	0.0000
DEV?	0.615065	0.081360	7.559828	0.0000

Weighted Statistics			
R-squared	0.341953	Mean dependent var	-0.065632
Adjusted R-squared	0.338150	S.D. dependent var	3.756765
S.E. of regression	3.056286	Sum squared resid	1615.973
F-statistic	89.89931	Durbin-Watson stat	2.455130
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.393597	Mean dependent var	-0.066378
Adjusted R-squared	0.390092	S.D. dependent var	5.277346
S.E. of regression	4.121429	Sum squared resid	2938.608
Durbin-Watson stat	3.082854		

Rubber and Plastic Products, FAT

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 145
Cross sections without valid observations dropped

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.569380	0.098678	-5.770072	0.0000
DEV?	0.665142	0.070207	9.473966	0.0000

Weighted Statistics			
R-squared	0.352274	Mean dependent var	-0.044976
Adjusted R-squared	0.347744	S.D. dependent var	4.334934
S.E. of regression	3.500995	Sum squared resid	1752.746
F-statistic	77.77225	Durbin-Watson stat	2.286952
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.414812	Mean dependent var	-0.056353
Adjusted R-squared	0.410720	S.D. dependent var	5.315192
S.E. of regression	4.080184	Sum squared resid	2380.650
Durbin-Watson stat	2.854686		

Rubber and Plastic Products, CTS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 175

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.302718	0.010940	-27.66951	0.0000
DEV?	0.497980	0.014355	34.68954	0.0000

Weighted Statistics			
R-squared	0.386879	Mean dependent var	-0.098799
Adjusted R-squared	0.383335	S.D. dependent var	4.927338
S.E. of regression	3.869342	Sum squared resid	2590.122
F-statistic	109.1628	Durbin-Watson stat	2.232578
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.115618	Mean dependent var	-0.153284
Adjusted R-squared	0.110506	S.D. dependent var	4.575116
S.E. of regression	4.314929	Sum squared resid	3221.020
Durbin-Watson stat	1.712412		

Machinery, ROS

Dependent Variable: ADJ?
Method: Pooled Least Squares

Sample(adjusted): 1994 1998
Included observations: 5 after adjusting endpoints
Total panel observations 5995
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.155227	0.075144	-2.065738	0.0402
DEV?	0.887625	0.150214	5.909059	0.0000

R-squared	0.374478	Mean dependent var	-0.155227
Adjusted R-squared	0.371237	S.D. dependent var	1.323326
S.E. of regression	1.049326	Sum squared resid	212.5095
F-statistic	115.5423	Durbin-Watson stat	2.210214
Prob(F-statistic)	0.000000		

Machinery, ROA

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 5995

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.180082	0.023565	-7.641931	0.0000
DEV?	0.526136	0.110874	4.745359	0.0000

Weighted Statistics

R-squared	0.189141	Mean dependent var	-0.293457
Adjusted R-squared	0.184939	S.D. dependent var	1.108619
S.E. of regression	1.000869	Sum squared resid	193.3356
F-statistic	45.01911	Durbin-Watson stat	3.060768
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.312014	Mean dependent var	-0.155227
Adjusted R-squared	0.308449	S.D. dependent var	1.323326
S.E. of regression	1.100472	Sum squared resid	233.7304
Durbin-Watson stat	2.765846		

Machinery, FAT

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 5995

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.077887	0.125771	-0.619277	0.5360
DEV?	-0.028007	0.088140	-0.317757	0.7508

Weighted Statistics			
R-squared	0.000729	Mean dependent var	-0.258125
Adjusted R-squared	-0.001129	S.D. dependent var	4.144040
S.E. of regression	4.146378	Sum squared resid	9249.538
F-statistic	0.392364	Durbin-Watson stat	2.002854
Prob(F-statistic)	0.531325		

Unweighted Statistics			
R-squared	-0.019120	Mean dependent var	-0.150601
Adjusted R-squared	-0.021014	S.D. dependent var	5.362815
S.E. of regression	5.418869	Sum squared resid	15797.91
Durbin-Watson stat	2.678873		

Machinery, CTS

Dependent Variable: ADJ?
Method: Pooled Least Squares

Sample(adjusted): 1994 1998
Included observations: 5 after adjusting endpoints
Total panel observations 5995
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.150601	0.210297	-0.716135	0.4742
DEV?	0.519978	0.146489	3.549617	0.0004

R-squared	0.171167	Mean dependent var	-0.150601
Adjusted R-squared	0.169626	S.D. dependent var	5.362815
S.E. of regression	4.886857	Sum squared resid	12848.18
F-statistic	111.1052	Durbin-Watson stat	2.503993
Prob(F-statistic)	0.000000		

Lumber, Wood and Paper, ROS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 1300

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.033024	0.029393	1.123534	0.2614
DEV?	0.956793	0.011982	79.84974	0.0000
GLS Transformed Regression				
R-squared	0.849293	Mean dependent var		0.033024
Adjusted R-squared	0.849177	S.D. dependent var		1.542186
S.E. of regression	0.598923	Sum squared resid		465.6040
Durbin-Watson stat	1.785882			
Unweighted Statistics including Random Effects				
R-squared	0.882783	Mean dependent var		0.033024
Adjusted R-squared	0.882692	S.D. dependent var		1.542186
S.E. of regression	0.528202	Sum squared resid		362.1387
Durbin-Watson stat	2.206120			

Lumber, Wood and Paper, ROA

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 1300

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.088889	0.106393	0.835481	0.4036
DEV?	0.594338	0.031105	19.10725	0.0000
GLS Transformed Regression				
R-squared	0.171737	Mean dependent var		0.088889
Adjusted R-squared	0.171099	S.D. dependent var		5.934417
S.E. of regression	5.402932	Sum squared resid		37890.79
Durbin-Watson stat	1.866892			
Unweighted Statistics including Random Effects				
R-squared	-0.047012	Mean dependent var		0.088889
Adjusted R-squared	-0.047819	S.D. dependent var		5.934417
S.E. of regression	6.074648	Sum squared resid		47897.95
Durbin-Watson stat	1.476848			

Lumber, Wood and Paper, FAT

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 1300

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.177060	0.125983	1.405426	0.1601
DEV?	0.774240	0.031689	24.43241	0.0000
GLS Transformed Regression				
R-squared	0.277135	Mean dependent var		0.177060
Adjusted R-squared	0.276578	S.D. dependent var		7.432509
S.E. of regression	6.321663	Sum squared resid		51872.52
Durbin-Watson stat	1.718971			
Unweighted Statistics including Random Effects				
R-squared	0.082400	Mean dependent var		0.177060
Adjusted R-squared	0.081693	S.D. dependent var		7.432509
S.E. of regression	7.122448	Sum squared resid		65846.59
Durbin-Watson stat	1.354168			

Lumber, Wood and Paper, CTS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 1300

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.348210	0.102814	-3.386809	0.0007
DEV?	0.615948	0.026719	23.05310	0.0000
Random Effects GLS Transformed Regression				
R-squared	0.228059	Mean dependent var		-0.348210
Adjusted R-squared	0.227464	S.D. dependent var		8.871206
S.E. of regression	7.797260	Sum squared resid		78914.85
Durbin-Watson stat	1.894318			
Unweighted Statistics including Random Effects				
R-squared	-0.509558	Mean dependent var		-0.348210
Adjusted R-squared	-0.510721	S.D. dependent var		8.871206
S.E. of regression	10.90372	Sum squared resid		154320.8
Durbin-Watson stat	0.968695			

Construction Materials, ROS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 3260

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.374793	0.038119	-9.832144	0.0000
DEV?	0.864069	0.018505	46.69458	0.0000
GLS Transformed Regression				

R-squared	0.374930	Mean dependent var	-0.374793
Adjusted R-squared	0.374738	S.D. dependent var	3.492257
S.E. of regression	2.761450	Sum squared resid	24844.22
Durbin-Watson stat	1.856017		
Unweighted Statistics including Random Effects			
R-squared	0.269597	Mean dependent var	-0.374793
Adjusted R-squared	0.269373	S.D. dependent var	3.492257
S.E. of regression	2.985067	Sum squared resid	29030.82
Durbin-Watson stat	1.531621		

Construction Materials, ROA

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 1882
Cross sections without valid observations dropped

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.087165	0.056229	-1.550179	0.1213
DEV?	0.704054	0.019724	35.69545	0.0000
Random Effects GLS Transformed Regression				

R-squared	0.377875	Mean dependent var	-0.087775
Adjusted R-squared	0.377544	S.D. dependent var	4.136386
S.E. of regression	3.263438	Sum squared resid	20022.05
Durbin-Watson stat	1.956942		
Unweighted Statistics including Random Effects			
R-squared	0.227759	Mean dependent var	-0.087775
Adjusted R-squared	0.227348	S.D. dependent var	4.136386
S.E. of regression	3.635909	Sum squared resid	24853.29
Durbin-Watson stat	1.576531		

Construction Materials, FAT

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 1882
Cross sections without valid observations dropped

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.563276	0.026922	-20.92278	0.0000
DEV?	0.745815	0.034280	21.75673	0.0000
Weighted Statistics				
R-squared	0.468802	Mean dependent var		-0.157978
Adjusted R-squared	0.468520	S.D. dependent var		3.632271
S.E. of regression	2.648023	Sum squared resid		13182.61
F-statistic	1659.172	Durbin-Watson stat		2.037305
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.454765	Mean dependent var		-0.087775
Adjusted R-squared	0.454475	S.D. dependent var		4.136386
S.E. of regression	3.055120	Sum squared resid		17547.46
Durbin-Watson stat	2.120694			

Construction Materials, CTS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 3260

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.396305	0.986100	-0.401892	0.6878
DEV?	0.657320	0.014420	45.58382	0.0000
GLS Transformed Regression				
R-squared	0.337186	Mean dependent var		-0.396305
Adjusted R-squared	0.336983	S.D. dependent var		150.2290
S.E. of regression	122.3253	Sum squared resid		48750993
Durbin-Watson stat	1.850172			
Unweighted Statistics including Random Effects				
R-squared	-0.378933	Mean dependent var		-0.396305
Adjusted R-squared	-0.379356	S.D. dependent var		150.2290
S.E. of regression	176.4380	Sum squared resid		1.01E+08
Durbin-Watson stat	1.793191			

Glass and Clay, ROS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 325

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.213032	0.012063	-17.65985	0.0000
DEV?	0.753786	0.054011	13.95605	0.0000
Weighted Statistics				
R-squared	0.239419	Mean dependent var		-0.469614
Adjusted R-squared	0.237064	S.D. dependent var		0.921503
S.E. of regression	0.804898	Sum squared resid		209.2588
F-statistic	101.6755	Durbin-Watson stat		2.222402
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.163084	Mean dependent var		-0.315109
Adjusted R-squared	0.160493	S.D. dependent var		0.918707
S.E. of regression	0.841762	Sum squared resid		228.8659
Durbin-Watson stat	1.720161			

Glass and Clay, ROA

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 325

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.315109	0.038939	-8.092354	0.0000
DEV?	0.722199	0.102818	7.024041	0.0000
GLS Transformed Regression				
R-squared	0.081186	Mean dependent var		-0.315109
Adjusted R-squared	0.078341	S.D. dependent var		0.918707
S.E. of regression	0.881987	Sum squared resid		251.2621
Durbin-Watson stat	1.892440			
Unweighted Statistics including Random Effects				
R-squared	-0.064576	Mean dependent var		-0.315109
Adjusted R-squared	-0.067872	S.D. dependent var		0.918707
S.E. of regression	0.949373	Sum squared resid		291.1226
Durbin-Watson stat	1.574404			

Glass and Clay, FAT

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 325

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.269147	0.043971	-6.121058	0.0000
DEV?	0.121129	0.025926	4.672187	0.0000
GLS Transformed Regression				
R-squared	-0.120279	Mean dependent var		-0.269147
Adjusted R-squared	-0.123747	S.D. dependent var		5.112947
S.E. of regression	5.420079	Sum squared resid		9488.854
Durbin-Watson stat	2.309358			
Unweighted Statistics including Random Effects				
R-squared	-8.547825	Mean dependent var		-0.269147
Adjusted R-squared	-8.577385	S.D. dependent var		5.112947
S.E. of regression	15.82322	Sum squared resid		80870.86
Durbin-Watson stat	1.294432			

Glass and Clay, CTS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 325

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.435456	0.245285	1.775305	0.0768
DEV?	0.104611	0.138287	0.756475	0.4499
Weighted Statistics				
R-squared	0.002045	Mean dependent var		1.014665
Adjusted R-squared	-0.001045	S.D. dependent var		5.631510
S.E. of regression	5.634452	Sum squared resid		10254.30
F-statistic	0.661768	Durbin-Watson stat		2.801250
Prob(F-statistic)	0.416536			
Unweighted Statistics				
R-squared	0.056550	Mean dependent var		0.824556
Adjusted R-squared	0.053629	S.D. dependent var		7.267366
S.E. of regression	7.069809	Sum squared resid		16144.25
Durbin-Watson stat	2.891021			

Light industry, ROS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 2739

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.249778	0.028767	-8.682729	0.0000
DEV?	0.165043	0.012685	13.01076	0.0000
GLS Transformed Regression				
R-squared	-0.084130	Mean dependent var		-0.249778
Adjusted R-squared	-0.084526	S.D. dependent var		7.558351
S.E. of regression	7.871310	Sum squared resid		169577.7
Durbin-Watson stat	2.229023			
Unweighted Statistics including Random Effects				
R-squared	-4.998940	Mean dependent var		-0.249778
Adjusted R-squared	-5.001132	S.D. dependent var		7.558351
S.E. of regression	18.51585	Sum squared resid		938344.0
Durbin-Watson stat	1.438974			

Light industry, ROA

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 2739

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.451701	0.064704	6.981078	0.0000
Fixed Effects				
Weighted Statistics				
R-squared	0.283857	Mean dependent var		-0.313836
Adjusted R-squared	0.145388	S.D. dependent var		5.588043
S.E. of regression	5.980481	Sum squared resid		78327.87
Durbin-Watson stat	2.305232			
Unweighted Statistics				
R-squared	0.236763	Mean dependent var		-0.249778
Adjusted R-squared	0.045779	S.D. dependent var		7.558351
S.E. of regression	7.383317	Sum squared resid		119384.3
Durbin-Watson stat	2.595902			

Light industry, FAT

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 2273

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.918081	0.126485	-7.258429	0.0000
DEV?	0.787165	0.015330	51.34735	0.0000
GLS Transformed Regression				
R-squared	0.554463	Mean dependent var		-0.895628
Adjusted R-squared	0.554267	S.D. dependent var		7.853392
S.E. of regression	5.243180	Sum squared resid		62431.92
Durbin-Watson stat	1.713457			
Unweighted Statistics including Random Effects				
R-squared	0.584831	Mean dependent var		-0.895628
Adjusted R-squared	0.584648	S.D. dependent var		7.853392
S.E. of regression	5.061339	Sum squared resid		58176.54
Durbin-Watson stat	1.624161			

Light industry, CTS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 2740

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.525800	0.023538	22.33841	0.0000
Weighted Statistics				
R-squared	0.495535	Mean dependent var		-5.864044
Adjusted R-squared	0.369361	S.D. dependent var		67.88504
S.E. of regression	53.90941	Sum squared resid		6367537.
Durbin-Watson stat	2.719274			
Unweighted Statistics				
R-squared	0.414835	Mean dependent var		-0.213672
Adjusted R-squared	0.268478	S.D. dependent var		129.7295
S.E. of regression	110.9564	Sum squared resid		26974122
Durbin-Watson stat	2.563453			

Food, ROS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 9120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.228102	0.004346	-52.48392	0.0000
DEV?	0.980851	0.002726	359.8315	0.0000

Weighted Statistics			
R-squared	0.934410	Mean dependent var	-2.639249
Adjusted R-squared	0.934403	S.D. dependent var	17.39624
S.E. of regression	4.455520	Sum squared resid	181007.4
F-statistic	129896.9	Durbin-Watson stat	1.935893
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.520222	Mean dependent var	-0.275497
Adjusted R-squared	0.520170	S.D. dependent var	6.486371
S.E. of regression	4.493096	Sum squared resid	184073.4
Durbin-Watson stat	2.354476		

Food, ROA

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 9120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.822127	0.560392	1.467057	0.1457
DEV?	-0.057470	0.387935	-0.148144	0.8825

Weighted Statistics			
R-squared	-0.006046	Mean dependent var	1.584044
Adjusted R-squared	-0.016864	S.D. dependent var	6.486476
S.E. of regression	6.540940	Sum squared resid	3978.902
Durbin-Watson stat	2.223459		

Unweighted Statistics			
R-squared	-0.045641	Mean dependent var	0.985201
Adjusted R-squared	-0.056885	S.D. dependent var	8.930275
S.E. of regression	9.180760	Sum squared resid	7838.631
Durbin-Watson stat	2.761875		

Food, FAT

Dependent Variable: ADJ?
Method: Pooled Least Squares

Sample(adjusted): 1994 1998
Included observations: 5 after adjusting endpoints
Total panel observations 9120
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.985201	0.794436	1.240127	0.2180
DEV?	0.177521	0.144364	4.693145	0.0000
R-squared	0.256182	Mean dependent var		0.985201
Adjusted R-squared	0.248184	S.D. dependent var		8.930275
S.E. of regression	7.743201	Sum squared resid		5576.015
F-statistic	32.03064	Durbin-Watson stat		1.834766
Prob(F-statistic)	0.000000			

Food, CTS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 1181

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.857642	0.228655	3.750818	0.0002
DEV?	0.374259	0.149739	-0.495919	0.0200
Weighted Statistics				
R-squared	-0.003703	Mean dependent var		1.626806
Adjusted R-squared	-0.004554	S.D. dependent var		7.540695
S.E. of regression	7.557847	Sum squared resid		67345.72
Durbin-Watson stat	2.315339			
Unweighted Statistics				
R-squared	-0.055763	Mean dependent var		1.115627
Adjusted R-squared	-0.056659	S.D. dependent var		10.70313
S.E. of regression	11.00217	Sum squared resid		142715.2
Durbin-Watson stat	2.672600			

Flow-milling and Groats, ROS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 915

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.355028	0.096360	3.684405	0.0002
Weighted Statistics				
R-squared	0.233367	Mean dependent var		-1.179469
Adjusted R-squared	0.041447	S.D. dependent var		3.965176
S.E. of regression	3.882134	Sum squared resid		11016.88
Durbin-Watson stat	2.701526			
Unweighted Statistics				
R-squared	0.307282	Mean dependent var		-0.268175
Adjusted R-squared	0.133866	S.D. dependent var		8.158176
S.E. of regression	7.592515	Sum squared resid		42139.43
Durbin-Watson stat	2.806157			

Flow-milling and Groats, ROA

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 915

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.409774	0.119322	3.434200	0.0006
Weighted Statistics				
R-squared	0.093582	Mean dependent var		-0.405123
Adjusted R-squared	-0.133333	S.D. dependent var		7.998380
S.E. of regression	8.514924	Sum squared resid		53000.38
Durbin-Watson stat	2.458861			
Unweighted Statistics				
R-squared	0.285908	Mean dependent var		-0.286188
Adjusted R-squared	0.107141	S.D. dependent var		12.60596
S.E. of regression	11.91152	Sum squared resid		103717.5
Durbin-Watson stat	2.606121			

Flow-milling and Groats, FAT

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 915

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.514751	0.495322	5.077005	0.0000
DEV?	0.048542	0.023855	2.034895	0.0421
GLS Transformed Regression				
R-squared	-0.157463	Mean dependent var		2.514751
Adjusted R-squared	-0.158731	S.D. dependent var		43.41351
S.E. of regression	46.73220	Sum squared resid		1993900.
Durbin-Watson stat	2.256228			
Unweighted Statistics including Random Effects				
R-squared	-2.067077	Mean dependent var		2.514751
Adjusted R-squared	-2.070436	S.D. dependent var		43.41351
S.E. of regression	76.07202	Sum squared resid		5283487.
Durbin-Watson stat	1.302416			

Flow-milling and Groats, CTS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 915

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.885926	0.610621	-3.088538	0.0021
DEV?	0.904998	0.024931	36.30046	0.0000
GLS Transformed Regression				
R-squared	0.563082	Mean dependent var		-1.885926
Adjusted R-squared	0.562604	S.D. dependent var		40.99676
S.E. of regression	27.11359	Sum squared resid		671189.1
Durbin-Watson stat	1.729147			
Unweighted Statistics including Random Effects				
R-squared	0.419886	Mean dependent var		-1.885926
Adjusted R-squared	0.419251	S.D. dependent var		40.99676
S.E. of regression	31.24236	Sum squared resid		891165.9
Durbin-Watson stat	1.451058			

Medical, ROS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 215

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.075802	0.130045	0.582887	0.5605
Weighted Statistics				
R-squared	0.086652	Mean dependent var		-0.539851
Adjusted R-squared	-0.143020	S.D. dependent var		0.891679
S.E. of regression	0.953312	Sum squared resid		155.4056
Durbin-Watson stat	2.845070			
Unweighted Statistics				
R-squared	0.247536	Mean dependent var		-0.317770
Adjusted R-squared	0.058320	S.D. dependent var		1.067784
S.E. of regression	1.036180	Sum squared resid		183.5972
Durbin-Watson stat	1.698449			

Medical, ROA

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 215

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.019365	0.485459	-0.039890	0.9682
DEV?	0.019660	0.178105	0.110387	0.9122
Weighted Statistics				
R-squared	0.000091	Mean dependent var		0.112764
Adjusted R-squared	-0.004603	S.D. dependent var		7.903526
S.E. of regression	7.921695	Sum squared resid		13366.44
F-statistic	0.019479	Durbin-Watson stat		2.998843
Prob(F-statistic)	0.889135			
Unweighted Statistics				
R-squared	0.010972	Mean dependent var		0.159238
Adjusted R-squared	0.006329	S.D. dependent var		11.00788
S.E. of regression	10.97299	Sum squared resid		25646.59
Durbin-Watson stat	3.017813			

Medical, FAT

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 215

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.186635	0.208773	1.372950	0.1710
Weighted Statistics				
R-squared	0.263309	Mean dependent var		1.892749
Adjusted R-squared	0.172233	S.D. dependent var		9.571564
S.E. of regression	10.36311	Sum squared resid		18364.37
Durbin-Watson stat	2.170497			
Unweighted Statistics				
R-squared	0.182865	Mean dependent var		1.885475
Adjusted R-squared	-0.022613	S.D. dependent var		14.09388
S.E. of regression	14.25234	Sum squared resid		34735.11
Durbin-Watson stat	2.779411			

Medical, CTS

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 215

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	-0.304574	0.169107	-1.801070	0.2729
Weighted Statistics				
R-squared	0.090752	Mean dependent var		1.820855
Adjusted R-squared	-0.137890	S.D. dependent var		8.793773
S.E. of regression	9.380485	Sum squared resid		15046.89
Durbin-Watson stat	2.952348			
Unweighted Statistics				
R-squared	0.199448	Mean dependent var		1.749326
Adjusted R-squared	-0.001860	S.D. dependent var		12.85215
S.E. of regression	12.86410	Sum squared resid		28297.95
Durbin-Watson stat	3.084197			

Printing anf Publishing, ROS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 1255

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.214456	0.011278	-19.01471	0.0000
DEV?	0.741111	0.027665	26.78863	0.0000
GLS Transformed Regression				
R-squared	0.309304	Mean dependent var		-0.214456
Adjusted R-squared	0.308753	S.D. dependent var		0.804861
S.E. of regression	0.669171	Sum squared resid		561.0815
Durbin-Watson stat	1.797912			
Unweighted Statistics including Random Effects				
R-squared	-0.022435	Mean dependent var		-0.214456
Adjusted R-squared	-0.023250	S.D. dependent var		0.804861
S.E. of regression	0.814164	Sum squared resid		830.5670
Durbin-Watson stat	1.201051			

Printing anf Publishing, ROA

Dependent Variable: ADJ?
Method: GLS (Cross Section Weights)

Sample: 1994 1998
Included observations: 5
Total panel observations 1181

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.171397	0.172922	0.991184	0.3218
Weighted Statistics				
R-squared	0.132850	Mean dependent var		1.439950
Adjusted R-squared	0.228458	S.D. dependent var		6.984975
S.E. of regression	7.741854	Sum squared resid		55680.83
Durbin-Watson stat	1.947665			
Unweighted Statistics				
R-squared	0.136028	Mean dependent var		1.115627
Adjusted R-squared	0.097402	S.D. dependent var		10.70313
S.E. of regression	11.21227	Sum squared resid		116789.3
Durbin-Watson stat	2.591084			

Printing anf Publishing, FAT

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 1181

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.114412	0.106794	10.43515	0.0000
DEV?	0.109366	0.024051	4.547328	0.0000
GLS Transformed Regression				
R-squared	0.126477	Mean dependent var		1.115627
Adjusted R-squared	0.127433	S.D. dependent var		10.70313
S.E. of regression	11.36465	Sum squared resid		152274.1
Durbin-Watson stat	2.232409			
Unweighted Statistics including Random Effects				
R-squared	0.029927	Mean dependent var		1.115627
Adjusted R-squared	0.032497	S.D. dependent var		10.70313
S.E. of regression	18.63850	Sum squared resid		409577.2
Durbin-Watson stat	0.904330			

Printing anf Publishing, CTS

Dependent Variable: ADJ?
Method: GLS (Variance Components)

Sample: 1994 1998
Included observations: 5
Total panel observations 1255

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV?	0.640501	0.008642	131.9754	0.0000
Weighted Statistics				
R-squared	0.354464	Mean dependent var		-0.479749
Adjusted R-squared	0.318044	S.D. dependent var		1.413223
S.E. of regression	0.602829	Sum squared resid		364.4934
Durbin-Watson stat	2.204559			
Unweighted Statistics				
R-squared	0.450488	Mean dependent var		-0.214456
Adjusted R-squared	0.437997	S.D. dependent var		0.804861
S.E. of regression	0.603379	Sum squared resid		365.1581
Durbin-Watson stat	1.897078			