

AN EMPIRICAL INVESTIGATION INTO DIFFERENCES BETWEEN
COMPANIES THAT ELECTED AN EARLY COMPLIANCE WITH SFAS 52
AND COMPANIES NOT ELECTING AN EARLY COMPLIANCE

by

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Abstract

The latest foreign currency translation standard, Statement of Financial Accounting Standard No. 52 (SFAS 52), promulgated in December of 1981, was issued in response to harsh criticisms of its predecessor, Statement of Financial Accounting Standard No. 8 (SFAS 8). Large foreign currency translation gains and losses, resulting from the use of the temporal translation method, were required to be reported in net income under the all-inclusive income concept mandated by SFAS 8. In contrast, SFAS 52 adopted the functional currency approach whereby companies whose functional currency is the local currency are required to use the current rate method, generally resulting in only minor translation gains and losses that are required to be reported in a separate component of stockholders' equity.

This study compares seven specific financial attributes between 83 Fortune 500 companies electing a December 31, 1981, compliance and 103 Fortune 500 companies not opting for a 1981 adoption.

Univariate t-tests on each attribute indicate the strongest difference between the two groups is in the foreign currency translation gains and losses for 1981. The multivariate Hotelling T^2 test simultaneously compared differences in the seven attributes for the two groups. Test results indicate the two groups of companies are different.

Since the "yo-yo" effect on earnings was an often cited reason for opposing SFAS 8, differences in the volatility in reported earnings between the two groups for the five-year period covered by SFAS 8 (1976-1980) were examined using three different measures. The overall conclusion was that companies adopting the standard early did not have more volatility in earnings than the other group during the period that SFAS 8 was in effect.

Security price reactions to the early adoption were also investigated. Surprisingly, a strong market reaction was indicated. Significant differences between the cumulative average residuals (CARs) for the two groups began two weeks prior to year-end and continued for five months. The CARs for the group that adopted SFAS 52 early generally performed better than expected whereas the residuals for the companies that continued to report under the temporal method were worse than expected.

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Chapter I

INTRODUCTION

In December, 1981, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards No. 52 (SFAS 52), which changed the method required for translating the financial statements of foreign subsidiaries of U.S. multinational enterprises into U.S. dollars.¹ SFAS 52 replaced the very controversial SFAS 8 promulgated in 1975.

Shortly after the issuance of SFAS 8, management oriented journals were flooded with opinion articles and editorials flaunting such titles as: "The Yo-Yo Effects of Foreign Exchange"², "FASB-8-Catch-22 in the Foreign Money Game, Nearly Everyone Loses"³, "Behind the 8-Ball"⁴,

¹Financial Accounting Standards Board, Statement of Financial Accounting Standards Number 52, "Foreign Currency Translation," Stamford, Connecticut: FASB, August 28, 1980.

²"The Yo-Yo Effects of Foreign Exchange," Business Week, September 6, 1976, pp. 28-29.

³"FASB-8-Catch-22 in the Foreign Money Game: Nearly Everyone Loses," Barrons, November 1, 1976, pp. 56-57.

⁴"Behind the 8-Ball," Financial World, December 15, 1976, p. 4.

"Foreign Exchange Distorts the Bottom Line"⁵, "Possible Undesirable Effects of FASB 8"⁶, "Trying to Outrun Currency Swings: Effect of Foreign Exchange Accounting Rule on Earnings"⁷, "Treasurers Sweat Out the Currency Turmoil: Effect of Floating Exchange Rates on Multinational Corporations"⁸, "Another Accounting Problem: New Rule on Foreign Currency Causes Confusion and Controversy"⁹, "For Better or Worse: FASB 8 Continues to Play Hob with Corporate Earnings"¹⁰, and "Ways Out of the Currency Translation Mess"¹¹. These titles alone reflect the sentiment of a large segment of the profession toward SFAS 8. The main theme of the articles seems to focus on the impact of SFAS 8 on earnings; that is, it was felt that SFAS 8 caused volatility in reported earnings, which frequently contradicted the economic realities underlying the changes in exchange rates.

⁵"Foreign Exchange Distorts the Bottom Line," Chemical Worker, January 14, 1976, pp. 26-27.

⁶W. D. Serfas, Jr., "Possible Undesirable Effects of FASB 8," CPA Journal, May 1976, pp. 58-60.

⁷"Trying to Outrun Currency Swings: Effect of Foreign Exchange Accounting Rule on Earnings," Business Week, February 14, 1977, pp. 108-112.

⁸"Treasurers Sweat Out the Currency Turmoil: Effect of Floating Exchange Rates on Multinational Corporations," Business Week, August 29, 1977, p. 68.

⁹A. Hershman, "Another Accounting Problem: New Rule on Foreign Currency Causes Confusion and Controversy," Dun's Review, June 1976, pp. 68-69.

¹⁰A. Merjors, "For Better or Worse: FASB 8 Continues to Play Hob with Corporate Earnings," Barrons, August 1977, pp. 8-11.

¹¹"Ways Out of the Currency Translation Mess," Business Week, August 6, 1979, p. 80.

John B. Giannotti, Vice President of Morgan Guaranty Trust Company of New York, stated that ". . . FAS 8 decisively shifted financial attention away from the real risk of conducting business overseas -- receiving net income in foreign currencies -- and focused attention on the mix of assets and liabilities on the balance sheet."¹² This problem became even more acute during 1981 when the strengthening U.S. dollar caused the exchange rate per unit of foreign currency to decrease. Foreign subsidiaries in a net monetary liability position translated monetary accounts at the lower rate, resulting in large translation gains that were required to be reported on the income statement. What was, in substance, a negative economic event for their U.S. parent companies (because the foreign subsidiary was not worth as much in U.S. dollars) was reported, in form, as a positive economic event on their financial statements.

SFAS 52, the first major revision made by the Financial Accounting Standards Board of one of its own standards, focuses on the functional currency approach. As will be discussed in more detail in chapter II, the functional currency is the currency in which the foreign subsidiary realizes most of its cash flows. If the foreign subsidiary is "self-contained" within the foreign boundaries (which is frequently the case), the functional currency is the local currency of the foreign subsidiary. For "self-contained" foreign subsidiaries, SFAS 52 requires the use of the current rate method, whereby all assets and liabilities are translated at the current exchange rate and any resulting gains and

¹²John B. Giannotti, "FAS 52 Gives Treasurers the Scope FAS 8 Denies Them," Euromoney, April 1982, pp. 141-151.

losses must be disclosed directly within stockholders' equity; that is, they bypass the income statement since they are not deemed to be realized. The Board encouraged early compliance with SFAS 52, but it only became mandatory for fiscal years beginning on or after December 15, 1982. Therefore, the relatively long transition period from SFAS 8 to SFAS 52 provided opportunities for "juggling the books" because under SFAS 8 translation differences had to be disclosed as part of net income.

Purpose of the Study

The purpose of this study is to identify possible motives for companies favoring the early adoption of SFAS 52 rather than continuing to comply with SFAS 8. It also provides further insight into the more general question of why companies select one accounting standard over another. Another purpose is to examine the effect of the change in foreign currency translation standards on security price behavior.

The first phase of the study examines differences in specific attributes between companies adopting SFAS 52 early and those delaying adoption. The year 1981, in which SFAS 52 was issued, produced relatively large translation gains or large losses, depending upon a company's net monetary asset or liability position. Consequently, some companies may have decided to switch to SFAS 52 before the mandatory date to improve their profit figures by charging translation losses directly to a "translation adjustment account" within the stockholders' equity section while other companies may have decided, for the same

reason, to retain SFAS 8 during the transition period in order to reflect translation gains within the income statement.

Another possible motive for the early adoption of SFAS 52 may have been the smoothing of income. The second phase of the study examines this issue. Since gains and losses resulting from the translation of the financial statements of "self-contained foreign subsidiaries" bypass the income statement, early adoptees of SFAS 52 could avoid showing highly erratic changes in earnings caused primarily by drastic changes in the exchange rates -- not by changes in operating results.

The third phase examines the effect of the early adoption of SFAS 52 on security price behavior. The semi-strong form of the efficient market hypothesis (hereafter the EMH) states that the market instantaneously reacts to all publicly available information. Based on the assumption the market is efficient, security prices should have reflected the true economic nature of reported foreign currency translation gains and losses. Since information about such translation gains and losses was available under SFAS 8 and must be disclosed pro forma under SFAS 52, it follows that the market should not react to changes in reported income caused solely by the change from one accounting principle to another. According to the EMH, any change in price would be due to investors' perceptions of changes in management decisions due to the switch from SFAS 8 to SFAS 52. It is logical to conclude that managerial decisions might be affected since the new standard could cause changes in reported income that might affect loan covenants, contractual arrangements, or management compensation.

Description of the Study

This study compares specific attributes between the two groups of companies -- 83 Fortune 500 companies electing a December 31, 1981, compliance and 103 Fortune 500 companies not opting for an 1981 adoption of SFAS 52. The seven attributes examined were the debt to equity ratio as of December 31, 1981, the amount of foreign currency translation gains and losses for 1980 and 1981, the translation gains and losses as a percent of pretax net income in 1981, foreign revenues to total revenues in 1981, foreign assets to total assets as of December 31, 1981, and 1981 primary earnings per share. Justification for selecting these particular attributes is given in Chapter IV.

Univariate t-tests on each attribute were used to determine which, if any, of these attributes is significantly different between the two groups. The multivariate Hotelling T^2 test which simultaneously compares differences in the seven attributes for the two groups, was used to test whether the two groups as a whole were different.

Also, differences in the volatility in reported earnings between the two groups for the five-year period (1976-1980) covered by SFAS 8 were examined. If volatility in earnings was a motive for changing standards, one would expect that companies adopting SFAS 52 early would experience higher volatility than companies continuing to report under SFAS 8 since companies with a higher volatility are perceived to be riskier. Three measures, the correlation coefficient (r), a statistic designed to isolate directional changes (C_{it}), and the coefficient of variation (CV), were used to test for volatility in reported earnings.

Security price reactions to the early adoption were also investigated by using a series of t-tests to check for significant differences between the cumulative average residuals (CARs) for the two groups for a 43 week period beginning August 9, 1981 and ending June 4, 1982.

Chapter II

FOREIGN CURRENCY TRANSLATION PROBLEMS

Foreign exchange is an integral part of the operations of companies engaging in business activities outside their national boundaries. Accounting problems associated with foreign exchange are at least as old as the fifteenth century according to DeRoover¹³. Choi and Mueller state, "While most technical issues in accounting tend to resolve themselves over time, currency translation has proven to be an exception".¹⁴

Although this study does not attempt to chronicle foreign currency translation problems of the last five centuries, the controversy surrounding the current standard may be illuminated by examining some of the U.S. developments in this area during the past 50 years. Consequently, this chapter reviews foreign currency translation methods and consolidation concepts, briefly retraces the evolution of translation practices in the United States, and then discusses recent

¹³ Raymond DeRoover, "Early Accounting Problems of Foreign Exchange," The Accounting Review, October 1944, pp. 38 & 407.

¹⁴ Fredrick D. S. Choi and Gerhard G. Mueller, An Introduction to Multinational Accounting, 2nd ed., Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1984, p. 109.

international developments pertaining to the translation of financial statements denominated in foreign currency. Differences between SFAS 52 and its predecessor will be delineated to lay the groundwork for the statistical comparisons in later chapters.

Foreign Currency Translation Methods and Consolidation Concepts

Basic Terminology

At times, the terms "translation," "exchange," and "conversion" are used in the international accounting literature as synonyms; at other times to connote differences. Strictly speaking, these terms are not synonymous, and care must be taken to distinguish among them.

Patz defined translation as ". . . a mathematical process of transforming measurements taken in terms of one scale of measurement into a second scale of measurement".¹⁵ Thus, the restatement of amounts on foreign currency financial statements into U.S. dollars is a translation process.

In contrast, the term "conversion" implies that a physical exchange has occurred; that is, a conversion happens when foreign currency amounts are actually exchanged for U.S. dollars. Conversion occurs, for example, when the foreign affiliate transmits cash to the home office.

The term "exchange" is often used synonymously with both translation and conversion. Some studies, however, distinguish between the two uses by referring to "realized" or "unrealized" exchange gains

¹⁵Dennis H. Patz, "A Price Parity Theory of Translation," Accounting and Business Research, Winter 1977, p. 15.

and losses. Unrealized exchange differences are attributable to the translation of foreign currency, whereas realized exchange differences are caused by the actual conversion of foreign currency amounts into U.S. dollars. The distinction between these terms is important for understanding the various translation methods used or proposed at one time or another.

Reasons for Translation

Foreign currency accounting issues arise when an enterprise (1) engages in foreign currency transactions, (2) needs to consolidate the financial statements of foreign subsidiaries, or (3) needs to carry its investments in a foreign affiliate at amounts determined according to the equity method of accounting. Foreign currency transactions are transactions requiring settlement in a currency other than the reporting entity's primary currency. They occur when a company (a) buys or sells on credit goods or services whose prices are stated in a foreign currency, (b) borrows or lends funds, provided that the amounts payable or receivable are denominated in foreign currency, (c) is a party to an unperformed forward exchange contract, or (d) for other reasons, acquires or disposes of assets, or incurs or settles liabilities denominated in foreign currency¹⁶. Thus, translation accounting is not only important for multinational enterprises having subsidiaries around

¹⁶Financial Accounting Standards Board, Statement of Financial Accounting Standard Number 52, "Foreign Currency Translation," Stamford, Connecticut: FASB, December 15, 1981.

the world, but also to domestic companies engaged in imports or exports which are denominated in a foreign currency.

Not all countries require multinational companies to prepare consolidated financial statements. Translation issues nevertheless surface since many multinationals in these countries prepare worldwide consolidated financial statements on a voluntary basis. In addition, the translation of the financial statements of foreign affiliates is necessary if investments in affiliates have to be carried under the equity method of accounting in accordance with Accounting Principles Board Opinion No. 18¹⁷ (APB 18).

Various Translation Methods

The four most common translation methods used internationally are: the current/noncurrent, monetary/nonmonetary, temporal, and current rate method. The current/noncurrent method requires current assets and current liabilities to be translated at the exchange rate in effect at the balance sheet date and all other balance sheet accounts at the respective rates in effect when the assets were acquired or the liabilities incurred. Revenue and expense accounts are translated at the average exchange rate for the period, although depreciation, amortization, cost of goods sold, and similar accounts related to balance sheet items are translated at the same rate as the balance sheet accounts from which they are derived.

¹⁷ Accounting Principles Board, American Institute of Certified Public Accountants, Accounting Principles Board Opinion Number 18, "The Equity Method of Accounting for Investments in Common Stock," New York: AICPA, March 1971.

Under the monetary/nonmonetary method, cash and all accounts fixed in terms of monetary amounts are translated at the current rate, while all other assets and liabilities are translated at the historical rate in effect at their respective acquisition dates. Since liabilities calling for the future outflow of goods and services, such as unearned revenue, typically constitute only a minor portion of total obligations, practically all liabilities are translated at the current rate. The procedures for translating the income statements are the same as under the current/noncurrent translation method. Revenue and expenses derived from balance sheet amounts translated at a historical rate are translated at the same rate as the related balance sheet items. Other revenue and expense accounts are translated at the average rate for the period.

The temporal translation method is a variation of the monetary/nonmonetary method. The only difference is that the temporal method calls for nonmonetary assets carried at current costs to be translated at the current rate. Thus, under this method, inventories and marketable equity securities carried at market values under the lower-of-cost-or-market rule have to be translated at the year-end exchange rate, even though they do not constitute monetary assets. The translation of the income statement follows the same procedures used by the current/noncurrent and monetary/nonmonetary methods.

The current rate method requires all asset and liability accounts to be translated at the exchange rate in effect at the balance sheet date. Revenue and expense accounts must be translated at the average rate for the period.

Exhibit 2.A demonstrates the differences in the amount of foreign currency translation gains and losses that could result from the use of the four translation approaches on the same economic phenomena. The current/noncurrent method produces an unrealized translation gain of \$1,000, the monetary/nonmonetary method results in a loss of \$3,500, the temporal method shows a loss of \$2,500, and the current rate method produces no translation gains or losses.

Differences between the current/noncurrent and monetary/nonmonetary translation methods result because not all current assets could be classified as monetary. The most common current, but nonmonetary, accounts are inventories, marketable equity securities, and prepaid expenses. Long-term receivables are monetary assets that would not be classified as current, but most nonfinancial businesses do not have substantial amounts of such assets. It follows that monetary assets would generally be lower than current assets. On the other hand, most liabilities, with the exception of the typically small amount of unearned revenue, are monetary. Since most business enterprises have significant amounts of long-term liabilities, such as bonds payable and mortgages payable, monetary liabilities would usually exceed current liabilities. To further demonstrate differences in the translation methods, Table 2.1 lists exchange rates employed by the four different translation methods on specific balance sheet accounts.

Exhibit 2.A
Balance Sheet for Company A

<u>Assets</u>		<u>Liabilities and Stockholders' Equity</u>	
Cash and Receivables	FC 10,000	Current Liabilities	FC 10,000
Inventories	<u>20,000</u>	Noncurrent Liabilities	<u>70,000</u>
Total Current Assets	30,000	Total Liabilities	80,000
Fixed Assets	<u>100,000</u>	Stockholders' Equity	<u>50,000</u>
Total Assets	<u><u>FC130,000</u></u>	Total Liabilities and SE	<u><u>FC130,000</u></u>

Assume current translation rate = 4:1

Assume historical translation rate = 5:1

1. Translation under the current/noncurrent method:

FC30,000 / 4 = \$ 7,500	FC10,000 / 4 = \$ 2,500
100,000 / 5 = 20,000	70,000 / 5 = 14,000
	50,000 / 5 = <u>10,000*</u>
<u>\$27,500</u>	<u>\$26,500</u>
	Gain = \$1,000

2. Translation under the monetary/nonmonetary method:

FC10,000 / 4 = \$ 2,500	FC80,000 / 4 = \$20,000
120,000 / 5 = <u>24,000</u>	50,000 / 5 = <u>10,000*</u>
<u>\$26,500</u>	<u>\$30,000</u>
	Loss = (\$3,500)

3. Translation under the temporal method:

(Assume inventories are carried at market value)	
FC30,000 / 4 = \$ 7,500	FC80,000 / 4 = \$20,000
100,000 / 5 = <u>20,000</u>	50,000 / 5 = <u>10,000*</u>
<u>\$27,500</u>	<u>\$30,000</u>
	Loss = (\$2,500)

4. Translation under the current rate method:

FC130,000 / 4 = \$32,500	FC130,000 / 4 = \$32,500
--------------------------	--------------------------

No Gain or Loss**

*For the convenience of eliminating Stockholders' Equity in the process of consolidation, Stockholders Equity is typically translated by using the historical rate. SFAS 52, for example, does not even discuss the translation of owners' equity accounts.

** Depending on the parent company's carrying value of its investment in the foreign subsidiary, a gain or loss may still arise in connection with the subsequent consolidation.

Table 2.1
Exchange Rates Employed in Different Translation Methods
for Specific Balance Sheet Items

	CNC	MNM	TEM	CUR
Cash	C	C	C	C
Accounts Receivable	C	C	C	C
Inventories				
Cost	C	H	H	C
Market	C	H	C	C
ST Investments				
Cost	C	H	H	C
Market	C	H	C	C
LT Investments				
Cost	H	H	H	C
Market	H	H	C	C
Fixed Assets	H	H	H	C
Other Assets	H	H	H	C
Accounts Payable	C	C	C	C
Long-Term Debt	H	C	C	C
Common Stock	H	H	H	C
Retained Earnings	r	r	r	*

Where: CNC = Current/noncurrent method
MNM = Monetary/nonmonetary method
TEM = Temporal method
CUR = Current method
C = current rate
H = historical rate
r = residual, balancing figure
* = translated beginning balance + translated profit -
translated dividends

The extent to which these methods are used in other countries is discussed in a study by Choi and Mueller¹⁸. They used a compilation of worldwide accounting practices by Choi and Bavishi¹⁹, as well as a survey by Fitzgerald, Stickler, and Watts²⁰ to construct a table of the translation methods used by different countries. According to their table, the current/noncurrent method represents the predominant practice in El Salvador, Iran, Malawi, New Zealand, Pakistan, South Africa, and Zambia. The monetary/nonmonetary method is predominately used in the Bahamas, Costa Rica, Finland, Guatemala, Honduras, Korea, Nicaragua, the Phillipines, Sweden, and Taiwan. The temporal method is predominant in Argentina, Austria, Bermuda, Boliva, Canada, Chile, the Dominican Republic, Equador, Jamaica, Panama, Peru, and Venezuela and was required in the United States prior to the passage of SFAS 52. Those countries primarily using the current rate method are Australia, Botswana, Canada, Colombia, Denmark, Fiji, France, Germany, Greece, Hong Kong, India, Ireland, Ivory Coast, Japan, Kenya, Malaysia, the Netherlands, Norway, Paraguay, Senegal, Singapore, Switzerland, the United Kingdom, and the United States (after the passage of SFAS 52).

¹⁸Op. cit., Choi and Mueller, 1984.

¹⁹Fredrick D. S. Choi and Vinod B. Bavishi, "Financial Accounting Standards: A Multinational Synthesis and Policy Framework," International Journal of Accounting Education and Research, Fall 1982, pp. 76-83.

²⁰R. D. Fitzgerald, A. D. Strickler, and T. R. Watts, International Survey of Accounting Principles and Reporting Practices, Scarborough, Ontario: Butterworth's for Price Waterhouse International, 1979.

Treatment of Foreign Currency Translation Gains and Losses

The following three alternative methods are in use for the treatment of foreign currency translation gains and losses: the all-inclusive income method, the deferral method, and the owners' equity adjustment method. The all-inclusive income method includes all translation gains and losses in net income. This method reflects the predominant practice in Argentina, Brazil, France, Germany, Japan, the Netherlands, and Venezuela, and was required in the United States under SFAS 8.

The deferral method, is based on the realization principle. It calls for the deferral of specific types of translation gains and losses and their subsequent amortization over the remaining life of the related asset or liability. This method is required only in Canada.

The owners' equity adjustment method, where all exchange differences are taken directly to stockholders' equity, is the predominant practice in Australia and is now required in the United States under SFAS 52 for the consolidation of most foreign subsidiaries of U.S. multinationals. Exceptions to this requirement will be discussed in the section on SFAS 52.

Consolidation Concepts

Kubin mentions three major consolidation concepts: the parent company concept, the entity concept, and the proprietary concept.²¹ The parent company concept regards current and potential stockholders of the parent company as the primary users of financial statements. In contrast, the entity concept views each separate part as a component of the whole; thus, there is less emphasis on the distinction between majority and minority stockholders. The proprietary concept, which justifies the equity method of accounting, includes in the consolidated statements only the proportional share of assets and liabilities accruing to the parent. Countries requiring or permitting one of these basic consolidation concepts include Argentina, Australia, Brazil, Canada, France, Great Britain, Japan, the Netherlands, New Zealand, South Africa, Sweden, Switzerland, the United States, and West Germany.

The current rate method shows the same foreign operation financial relationships after translation as before translation. Thus consolidated financial statements prepared under the current rate method are compatible with the entity concept. In contrast, the monetary/nonmonetary and temporal methods are purported to change only a measurement in foreign currency into a measurement in domestic currency without changing accounting principles of the parent company.

²¹Konrad W. Kubin, "Financial Accounting and Reporting for International Business Operations," In: H. Peter Holzer, et. al., International Accounting, New York: Harper & Row, 1984.

Evolution of Translation Practices in the United States

Table 2.2 presents a matrix demonstrating how past and present U. S. accounting standards correspond to the consolidation and income concepts discussed above.

Table 2.2
Classification of U.S. Translation Standards
According to Various Consolidation and Income Concepts

Consolidation concepts	Income Concepts		Owners' equity adjustment
	Deferral	All-inclusive	
Parent Company	ARB 43** APB 6**	ARB 43*** APB 6*** SFAS 8 SFAS 52*	
Entity			SFAS 52*
Proprietary		APB 18 (Equity method)	

* Depending on the determination of the functional currency

** Deferral of unrealized gains

*** Current recognition in income of unrealized losses

Accounting Research Bulletin No. 43 (ARB 43)²²

The AICPA first attempted to deal with the problems of foreign currency translation by issuing Bulletin No. 92 in 1931, which recommended the current/noncurrent method. In 1953, the AICPA modified Bulletin No. 92 when it issued Accounting Research Bulletin No. 43. Chapter 12 of ARB 43 allowed considerable flexibility when it suggested that "the practical problems which arise in their application should receive careful consideration in each case."²³ This flexibility allowed management to manipulate the impact of the translation adjustments for foreign currency.

Under ARB 43, actual conversion gains and losses, resulting from differences in exchange rates between the date the cash was earned or advanced and the date the cash was transmitted to the home office, were to be included in current income in accordance with the realization principle. This treatment was consistent with the clean surplus concept whereby all income and expense items flow through net income before being reflected in stockholders' equity.

In keeping with the tradition of conservatism, unrealized translation losses were included in net income, but unrealized translation gains were deferred unless they could be used to offset previously recognized unrealized losses, in which case they would be credited to the previously charged account. ARB 43 implicitly adopted

²²American Institute of Certified Public Accountants, Accounting Research Bulletin Number 43, "Restatement and Revision of Accounting Research Bulletins," New York: AICPA, 1953.

²³Ibid., ARB 43, Chapter 12.

the two transaction approach which considers the credit sale and subsequent collection of the receivable as two separate transactions. The credit sale was translated at the rate in existence at the point of sale whereas the receivable or subsequent cash receipt was translated at the year-end translation rate.

Accounting Principles Board Opinion No. 6, "Status of Accounting Research Bulletins," promulgated in 1965, approved, among others, a variation of the monetary/nonmonetary method when it gave firms the option of using current exchange rates for translating long-term receivables and long-term liabilities. Resulting exchange gains and losses were handled in the same manner as under the current/noncurrent method. Thus, the same translation method -- with some expansions -- was appropriate for the 44-year period from 1931 to 1975. As Kubin, in a review of the development of foreign currency translation standards, noted:

. . . accounting standards for foreign operations have been developed largely during crisis situations to cope with exceptional circumstances, and . . . their use has been extended to also cover non-crisis situations for which they were not originally intended.²⁴

This opinion was supported by Dennis Patz. He pointed out that proposed solutions to translation problems are ". . . a massive body of opinions, methods, issues, fragmental bits of theorizing and

²⁴Konrad W. Kubin, "Accounting for Foreign Currency Translation: Current Problems in Historical Perspective," The Accounting Historian, Winter 1975, p. 7.

unintegrated solutions to specific pragmatic problems, most of which were generated on an ad hoc basis."²⁵

Joseph E. Connor compared the different translation methods and expressed concern that companies could manipulate earnings with the use of different methods.²⁶ To avoid such manipulations, he advocated adherence to the current rate method.

Donald J. Hayes similarly believed that "economic consequences of 1971's floating exchange rates clash with present accounting practices."²⁷ The early 1970s were marked by wide fluctuations in exchange rates resulting from the U.S. suspension of the gold standard in 1971 and the adoption of a floating exchange rate system. Moreover, worldwide inflation was having different effects on different countries, further distorting currency exchange rates. Numerous practitioner-oriented articles appeared in the early to mid seventies, indicating that foreign exchange gains and losses were becoming a problem.

A 1972 survey by the Financial Executives Institute of 45 U.S.-based multinational companies showed diverse accounting practices. Combes and Houghton summarized the survey, exposing the failure of companies to comply with current standards, and concluded that a new

²⁵Dennis H. Patz, "The State of the Art in Translation Theory," Journal of Business, Finance and Accounting, Autumn 1977, p. 317.

²⁶Joseph E. Connor, "A New Approach to the Translation Problem," Price Waterhouse Review, Spring 1972, pp. 8-16.

²⁷Donald J. Hayes, "Translating Foreign Currencies," Harvard Business Review, January-February 1972, p. 6.

standard was imperative.²⁸ The APB considered the foreign currency translation problem and released an exposure draft in December of 1971. The draft was later withdrawn to await the results of a research study commissioned by the AICPA. The findings of that study were published as Accounting Research Study No. 12²⁹, released in June of 1972.

Accounting Research Study No. 12

The project leader, Leonard Lorensen, developed the temporal method of translating foreign currencies into U.S. dollars. This method is very similar to the monetary/nonmonetary method that had been comprehensively developed in the early 1950s by Samuel R. Hepworth.³⁰

The primary difference between the two methods is in the treatment of inventories and marketable equity securities. If the two types of assets are carried at cost, they are translated at historical rates, but if carried at market value, they are translated at current rates. This method will be discussed more fully in the next section.

Lorensen used the following rationale to defend his position that the temporal method was superior to all others:

The temporal principle was developed in this study from a definition of translation as a measurement conversion process in which the unit of measure is changed in the financial statements of foreign subsidiaries from one defined in terms of foreign money to

²⁸J. H. Combes and J. W. Houghton, "Translating Foreign Currency," Financial Executive, December 1973, pp. 8-16.

²⁹American Institute of Certified Public Accountants, Accounting Research Study Number 12, "Reporting Foreign Operations of U. S. Companies in U. S. Dollars," New York: AICPA, 1972.

³⁰Samuel R. Hepworth, Reporting Foreign Operations, Ann Arbor: University of Michigan, 1956.

one defined in terms of U.S. dollars. The alternative translation methods that are used in practice or have been proposed were not developed from a definition of translation and no real arguments have been given to support them. The current rate method is proposed virtually without explanation. The current-noncurrent method is derived from a classification scheme that is useful for a particular disclosure purpose but is unrelated to the way assets and liabilities are measured in financial statements. The constructed rate method relies on the unsupported assertion that foreign exchange rates are not appropriate for translation because they are government controlled. The monetary-nonmonetary method is derived partly from a classification scheme that is indirectly related to the way assets and liabilities are measured in financial statements and partly from other criteria. The monetary-nonmonetary method can perhaps be described as an incomplete version of the temporal principle.³¹

Statement of Financial Accounting Standards No. 8

The original discussion memorandum for Statement of Financial Accounting Standard No. 8 (SFAS 8), dated February of 1974, received a response of 90 position papers. Moreover, 15 presentations were made at the public hearing. The exposure draft in 1974 drew 190 letters of response, further emphasizing the controversies surrounding the statement³².

The promulgation of SFAS 8 in October of 1975 represented the first attempt by the FASB to cope with the floating exchange rates. The Board determined that ". . . the objective of translation is to measure and express (a) in dollars and (b) in conformity with U.S. generally

³¹Ibid., p. 47

³²AICPA, Professional Standards Vol. 3, paragraphs 1083.057 and 1083.060, 1980.

accepted accounting principles, the assets, liabilities, revenues or expenses that are measured or denominated in foreign currency."³³

The translation method that the Board felt most compatible with the above objective was the temporal method because this method changed the unit of measure without deviating from the historical cost income model. The temporal method first required that a company's foreign statements be prepared in conformity with U.S. generally accepted accounting principles. Then all balance sheet accounts carried at current and future exchange prices were required to be translated at the rate in effect at the balance sheet date. Such accounts included all monetary accounts or accounts stated in fixed currency amounts, as well as marketable equity securities and inventories stated at market prices.

All balance sheet accounts carried at historical costs were to be translated at the exchange rate in effect when the asset or liability was originally acquired. Paid in capital was translated at the rate in effect when the stock was issued. In practice, translated retained earnings at the end of the year equaled the translated retained earnings at the beginning of the year, plus (or minus) translated net income (or loss) and minus dividends translated at the exchange rate in effect when the dividends were declared. Revenue and expense accounts were translated at the average rate for the period except for those directly related to asset accounts that were stated at the historical cost (i.e., depreciation, amortization, and cost of goods sold).

³³Op. cit., SFAS 8, p. 3.

The sale or purchase of goods was deemed to be a separate transaction from the collection of the receivable or the disbursement of the payable. The gain or loss attributable to changes in the exchange rate between the time of the first transaction (i.e., sale or purchase) and the second transaction (i.e., collection of receivable or disbursement of payable) were conversion gains and losses which SFAS 8 referred to as transaction gains and losses. Although Statement 8 maintained the two-transaction approach, it failed to differentiate between translation and conversion gains and losses. It simply referred to both as "exchange gains and losses," and included this lump sum amount in the determination of net income.

Exchange gains and losses resulting from hedging activities, however, could in certain circumstances be postponed under SFAS 8. A hedge, used by some companies to minimize foreign risk exposure, is a contractual agreement to exchange currencies of different countries at a specified rate for some future date. An exchange gain or loss may be deferred if the contract is to hedge an identifiable foreign currency commitment that meets the following conditions: (a) the duration of the forward contract must extend from the commitment date to the settlement date; (b) the contract must be in the same currency as the commitment and; (c) the contract must be firm and noncancellable. However, losses on forward contracts can not be deferred if deferral could lead to the recognition of losses in later periods. If a forward contract hedges (a) a foreign currency commitment that does not meet the above conditions, or b) protects an exposed currency position (a company's accounting exposure is dependent upon the ratio of its debt to monetary gain or loss has to be included in net income.

A survey by Mathur and Loy indicated that many treasurers considered too restrictive the criteria for deferring recognition of a gain or loss on a forward exchange contract.³⁴ They considered it inappropriate that certain hedges used to reduce the risk associated with a foreign currency commitment could often not be accounted for as such, merely because they did not meet all of the criteria to qualify as hedges of foreign currency commitments.

Interestingly, Robert E. Mays, the only dissenter to the adoption of SFAS 8, stated that ". . . the immediate recognition of the resulting exchange differences as gains and losses will, in the present environment of fluctuating exchange rates, cause erratic changes in the reported results of companies with significant foreign operations..."³⁵ Further, he expressed concern that companies may take uneconomic actions to protect themselves against accounting exchange exposures. His concerns were later to become the primary arguments against SFAS 8. In May of 1976, the Financial Accounting Standards Board invited comments on statements 1 through 12 and received over 200 responses; more than 90 percent concerned SFAS 8 and all but 2 were critical of the standard.

³⁴Ike Mathur and David Loy, "Foreign Currency Translation: Survey of Corporate Treasurers," Management Accounting, September 1981, pp. 33-38.

³⁵Op. cit., SFAS 8, p. 17.

Statement of Financial Accounting Standard No. 52

During the controversy surrounding the development of the previous translation standard, SFAS 8, Patz introduced the notion that not all foreign operations are the same.³⁶ He distinguishes between "the measurement theory approach" and "the pure restatement theory approach."³⁷ The measurement theory approach, also called the proprietary theory approach, views the operations of the subsidiary as an integral part of the operations of the parent company. Under this theory, the primary goal of the firm is maximization of remittable domestic currency values.

In contrast, the pure restatement theory approach considers the foreign subsidiary to be a separate economic entity. Patz stated that:

The underlying reasoning of entity theory is that the pretranslation measurements were taken with respect to and contain important information and relationships with regard to an environment markedly different from the domestic environment, one in which the foreign bundle of assets has, is, and can be expected to continue to be used. Thus, their utility is uniquely and meaningfully expressed only³⁸ in terms of the local economy where they presently reside."

Although not specifically credited to him, Patz's theories were later to become the underlying premise of both Financial Accounting

³⁶Dennis H. Patz, "Alternative Theories of Translation and Their Implications for Empirical Research," Collected Papers on the American Accounting Association's Annual Meeting, Sarasota, Florida: AAA, 1975, pp. 339-48.

³⁷Op. cit., Patz, "The State of the Art in Translation Theory."

³⁸Op. cit., Patz, "Alternative Theories of Translation and Their Implications for Empirical Research," pp. 343-44.

Standard No. 52 and International Accounting Standard 21.³⁹ Both of these standards clearly distinguish between foreign subsidiaries that are independent of the parent's operations and those that are not.

The new standard was not promulgated without significant controversies. The first exposure draft, issued in August of 1980, received 360 comment letters and 47 organizations and individuals presented views at the hearing. The revised exposure draft, issued on June 30, 1981, received 260 comment letters. The many conflicting viewpoints supported previous assessments that there would be no universally acceptable solution to the problem of foreign currency translation.

SFAS 52 adopted the "functional currency" approach to the translation of the financial statements of foreign subsidiaries into U.S. currency. "An entity's functional currency is the currency of the primary economic environment in which the entity operates; normally, that is the currency of the environment in which an entity primarily generates and expends cash."⁴⁰ This relates back to Patz's proprietary and entity theories. If the currency of the foreign operation is determined to be the functional currency, the pure restatement according to the entity approach is appropriate. On the other hand, if the U.S. dollar is deemed to be the functional currency, the measurement, or proprietary, theory approach applies.

³⁹International Accounting Standards Committee, International Accounting Standard 21, "Accounting for the Effects of Changes in Foreign Exchange Rates," London: IASC, March 1983.

⁴⁰Op. Cit., SFAS 52, p. 3.

In SFAS 52, the Board changed the objective of translating the financial statements of foreign subsidiaries to:

(a) Provide information that is generally compatible with the expected economic effects of a rate change on an enterprise's cash flows and equity and (b) Reflect in consolidated statements the financial results and relationships of the individual consolidated entities as measured in their functional currencies in conformity with U.S. generally accepted accounting principles."⁴¹

Revsine points out that SFAS 52 ". . . is intended to achieve compatibility between firms' reported exchange gains and losses and these firms' underlying real economic changes."⁴²

Functional Currency Equals Currency of Foreign Affiliates. The financial statements of foreign operations that can be classified as separate entities are first prepared in accordance with U.S. generally accepted accounting principles. Then, assets and liabilities are translated at the exchange rate in effect at the balance sheet date. Revenue and expense accounts, from a practical standpoint, are translated at the average exchange rate during the period.

Translation adjustments resulting from the translation of the financial statements are deferred and reported in a separate component of stockholders' equity called "accumulated translation adjustment." This is similar to the treatment of unrealized losses on marketable equity securities required by SFAS 12 issued in 1975. Therefore, the

⁴¹Ibid., p. 3.

⁴²Lawrence Revsine, "The Rationale Underlying the Functional Currency Choice," The Accounting Review, July 1984, p. 505.

translation adjustment was the second time a FASB standard required that net income and retained earnings be bypassed in recording an item in stockholders' equity. Zieha and Duangploy suggested that this treatment may confound ratio analysis as well as the understanding of equity per share and its changes.⁴³

Transaction gains and losses are generally reported in net income, including those attributable to normal intercompany trade receivables and payables denominated in a foreign currency. Conversely, if the transaction gains and losses result from either economic hedges or intercompany transactions that are of a long-term investment nature, they are deferred and reported as part of the translation adjustment.

The paid in capital portion of stockholders' equity is translated at the historical exchange rates. Retained Earnings is updated by adding the current year's translated income to and deducting translated dividends from the translated balance at the end of the prior period.

In addition, SFAS 52 replaced the restrictions in SFAS 8 with milder conditions for the deferral of gains and losses on forward exchange contracts. Such contracts are considered hedges of foreign currency commitments if they meet the following criteria: "(a) The foreign currency transaction is designated as, and is effective as, a hedge of a foreign currency commitment and (b) the foreign currency commitment is firm."⁴⁴

⁴³Eugene L. Zieha and Orapin Duangploy, "Manifestations of FAS No. 52," The Woman CPA, July 1984, pp. 18-25.

⁴⁴Op. cit., SFAS 52, p. 9.

Functional Currency Equals Currency of the Parent Company. In contrast, if the foreign operations are an integral part of the parent's operations, the temporal method is used to translate financial statements of the subsidiary. This translation method is deemed most appropriate for the measurement theory approach. SFAS 52 gives guidelines for determining whether a foreign operation is an integral part of the parent company.

Also, if the foreign entity is in an economy with a cumulative inflation rate of approximately 100 percent or more over a three-year period, the local currency is considered too unstable to serve as the functional currency; therefore, the financial statements shall be remeasured as if the functional currency were the reporting currency. In essence, the financial statements for these entities would continue to be translated using the temporal method.

U.S. multinational companies with more than one foreign subsidiary may use all three alternatives for the treatment of foreign currency translation gains and losses on a single year's financial statements. Translation gains and losses resulting from the use of the temporal method and transaction -- i.e., conversion -- gains and losses are reported in current net income. Exchange gains and losses related to specific hedging activities are deferred. Translation gains and losses resulting from the consolidation of independent foreign subsidiaries are recognized in a separate shareholders' equity adjustment account.

To highlight the differences between SFAS 8 and SFAS 52, Exhibit 2.B provides a comparative summary.

Exhibit 2.B
Summary of Differences Between SFAS 8 and SFAS 52

Issue	SFAS 8	SFAS 52 [if self-contained subsidiary]
Objectives of translation	Measure and express foreign operations as if all transactions occurred in U.S. dollars (parent company perspective)	<ul style="list-style-type: none"> . Preserve foreign currency financial results and relationships in consolidated financial statements (local company perspective) . Make translation results more compatible with the expected economic effects of a rate change on the enterprise's cash flows and equity
Functional currency	Not used as a concept; effectively the U.S. dollar	Primary currency of economic environment in which foreign entity operates (may be U.S. dollar or a foreign currency) (note that the U.S. dollar is the functional currency in highly inflationary economies)
Translation method	Essentially the Monetary-nonmonetary method	Depends on circumstances: <ul style="list-style-type: none"> .Essentially the Monetary-nonmonetary method (where U.S. dollar is the functional currency) .Current rate method (where a foreign currency is the functional currency)
Translation gains and losses	Recognized in net income	Recognized in a separate shareholders' equity account
Exchange gains and losses on transactions and balances (except see below)	Gains and losses from transactions and monetary item balances not denominated in the reporting currency (i.e., U.S. dollars) affect consolidated net income	Gains and losses from transactions and balances not denominated in each entity's functional currency affect consolidated net income except that exchange gains and losses on intercompany transactions of a long-term investment nature are taken to a separate shareholders'

		equity account
Criteria for deferring gains and losses on hedges of foreign currency commitments	.Life of the contract extends from the foreign currency commitment date to or beyond the anticipated transaction date .Denominated in currency of commitment being hedged .Firm and uncancelable	.Effective as and designated as a hedge .Denominated in currency of commitment being hedged or in a linked currency .Firm
Exchange adjustments from hedging net investments in foreign subsidiaries	Taken through net income	Taken directly to the separate shareholders' equity account as an offset to related translation adjustments

Source: Coopers and Lybrand, Foreign Currency Translation: An Implementation Study, New York: C & L, 1982.

Some Recent Studies on SFAS 52

Several recent studies used computer modeling to examine differences between the reporting results of complying with SFAS 8 and SFAS 52. Rupp used a computer simulation model to compare the accounting income measures generated by the two standards with a current value version of Sterling's command-over-goods measure.⁴⁵ His overall conclusion was that SFAS 8 did not perform as well as SFAS 52 because SFAS 8 was extremely sensitive to the debt ratio. After debt reached a certain level relative to assets, this model generated translation losses rather than gains thereby reducing net income; therefore, net

⁴⁵ Galen Lee Rupp, A Simulation Study of Alternative Methods for Translating Financial Statements of Autonomous Foreign Entities, Oklahoma State University, Dissertation, 1982.

income fluctuated with changes in the mix of assets and liabilities on the balance sheet.

Troberg examined differences in the results of different translation processes by using a computer translation procedure.⁴⁶ He focused on the ability to preserve the integrity of net income and financial statement relationships of foreign entities. He found SFAS 52 translation approaches generally were more effective than the approaches of SFAS 8. This is consistent with the argument that the current rate method maintains foreign operation relationships on the parent company's financial statements. Thus, the results of both studies favored SFAS 52 over SFAS 8.

Some Early Criticisms of SFAS 52

SFAS 52, passed by a narrow four to three margin, has already created new controversies regarding the violation of the comprehensive income concept. Since most critics of SFAS 8 were from industry, strong pressure from this group is believed to be the primary reason for the reversal. The Board had earlier rejected the current rate method on the basis that it was in conflict with the historical cost accounting model⁴⁷; therefore, this reversal could have serious ramifications regarding the credibility of the Board.

⁴⁶Pontus Henrik Troberg, Accounting Resource (Currency) Translation: A Comparative Analysis of Approaches, University of Oklahoma, Dissertation, 1982.

⁴⁷Op. cit., SFAS 8, p. 61.

International Developments

The International Accounting Standards Committee (IASC), founded June 29, 1973, is a standard setting body which attempts to harmonize accounting standards among countries. The first effort by the IASC to address the foreign currency translation problem was in December of 1977, when it issued Exposure Draft 11. This proposed standard would have given companies the option of using either the temporal method required in SFAS 8 or the current rate method. A subsequent draft issued August 31, 1982, after the passage of SFAS 52, eliminated the option of selecting the translation method. Exposure Draft 23 required the use of the current rate method for translating the financial statements of foreign subsidiaries not considered to be an integral part of the parent company's operations and thus not affecting the parent's cash flows. The temporal method was required for companies deemed to be an integral part of the parent's operations. This draft culminated in International Accounting Standard 21 (IAS 21).⁴⁸

International Accounting Standard 21

IAS 21, "Accounting for the Effects of Changes in Foreign Exchange Rates," was approved in March of 1983, effective for periods beginning on or after January 1, 1985. IAS 21 is very similar to SFAS 52, indicating that the IASC wanted to assure compliance by U. S. Companies with the international guideline.

⁴⁸Op. cit., IAS 21.

Although not specifically mentioned, this statement adopts the functional currency approach. It distinguishes between foreign operations that are basically autonomous within the foreign boundaries and those operations that function as an integral part of the parent company.

The first type of foreign operations, called foreign entities, are translated by the closing rate method which is quite similar to the current rate method. All balance sheet accounts are translated at the rate in effect on the closing date, and all revenue and expense accounts are translated either at the closing rate or the average rate in effect during the period. The exchange difference resulting from translating the opening net investment in the foreign entity at an exchange rate different from that at which it was previously reported is taken to shareholders' interests. Differences resulting from translating income statement items at exchange rates other than the closing rate but balance sheet items at the closing rate may be taken to either shareholders' interest or income. If offsetting gains or losses are expected in the future, or if they result from a serious devaluation for which there is no practical means of hedging, the related asset would be written down, and no gain or loss would be reflected.

The other type of foreign operation, one which is considered an integral part of the parent operation, is translated using the monetary/nonmonetary method. Translation gains and losses are to be included in net income except for exchange differences related to long-term monetary items. These gains and losses may be deferred and amortized over the remaining lives of the related monetary items, except

that exchange losses should not be deferred if recurring exchange losses are expected in the future.

The financial statements of foreign operations in countries experiencing high inflation rates should first be price-level adjusted and then translated at the current rate if they qualify as foreign entities. If the operations are considered integral parts of the parent company, the statements are price-level adjusted and translated using the monetary/nonmonetary method. This differs from SFAS 52 that requires the temporal method for all foreign operations in highly inflationary economies. SFAS 52 considered highly inflationary economies to be too unstable to sustain an autonomous foreign entity, whereas IAS 21 does not consider high inflation rates to preclude autonomy.

Summary

As previously discussed, U.S. foreign currency translation standards have been issued in response to crisis situations rather than on sound theoretical bases. With the passage of SFAS 52, the U.S. has now used all four of the major translation methods; the current/noncurrent method under ARB 43, the monetary/nonmonetary under APB 6, the temporal method under SFAS 8, and finally, the current rate method under SFAS 52. Moreover, all three treatments of translation gains and losses have been used by United States multinational companies. The deferral method was mandated by ARB 43 and APB 6 for unrealized gains; the all-inclusive method was specified by SFAS 8; and

SFAS 52 primarily requires the owners' equity adjustment method for self-contained foreign operations.

The change from SFAS 8 to SFAS 52 may be perceived as a response to Statement of Financial Accounting Concepts (SFAC) Nos. 1⁴⁹ and 2.⁵⁰

SFAC 1 states that the primary objective of financial statements is to provide information useful for decision-making purposes. Thus, the Board may have decided that the current rate method provided more useful information than the temporal method for self-contained foreign subsidiaries. Also, SFAC 2 says that standards must pass a pervasive cost-benefit constraint. Because the temporal method stipulates the use of multiple exchange rates, this method is undoubtedly more costly than the current rate method; therefore, to justify its continuance, the temporal method must be proven to provide more beneficial information than the current rate method.

SFAS 52 was promulgated in December of 1981. It became mandatory for fiscal years beginning on or after December 15, 1982, but it gave companies the option of adopting the new standard earlier. Thus, calendar-year companies could use either SFAS 8 or SFAS 52 for the years 1981 and 1982. This relatively long transition period is important to the following chapters because it facilitated the comparison of multinational enterprises that complied early with SFAS 52 to those that

⁴⁹Financial Accounting Standards Board, Statement of Financial Accounting Concepts No. 1, "Objectives of Financial Reporting by Business Enterprises," Stamford, Connecticut: FASB, 1978.

⁵⁰Financial Accounting Standards Board, Statement of Financial Accounting Concepts No. 2, "Qualitative Characteristics of Accounting Information," Stamford, Connecticut: FASB, 1980.

continued reporting under the requirements of SFAS 8.

The latest U.S. translation standard is very similar to the new international standard for translating the statements of foreign subsidiaries except for the difference in the procedures for highly inflationary economies. Since many other industrial countries with extensive multinational enterprises use the current rate method, there may be some congruency in accounting standards in the area of foreign currency translation.

The long-term acceptance of SFAS 52 is yet to be determined. There are some indications that SFAS 52 was hastily issued. If there are problems with SFAS 52, there will likely be problems also with the new international standard (IAS 21) since it is similar to the U.S. standard in all material respects.

Chapter III

OBJECTIVES, HYPOTHESES, AND DATA SOURCES

Objectives

As the analysis in the previous chapter has shown, the profession is still divided with regard to the proper method of reporting the impact of foreign currency translation. This study is intended to provide information about some measurable financial characteristics (attributes) of companies that changed from SFAS 8 to SFAS 52 before the mandatory date. The purpose is to determine if specific attributes are related to the choice of foreign currency translation standards within a given time period. If differences exist between the change and non-change companies, the choice in translation methods may have been motivated by the desire to reflect certain financial characteristics or attributes, and not by an interest in disclosing the financial position and results of operations according to the now deemed preferable translation method.

The motives of industry for favoring the current rate method should be examined. Many opponents of SFAS 8 cited the effect on earnings as the reason for wanting the standard superceded. To examine the charge that companies favored the current rate method to improve reported

earnings, a study is needed to compare the effect of the accounting change on the earnings of companies that are voluntarily using the current rate method as of December 31, 1981, with the "as if" effect on the earnings of the companies that did not change standards early.

If only companies suffering foreign currency translation losses adopted the standard early, this might lead to the assessment that companies are only interested in improved earnings figures rather than more realistic earnings figures. On the other hand, if companies having both translation gains and losses changed early, it may lead to the conclusion that companies are interested in fairer presentations.

Since other financial characteristics or relationships might also have affected the decision to adopt early, six additional attributes that might logically have contributed to the decision were also compared. Although attributes other than those selected may have influenced the decision to adopt early, only those which appeared most obvious were selected for the study. Reasons for selecting each attribute are discussed in Chapter IV.

Furthermore, the market reaction to the change to SFAS 52 needs investigation. Because the change in standards significantly affected earnings of many companies during 1981, stock prices would most likely react during this period. Market reactions to the change would tend to support the speculation that investors do not always interpret financial statements rationally. On the other hand, no reaction is further evidence of the validity of the efficient market hypothesis.

Research Questions and Hypotheses

To achieve the above objectives, the following questions were addressed:

Q1: What are the differences in certain characteristics (the debt to equity ratio as of December 31, 1981; the amount of foreign currency translation gains and losses for 1980 and 1981; the translation gains and losses as a percent of net income for 1981; the 1981 ratio of foreign revenues to total revenues; the ratio of foreign assets to total assets as of December 31, 1981; and 1981 primary earnings per share) between companies electing an early compliance with the provisions of SFAS 52 and those companies not electing an early compliance?

Q2: Is the volatility in earnings during the period that SFAS 8 was in effect related to a company's decision to adopt SFAS 52 before the mandatory date?

Q3: Is there a relationship between the early adoption of SFAS 52 and changes in security price behavior?

The hypotheses to be statistically tested are:

H1: There are no significant differences (in the debt to equity ratio as of December 31, 1981; the amount of foreign currency translation gains and losses for 1980 and 1981; the translation gains and losses as a percent of net income for 1981; the 1981 ratio of foreign revenues to total revenues; the ratio of foreign assets to total assets as of December 31, 1981; and 1981 primary earnings per share) between companies that elected to comply with SFAS 52 early and those companies that did not elect an early compliance.

H2: There is no difference in the volatility in earnings during the period beginning 1976 and ending 1980, between companies that elected to comply with SFAS 52 early and those companies that did not elect an early compliance.

H3: There are no differences in the cumulative average residuals between companies that elected to comply with SFAS 52 early and those companies that did not elect an early compliance.

Data Sources

All Fortune 500 industrial corporations who met the following conditions were selected for the study. Test companies must: (1) have a fiscal year ending December 31, (2) be listed on both the Standard and Poor's Industrial COMPUSTAT tape and the Center For Research on Security Prices CRSP tape, (3) have SEC 10-K's listed on microfiche, (4) have foreign subsidiaries that designate the local currency as the functional currency and are not located in highly inflationary economies, and (5) report segmental geographical data on their financial statements.

All companies registered with the Securities Exchange Commission are required to annually file a 10-K report which includes their financial statements. SFAS 8 required companies to disclose foreign currency translation gains and losses in the notes of their financial statements; therefore SEC reports were used to determine the amounts of foreign currency translation gains and losses for 1980 and 1981 and total foreign revenues and identifiable assets for 1981. Also, companies electing an early compliance with SFAS 52 were required to disclose the impact of the early adoption on income. The total translation gain or loss for the early adoptees would have been the sum of the pro forma amount required to be disclosed under SFAS 52 and the actual translation gains and losses included in net income. These gains and losses resulted from foreign operations in highly inflationary economies or operations with the U.S. dollar as the functional currency.

Not included in this study were companies whose major foreign subsidiaries were operating in highly inflationary economies, or, had

determined the U. S. dollar to be the functional currency. These companies were eliminated since for them the results under SFAS 52 were the same as under SFAS 8, i.e., these companies only changed the name of the translation method without any change in the results from operations.

Finally, only companies reporting geographical segmental data for the fiscal year ended December 31, 1981, were included in the study. This restriction was necessary because some of the financial attributes tested require information about revenues, profits or losses, and identifiable assets by geographical segments.⁵¹

December 31, 1981, was selected because 1981 was the year large foreign currency translation losses occurred for most companies, thereby resulting in large impacts on income. The final number of usable enterprises included 83 companies that elected to adopt SFAS 52 at December 31, 1981, and 103 companies that did not adopt on that date. The companies included in this inquiry are identified separately by "adopt-early group" and non-change group" in APPENDIX D at the end of this study.

⁵¹Statement of Financial Accounting Standards Number 14, "Financial Reporting for Segments of a Business Enterprise," requires companies with international operations to report geographical segmental data on revenues, profit and loss, and identifiable assets if the results of foreign operations exceeded 10 percent of the results of total operations.

Chapter IV

COMPARISON OF ATTRIBUTES

Many accounting standards give financial managers the option of selecting among alternative accounting treatments for the same economic phenomena. The rationale behind this flexibility is that given the diverse nature of business operations, no single set of accounting methods is appropriate for all firms. This raises the question whether financial characteristics of firms are related to the selection of an accounting method when options are available. The purpose of this phase of the study is to identify differences in specific attributes between the two groups of companies to determine if they might be related to the selection of a discretionary accounting standard.

This chapter compares seven measurable characteristics (attributes) of two groups of companies. One group voluntarily adopted SFAS 52 on December 31, 1981 ("adopt-early group" or "change group"), while the other group opted to continue reporting under the requirements of SFAS 8 ("non-change group"). The attributes compared are:

- (1) the debt to equity ratio as of December 31, 1981,
- (2) foreign currency translation gains and losses for 1980,
- (3) foreign currency translation gains and losses for 1981,
- (4) translation gains and losses as a percent of net income for 1981,
- (5) the 1981 ratio of foreign revenues to total revenues,

(6) ratio of foreign identifiable assets to total identifiable assets as of December 31, 1981,

(7) and 1981 primary earnings per share.

Justification for the Selection of Attributes

Debt to Equity Ratio as of December 31, 1981

Since the translation method used could affect the restrictiveness of bond covenants, the proportion of debt financing might be a factor in the decision to adopt SFAS 52 early. The numerator, debt, in the debt to equity ratio is translated at the current rate under both methods. However, the denominator differs under the two translation methods, even though the translation differences under both translation methods ultimately show up in owners' equity. Equity differs under the two methods because the amount and at times even the sign (i.e., gain or loss), of the translation difference is not the same under the temporal and the current rate translation method as shown in Exhibit 2.A. Zieha and Duangploy pointed out that ratio analysis is confounded by the switch from SFAS 8 to SFAS 52.⁵²

Foreign Currency Translation Gains and Losses for 1980

The decision of whether or not to change standards may have been affected by 1980 translation gains and losses since 1981 foreign currency translation gains and losses were not completely determinable

⁵²Op. cit., Zieha and Duangploy.

until the end of 1981. Although the change would not have affected 1980 reported profits, these reported numbers were available when the decision was made, whereas the 1981 figures were not complete.

Foreign Currency Translation Gains and Losses for 1981

One of the basic assumptions in economics is that man is rational. When given choices, he will select the alternative which offers him the greatest benefit. Lewellen and Huntsman, for example, found that management compensation is significantly related to reported net profits.⁵³ It therefore follows that the rational manager can be expected to select the accounting principle that results in the highest reported net income if management compensation is significantly related to reported net income.

Griffin analyzed differences in various exchange gains and losses to income ratios.⁵⁴ His sample included not only the FASB respondents to the May 1978 invitation to comment on SFAS 8, but also an independent sample of multinational companies. The test results indicate that translation gains and losses have a relatively minor effect on reported income, but that FASB respondents experienced greater volatility in pretax earnings.

In a followup to his 1982 study, Griffin found that SFAS 52 respondents appear to be relatively larger in size and less profitable

⁵³Wilbur G. Lewellen and B. Huntsman, "Managerial Pay and Corporate Performance," American Economic Review, September 1970, pp. 710-20.

⁵⁴Paul A. Griffin, "Foreign Exchange Gains and Losses: Impact on Reported Earnings," ABACUS, June 1982, pp. 50-69.

than other multinational companies.⁵⁵ He expressed the view ". . . that corporate managers act in a self-interested manner preferring accounting proposals that enhance rather than diminish the utility of their wealth."

If managers are assumed to be rational and act in their self interest, then 1981 foreign currency translation gains and losses might have affected the decision to adopt SFAS 52 because of the effect on net income and management compensation. The amount of excludable translation gain or loss is disclosed in the financial statements since early adoptees are required to disclose the pro forma effect on income. SFAS 8 requires companies to disclose foreign currency translation gains and losses in the financial footnotes. This information is available on the SEC 10K.

The problems of defining exposure and determining risk factors related to compliance with the provisions of SFAS 8 have been addressed in studies by Dietman⁵⁶, Feskoe⁵⁷, Choi⁵⁸ and Smith⁵⁹. Studies by

⁵⁵Paul A. Griffin, "Management's Preferences for FASB Statement No. 52: Predictive Ability Results," ABACUS, December 1983, pp. 131.

⁵⁶Gerald J. Dietman, "Evaluating Multinational Performance Under FAS 8," Management Accounting, May 1980, pp. 49-55.

⁵⁷Gaffney Feskoe, "Reducing Currency Risks in a Volatile Foreign Exchange Market," Management Accounting, September 1980, pp. 19-24.

⁵⁸F. D. S. Choi, "Foreign Inflation and Management Decisions," Management Accounting, June 1977, pp. 21-17.

⁵⁹Alan F. Smith, "Temporal Method: Temporary Mode?" Management Accounting, February 1978, pp. 21-26.

Evans, Folks and Jilling⁶⁰, Mathur and Loy⁶¹, Cooper, Fraser and Richards⁶², and Stanley and Block⁶³ have indicated that translation gains and losses affect corporate management practices. They believe that the inclusion of translation gains and losses in net income might have led to dysfunctional behavior (i.e., excessive hedging) on the part of corporate managers.

The ratio of foreign monetary assets to foreign monetary liabilities would have provided the ideal measure of differences in accounting exposure and risk factors for the two groups if the foreign subsidiary's net monetary position is perceived to be at risk of devaluation. However, information about the foreign monetary position was not publicly available.

Translation Gains and Losses as a Percentage of Net Income for 1981

Direct comparisons of the actual dollar amounts are confounded by differences in firm size. This problem is partially controlled by standardizing foreign currency translation gains and losses as a percentage of net income. Net income for the adopt-early group was

⁶⁰Thomas G. Evans, William R. Folks, Jr., and Michael Jilling, The Impact of Statement of Financial Accounting Standards No. 8 on the Foreign Exchange Risk Management Practices of American Multinationals: An Economic Impact Study, Stamford, Connecticut: FASB, 1978.

⁶¹Op. cit., Mathur and Loy.

⁶²Kerry Cooper, Donald R. Fraser, and R. Malcolm Richards, "Impact of SFAS 8 on Financial Management Practices," Financial Executive, June 1978, pp. 26-31.

⁶³Marjorie T. Stanley and Stanley B. Block, "Accounting and Economic Aspects of SFAS 8," International Journal of Accounting Education and Research, Spring 1979, pp. 135-155.

adjusted for the currency translation losses excludable under the current rate method of SFAS 52 for purposes of comparability. This information was taken for the financial statement footnotes.

A recent study by Coopers and Lybrand surveyed 392 of the Fortune 500 industrial companies and the Fortune 50 largest nonindustrial companies to determine why they did or did not adopt SFAS 52 before the mandatory date and if they did, what effect it had on corporate earnings.⁶⁴ Survey results indicate that 40% of the companies adopted SFAS 52 for the fiscal year ended December 31, 1981. It was determined that industrial companies electing an early compliance had an average increase in net income of 11% over what it would have been in the current year if the company had not adopted SFAS 52 early. On the other hand, nonindustrial companies showed only a 2% increase in net income. This information was readily available since companies electing to adopt SFAS 52 for fiscal years ended on or before March 31, 1982 were required to disclose the pro forma effect on income of changing standards. Corresponding pro forma earnings, however, were not required to be disclosed by companies deciding against an early adoption.

The most common reason given for not complying early was the cost of sudden implementation due to the lack of time. Since the standard was not approved until December 1981, the time for implementation was short, therefore this reason appears credible on the surface. It should be mentioned, however, that the change from the multiple exchange rate

⁶⁴Coopers and Lybrand, Foreign Currency Translation: An Implementation Study, New York: Coopers and Lybrand, 1982.

method of SFAS 8 to the single exchange rate method of SFAS 52 would be relatively easy.

Ratio of 1981 Foreign Revenues and Foreign Identifiable Assets as of December 31, 1981 to the Corresponding Consolidated Totals

Companies were compared according to the proportion of foreign revenue to total revenue and foreign assets to total assets thus controlling for differences in the proportion of foreign operations to total operations. That is, foreign operations may be more material to some companies than to other companies. Thus, the proportion of foreign operations may logically affect the amount of attention that management pays to foreign currency translation standards.

1981 Primary Earnings Per Share

Also compared was the difference in primary earnings per share (PEPS) between the two groups. This comparison was made to determine if the reported earnings of the group that adopted SFAS 52 early was significantly different from the reported earnings of the group that did not adopt early. PEPS was selected rather than fully diluted earnings per share (FDEPS) because all companies must report PEPS whereas less than half of all companies are required to report FDEPS.

Statistical Tests

The null hypothesis tested was: There are no significant differences (in the debt to equity ratio as of December 31, 1981; the amount of foreign currency translation gains and losses for 1980 and

1981; the translation gains and losses as a percent of net income for 1981; the 1981 ratio of foreign revenues to total revenues; the ratio of foreign assets to total assets as of December 31, 1981; and 1981 primary earnings per share) between companies that elected to comply with SFAS 52 early and those companies that did not elect an early compliance.

Each attribute was compared between the two groups using the general t-test which can be mathematically stated as:

$$t = (\bar{x}_1 - \bar{x}_2) / (s^2_1/N_1 + s^2_2/N_2)^{1/2}. \quad (1)$$

where:

\bar{x} is the mean and

s^2 is the variance for the variable of interest.

A series of t-tests on different variables within the same observations often leads to a confusion of alpha risks because each alpha risk is not independent of the other. The alpha risk, called the level of significance, is the probability of rejecting the null hypothesis when, in fact, it is true. There is a high probability that tests on positively associated variables will lead to the same conclusion.

Correlations between variables will be tested by the correlation coefficient, r , which is mathematically stated as:

$$r_{1k} = \frac{\sum_j (x_{1j} - \bar{x}_1)(x_{kj} - \bar{x}_k)}{[\sum_j (x_{1j} - \bar{x}_1)^2 \sum_j (x_{kj} - \bar{x}_k)^2]^{1/2}} \quad (2)$$

or simply:

$$r_{ik} = \text{cov}_{ik} / s_i s_k$$

where: s_i and s_k are the standard deviations for each variable.

A basic assumption of the t-test is that both groups come from normally distributed populations. If the normality assumption is not valid, the nonparametric version of the t-test, the Wilcoxon Rank Sum test might be more appropriate to test for differences between the two groups. The Wilcoxon Rank Sum test is mathematically stated as:

$$W = \sum_{j=1}^n R_j \quad (3)$$

where:

R_j = the rank of the observations when ordered from least to greatest and

W = the sum of the ranks.

The Hotelling T^2 test was used to simultaneously analyze differences between all of the variables of interest in the two groups. Hotelling's T^2 is a test to determine if the difference in the mean vectors of the two groups is significant. The test statistic can be mathematically stated as:

$$T^2 = (\bar{X}_1 - \bar{X}_2)' S^{-1} (\bar{X}_1 - \bar{X}_2) / (1/N_1 + 1/N_2) \quad (4)$$

where:

\bar{X}_1 is the sample mean vector of the variables in one group.

\bar{X}_2 is the sample mean vector of the variables in the other group.

S is a square matrix representing the pooled within-groups covariance matrix for the two groups.

The F distribution will be used to evaluate the significance of T^2 because Hotelling's T^2 can be transformed into an F statistic,

$$F = \frac{T^2(N_1 + N_2 - v - 1)}{v(N_1 + N_2 - 2)} \quad (5)$$

where v is the number of variables in the analysis.

Stem and leaf plots, partially graphical and partially tabular displays of the data, are used to visually inspect the distributions of the observations within each group and for each attribute. The first digits of the data form the stem and the last digits are the leaves. Each stem defines a class of the grouped frequency distributions -- or, an interval. The stem and leaf plot has the appearance of a tilted histogram. A horizontal bar graph is often necessary if too many observations fall within a single interval.

The box plot, another visual display of data, is very useful in identifying outliers as well as skewed distributions. The two ends of the box are the 25th and 75th percentiles. A center horizontal line designates the sample median and a "+" is at the sample mean. The "whiskers", or central vertical lines extending from the box, extend to a distance of 1.5 interquartile ranges (an interquartile range is the distance from one end of the box to the other). Any value more extreme than this is marked with a 0 if it is within 3 interquartile ranges, or with a * if more extreme.

Results

Univariate t-test on Attributes

Test results are summarized in Table 4.1 (All Tables and Exhibits for this chapter are in APPENDIX A listed at the end of the chapter. All Computer programs used are reproduced in APPENDIX D at the end of this study). The most obvious difference between the change and non-change companies is in the dollar amount of foreign currency translation gains and losses for the fiscal year ending December 31, 1981. The mean difference between the two groups was highly significant, with a p-value of 0.0045. The companies that adopted SFAS 52 as of December 31, 1981, had an average foreign currency translation loss of 13.7794 million dollars. In contrast, the companies that did not adopt SFAS 52 early had an average foreign currency translation gain of 12.3262 million dollars. Compliance with the requirements of SFAS 52 resulted in an average increase in net earnings for companies that adopted early. On the other hand, compliance with SFAS 52 would have resulted in a decrease in net earnings for companies that did not elect an early adoption.

Furthermore, virtually all companies in the adopt-early group had translation losses that could be excluded from reported earnings and were therefore able to increase net earnings for December 31, 1981 by electing an early compliance with the requirements of SFAS 52 as shown in Exhibit 4.B1. A visual inspection of the stem and leaf and box plots for the adopt-early group shows a much tighter distribution than for the non-change group. The standard deviation for the change group is

21.4973 and the standard deviation for the other group is 80.3125, largely attributable to two extreme outliers.

An inspection of the stem and leaf plot for the adopt-early group shows a heavy distribution around the -0 interval of the stem. A one number interval in the scale of the stem further indicates a tighter distribution. The extreme outliers affected the scale of the non-change group thereby requiring the use of a bar chart rather than a stem and leaf plot. The box plots revealed a median value of -8.8 for the change group which is above the mean value of -13.8, whereas the median of 0 for the change group is lower than the mean of 12.3 for that group. The Kolomogorov D statistic, testing normality, indicates that the probability is less than .01 that either group is normally distributed.

The two extreme outliers were identified as Exxon, with a gain of 710 million, and Ford, with a 309 million dollar gain. When these two observations were eliminated from the groups, the mean translation gain for the non-change group fell from 12.3262 to 2.4812 (Tables 4.1 and 4.2). However, the observed value of t for the variable changed from -2.88 to -4.54 and the level of significance was even higher at 0.0001 because the standard deviation decreased from 80.3125 to 27.0845 as shown in Exhibits 4.B1 and 4.B2, respectively. The visuals for the reduced groups are shown in Exhibit 4.B2.

These results are consistent with the results of the Coopers and Lybrand study which shows an average increase in net income of 11 percent for companies that elected an early compliance with SFAS 52. The above leads to the logical conclusion that companies are more willing to change accounting standards if the change results in increased reported profits.

Other attributes indicating significant differences are the 1981 primary earnings per share; the 1981 ratio of foreign currency translation gains and losses to net income; and the debt to equity ratio as of December 31, 1981. As Table 4.1 indicates, these attributes were different at the .0514, .0250 and .0637 levels of significance respectively. This suggests that these attributes might also have been factors in the decision to adopt SFAS 52 before the mandatory date.

Primary earnings per share for the adopt-early group are significantly smaller (1.8171) than for the non-change group (2.8157) as shown in Table 4.1. Although foreign currency translation gains and losses are excludable from the EPS for the change group they are not excludable from the EPS of the non-change group, therefore the two groups are not comparable for this attribute.

The use of sensitivity analysis, a technique that asks how a result will change if the original data is changed, facilitated two "as if" comparisons on the PEPS variable between the two groups. As shown in Table 4.3, the change group had average translation losses of \$13.7794 million which would have caused a decrease in PEPS from 1.8171 to 1.4495 per share if the group had not changed to SFAS 52. These amounts were computed for the adopt-early group by subtracting the translation losses disclosed in the financial footnotes from net income and dividing the result by the shares used in the PEPS computation. This "as-if" analysis caused an even greater difference between the two groups with a new t observed of -2.5817 and a p -value of 0.0107, compared with the previous t observed of -1.96 and p -value of 0.0514 (Table 4.1).

Conversely, the assumption that both groups complied with SFAS 52 resulted in a lower PEPS number for the non-change group because average

translation gains would be excluded from income. The hypothetical PEPS amounts for the non-change group were obtained by subtracting the translation gains disclosed in the financial footnotes from net income and dividing the result by the shares used in the PEPS computation. This analysis caused less difference in PEPS between the two groups with a t observed of -1.8217 and a p -value of 0.0701 (Table 4.3).

It should be noted that even with the two groups being placed on a comparable basis, the PEPS amounts are significantly different for the two groups, assuming a p -value of 0.0701 is significant. The inclusion of foreign currency translation gains and losses in net income for both groups did result in greater differences, reinforcing the earlier conclusion that translation gains and losses had opposite effects on income for the change and non-change group of firms.

A comparison of the stem and leaf and box plots (Exhibit 4.C) for the two groups indicates the presence of more extreme outliers for the adopt-early group. Although the results of the Kolomogorov test failed to reject the null hypothesis that the non-change sample came from a normally distributed population at the .05 level of significance, however, it did reject the null at the .01 level for the adopt-early group. A mixture of distributions (i.e., comparing a normal to a non-normal) must be considered a non-normal distribution.

The ratio of foreign currency translation gains and losses to net income was also significantly different for the two groups. Intuitively, if the translation gains and losses are different, one would expect the ratio to also be different between the two groups. The foreign currency translation gains and losses for the adopt-early group represent a much larger proportion of net income than the translation

gains and losses for the non-change group. The proportion of translation gains and losses for the non-change group is only .0774 while the proportion for the change group is a negative .4055 (Table 4.1). Therefore inclusion of translation gains and losses in the net income of the change group would have had a much greater impact on net income than for the non-change group. This is further explored in comparisons of the PEPS variable.

Correlation matrices for the two groups are presented in Table 4.4. For the adopt-early group, the correlation coefficients indicate that both the amount of 1981 foreign currency translation gains and losses and the primary earnings per share are independent of the proportion of translation and gains and losses to net income (i.e., 0.0510 and 0.0022 respectively). This is further demonstrated by Exhibits 4.J and 4.L. The two scatterplots show a similar pattern with an almost vertical distribution. The 1981 translation gains and losses and PEPS are also independent of the ratio of gains and losses to net income for the non-change group with r values of -0.0134 and -0.0359 , respectively, as shown in Table 4.4. Since the patterns in Exhibits 4.K and 4.M also show vertical distributions, one possible explanation for these counter-intuitive, i.e., negative, results is the non-linear association of the variables. Thus a continuancy-table-measure association may be more appropriate than correlation.

The debt to equity ratio for the change group was smaller than for the non-change group at the 0.0637 level of significance. Although the results of the Kolomogrov test indicates that neither distribution is from a normally distributed population, an inspection of the stem and leaf and box plots (Exhibit 4.D) shows a relatively bell-shaped

distribution around the mean. The debt to equity ratio for both groups is greater than one, indicating that debt capital exceeds equity capital for both groups of companies. However, the average ratio for the change group is lower and closer to one. That is, companies that did not adopt early had, on average, a larger proportion of debt financing than the companies that did adopt SFAS 52 early. This implies that the financial leverage for the non-change group was higher, because less favorable financial leverage would cause companies to rely more on equity financing and less on debt financing. Of course, since SFAS 52 was not passed by the Board until November, 1981, almost all financing decisions would have been made while SFAS 8 was in effect. The inclusion of foreign currency translation losses in net income would have decreased the computed financial leverage whereas the inclusion of translation gains would have increased the computed financial leverage. This means that SFAS 52 had a favorable effect on the financial leverage of the adopt-early group and would have had an unfavorable effect on the financial leverage of the non-change group.

Test results summarized in Table 4.1 indicate that there are no significant differences in the foreign asset to total asset ratios and foreign revenues to total revenues for the two groups of firms. The revenue ratio is correlated with the asset ratio (0.7123 for the adopt-early group and 0.7186 for the non-change group), therefore it is not surprising that the differences between the groups for both ratios are similar. Exhibits 4.H and 4.I contain scatterplots of the two distributions that show a definite trend line between the two variables for both groups. Both ratios are slightly higher for the group that adopted SFAS 52 early, however the levels of significance are only

0.5942 for the revenue ratio and 0.2369 for the asset ratio (Table 4.1). The variances of the ratios for both groups are equal. This is further supported by the visuals (Exhibits 4.E and 4.F) which show very similar distributions.

Moreover, the amount of 1980 foreign currency translation gains and losses is not significantly different between the groups. Although the adopt-early companies had an average translation loss of 0.6397 million and the non-change group had an average translation gain of 2.5349 million, the difference is significant only at the 0.2440 level (Table 4.1). As with the 1981 translation gains and losses, the 1980 variance for the non-change group is much higher than the variance for the group that adopted early. The standard deviation and range for the non-change group are 24.0022 and 229.6 respectively, while the same measures for the change group are only 6.6648 and 57.4 (Exhibit 4.A). The difference in the variances is significant at the 0.0123 level. It should also be noted that both groups had extreme outliers as demonstrated by Exhibit 4.A.

The 1980 translation gains and losses for the adopt-early group are not highly correlated with the 1981 translation gains and losses for the adopt-early group, since the correlation coefficient, r , is only 0.2819 (Table 4.4). On the other hand, the 1980 translation gains and losses are highly correlated with the 1981 gains and losses for the non-change group with an r of 0.8729. This is further evidenced by a comparison of the scatterplots for the two variables (Exhibits 4.N and 4.O). This indicates that changes in translation gains and losses between 1980 and 1981 were more closely related for companies that changed from SFAS 8 to SFAS 52 than those for companies that continued to report under

SFAS 8.

Nonparametric Tests

Although all of the variables were not normally distributed, the sample sizes are large enough for the test results to approximate normal test results. To further support the findings, the nonparametric version of the t-test, the Wilcoxon Rank Sum test, was also computed for each of the seven variables of interest. Results are summarized in Table 4.5. There were outliers in some of the variables of both groups and the nonparametric test is not sensitive to these outliers. This factor may cause the Wilcoxon test to be appropriate for comparing the variables with outliers in the distribution. On the other hand, the Wilcoxon test assumes that the variances of the two groups are identical. F tests were used to test for equality of variances. The test results indicate that the hypothesis of equal variances could not be rejected at the .10 level of significance in only two cases, revenue ratio and asset ratio variables. This may be the reason for some of the differences between parametric and nonparametric tests results.

Generally the results were the same as the normal test results, however, one hypothesis rejected using the t-test, failed to be rejected with the Wilcoxon test. Significant differences were found between the debt to equity ratios for the two groups using the t-test, but the differences were not significant using the Wilcoxon test. The p-value for the parametric test was 0.0637 (Table 4.1) and only 0.2312 (Table 4.5) for the nonparametric version. An examination of the stem and leaf and box plots shows the adopt-early group contained only mild

outliers. The non-change group, in contrast, had four extreme outliers and some mild outliers. This could explain the difference in results.

Both tests strongly rejected the null hypothesis for the 1981 foreign currency translation gains and losses and the foreign currency to net income ratio. The p-values under the nonparametric test were less than 0.0001 for both variables. In addition, differences in the PEPS for the two groups was detected at a p-value of 0.0514 (Table 4.1) for the parametric test and 0.0868 (Table 4.5) for the nonparametric test.

The expected values of the following variables were higher than the observed values for the group that adopted SFAS 52 as of December 31, 1981: 1980 foreign currency translation gains and losses; 1981 foreign currency translation gains and losses; 1981 PEPS; the debt to equity ratio as of December 31, 1981; and the 1981 foreign currency translation gains and losses to net income ratio. These differences in variables indicate that the values of the adopt-early group were lower than those of the group that did not adopt early, even though the means were not being considered. This is consistent with a comparison of the mean values of these variables computed in the parametric tests.

The expected values of the foreign revenue to total revenue and foreign assets to total assets ratios were lower than the observed values for the adopt-early group. This implies that these ratios were higher for the group that adopted early which is also consistent with parametric results.

Multivariate Test on Attributes

The Hotelling T^2 simultaneously tests for differences among the mean vectors of the seven variables and between the two groups. This test is able to filter out the effects of within group covariances and therefore overcomes many of the limitations of the univariate t-test.

The null hypothesis that the difference between the means for the two groups are not different from zero is rejected at the 0.0005 level of significance as shown in Table 4.6. Test results show a T^2 of 28.6416 with an F value of 3.9582. These results indicate that the two groups are not the same.

The 1981 foreign currency translation gains and losses for the non-change group had two extreme outliers that significantly affected the mean for that variable, therefore the two observations were removed and the test was repeated on the reduced group. The results of the second test rejected the null hypothesis even stronger with a p-value of 0.0001.

Each of the univariate t-tests either failed to reject or rejected the null hypothesis at a different level of significance indicating the differences between the groups were not uniform for all attributes. Therefore, since the results of the univariate t-tests were mixed, the multivariate test was applied to arrive at an overall conclusion. The attributes selected for comparison were different for the group of companies that adopted SFAS 52 as of December 31, 1981 and the group not electing an early adoption. This implies that the decision whether to adopt SFAS 52 in 1981 was not a random one, but was related to a company's reported financial data.

Conclusions

There are significant differences between the two groups of companies. The companies that adopted SFAS 52 early were able to use the standard to increase reported profits as well as their financial leverage factor.

The favorable effect on the financial leverage factor would have, in turn, had a favorable effect on bond covenants. On average, companies adopting SFAS 52 early had a lower debt to equity ratio than the companies that did not adopt SFAS 52 as of December 31, 1981.

If management compensation is related to net income, then increased profits, regardless of whether they are true economic profits or simply accounting profits, are beneficial to the managers who decide which accounting principles to use in the preparation of financial reports for external purposes. Further research is needed to provide evidence of a relationship between changes in accounting principles and changes in agency costs to an organization. That is, do changes in accounting standards affect any dysfunctional behavior in managers.

Also, the results of this study imply that managers do not believe that investors recognize the difference between economic profits and accounting profits. Behavioral studies are needed to test how managers perceive investor reaction toward accounting numbers.

Limitations

There are several limitations to the analysis outlined above. For example, not all foreign currency translation gains and losses can be

excluded under the provisions of SFAS 52 as described in an earlier chapter. Although the excludable portion could be identified for the companies that reported under SFAS 52, that portion could not be isolated for the companies that reported under the provisions of SFAS 8. Therefore, it is impossible to determine what the effect on net profits would have been if the non-change firms had adopted SFAS 52 as of December 31, 1981 simply by looking at the financial disclosures. Part of the 1981 translation gains and losses may have been required to be reported in the computation of net income under the provisions of SFAS 52 also.

Further, since companies were self-selected into the two categories by their decision to adopt or not adopt SFAS 52 before the mandatory date, randomization does not exist. In addition, only Fortune 500 companies were chosen; therefore it may not be appropriate to generalize the results beyond this category of companies.

The Hotelling T^2 multivariate test assumes normality. Tests indicated that the two groups were not normally distributed for all of the tested variables.

The question of whether or not corporate risk management practices for foreign exposure were a factor in the decision to change standards could not be addressed using publicly available information. Monetary assets and liabilities of foreign subsidiaries are not required to be disclosed in a disaggregated format. This precludes any analysis of differences in accounting exposure between the two groups.

APPENDIX A

Table 4.1

Univariate T-Test on Attributes

nA= 83

nN= 103

Variable	A-mean	N-mean	tobs	p-value
FC80	-0.6397	2.5349	-1.17	0.2440
FC81	-13.7794	12.3262	-2.88	0.0045
PEPS	1.8171	2.8157	-1.96	0.0514
DER	1.0503	1.2331	-1.87	0.0637
RR	0.2614	0.2496	0.53	0.5942
AR	0.3154	0.2870	1.19	0.2369
FCR	-0.4055	0.0774	-2.26	0.0250

FC80 = Foreign currency translation gains and losses for the fiscal year ended December 31, 1980

FC81 = Foreign currency translation gains and losses for the fiscal year ended December 31, 1981

PEPS = 1981 Primary Earnings per Share

DER = Debt to Equity Ratio, December 31, 1981

RR = 1981 Foreign Revenues to Total Revenues

AR = Foreign Assets to Total Assets, December 31, 1981

FCR = Foreign Currency Translation Gain and Loss to Net Income Ratio

nA = The number of companies that adopted SFAS 52 early

nN = The number of companies that did not adopt SFAS 52 early

Table 4.2

Univariate T-Tests on Reduced Groups

nA= 83

nN= 101

Variable	A-mean	N-mean	tobs	p-value
FC80	-0.6397	-0.2861	-0.2651	0.7913
FC81	-13.7794	2.4812	-4.5395	0.0001
PEPS	1.8171	2.8778	-2.0550	0.0415
DER	1.0503	1.2215	-1.8383	0.0678
RR	0.2614	0.2424	0.8887	0.3754
AR	0.3154	0.2811	1.4373	0.1525
FCR	-0.4055	0.0819	-2.1567	0.0329

Table 4.3

"As If" T-Test of PEPS (complete Groups)

Assuming Both Groups Complied with SFAS 8

Adopt-early mean	Non-change mean	t-obs	p-value
1.4495	2.8157	-2.5817	0.0107

Assuming Both Groups Complied with SFAS 52

Adopt-early mean	Non-change mean	t-obs	p-value
1.8171	2.7772	-1.8217	0.0701

Table 4.4

Correlation Matrix for Adopt-Early Group

	FC80	FC81	PEPS	DER	RR	AR	FCR
FC80	1.0000						
FC81	0.2819	1.0000					
PEPS	0.1170	-0.1801	1.0000				
DER	0.0029	0.1336	-0.3342	1.0000			
RR	-0.1117	-0.4033	0.1449	-0.2208	1.0000		
AR	-0.0187	-0.2200	-0.0124	-0.1547	0.7123	1.0000	
FCR	0.0074	0.0510	0.0022	0.0369	-0.0076	0.0192	1.0000

Correlation Matrix for Non-change Group

	FC80	FC81	PEPS	DER	RR	AR	FCR
FC80	1.0000						
FC81	0.8729	1.0000					
PEPS	-0.0674	-0.0121	1.0000				
DER	0.0327	0.0626	-0.1836	1.0000			
RR	0.3138	0.2907	0.1579	-0.2263	1.0000		
AR	0.2419	0.2187	0.1771	-0.2145	0.7186	1.0000	
FCR	-0.0531	-0.0134	-0.0359	-0.1093	-0.0257	-0.0259	1.0000

Table 4.5

Wilcoxon Test on Attributes

Variable	A-mean	N-mean	Zobs	p-value
FC80	88.43	97.59	-1.1593	0.2463
FC81	66.95	114.90	-6.0415	0.0000
PEPS	85.96	99.57	-1.7124	0.0868
DER	88.23	97.75	-1.1973	0.2312
RR	97.63	90.17	0.9370	0.3488
AR	98.70	89.31	1.1808	0.2377
FCR	72.06	110.78	-4.8775	0.0000

Table 4.6
Hotelling T^2

Test on Entire Groups

Hotelling T Square	28.6416
F-Value	3.9582
p-value	0.0005

Test on Reduced Groups

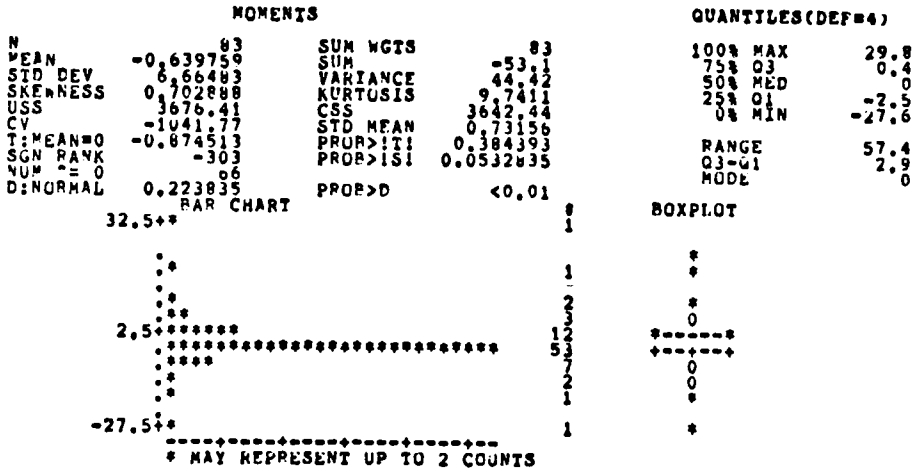
Hotelling T Square	35.0002
F-Value	4.8352
p-value	0.0001

Exhibit 4.A

Stem and Leaf Plots and Box Plots
1980 Foreign Currency Translation Gains and Losses

Change Group

VARIABLE=FC00



Non-change Group

VARIABLE=FC00

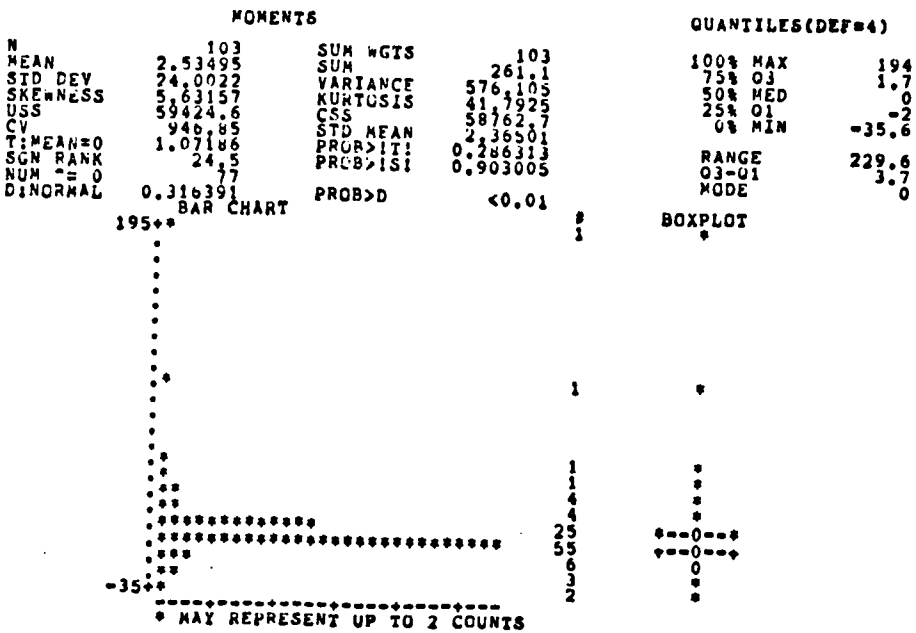


Exhibit 4.B1

Stem and Leaf Plots and Box Plots
1981 Foreign Currency Translation Gains and Losses
(Complete Groups)

Change Group

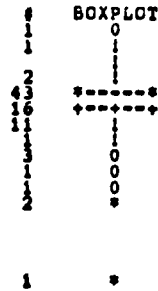
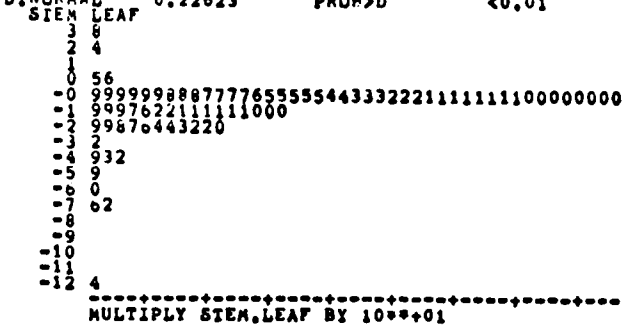
VARIABLE=FC81

MOMENTS

N	83	SUM WGT5	83
MEAN	-13.7795	SUM	-1143.7
STD DEV	21.4973	VARIANCE	462.134
SKEWNESS	-2.2813	KURTOSIS	8.93685
USS	53654.6	CSS	37895
CV	-156.009	STD MEAN	2.35963
T:MEAN=0	-5.83968	PRGB>IT	0.0001
SGN RANK	-1391.5	PRGB>IS	0.0001
NUM = 0	79		
D:NORMAL	0.22623	PROB>D	<0.01

QUANTILES(DEF=4)

100% MAX	38.3
75% Q3	-1.8
50% MED	-8.8
25% Q1	-19.2
0% MIN	-124
RANGE	162.3
Q3-Q1	17.4
MODE	0



Non-change Group

VARIABLE=FC81

MOMENTS

N	103	SUM WGT5	103
MEAN	12.3262	SUM	1269.6
STD DEV	80.3125	VARIANCE	6450.1
SKEWNESS	7.03211	KURTOSIS	58.1403
USS	8735.0	CSS	657911
CV	651.559	STD MEAN	7.91343
T:MEAN=0	1.55763	PRGB>IT	0.122418
SGN RANK	125.5	PRGB>IS	0.590398
NUM = 0	86		
D:NORMAL	0.293817	PROB>D	<0.01

QUANTILES(DEF=4)

100% MAX	710
75% Q3	7
50% MED	0
25% Q1	-5.2
0% MIN	-88
RANGE	798
Q3-Q1	12.2
MODE	0

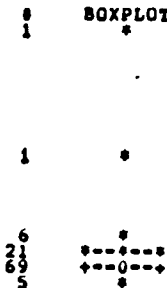
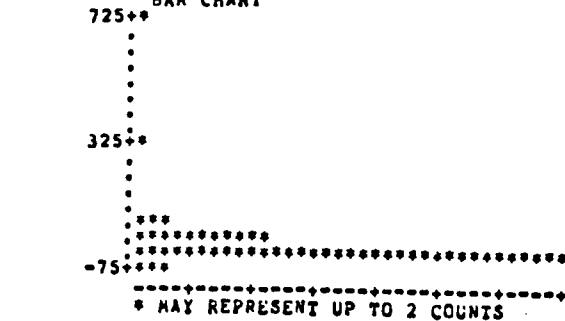
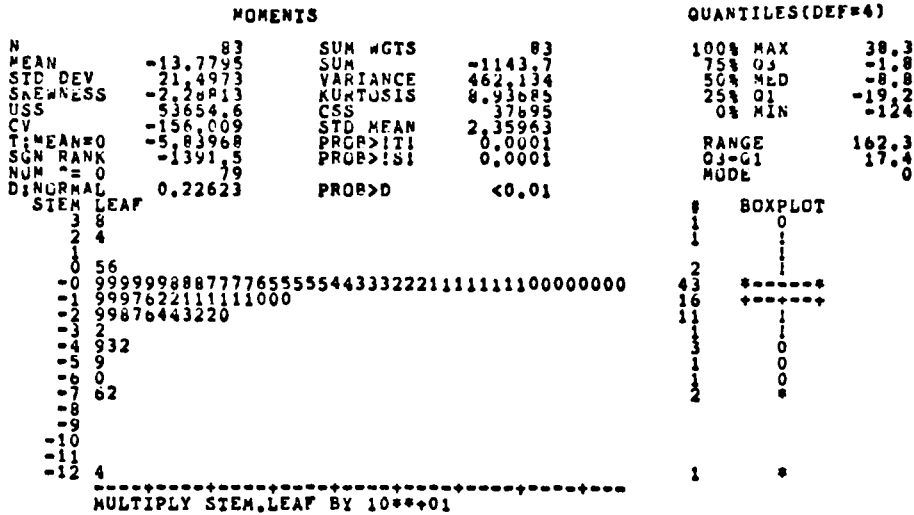


Exhibit 4.B2

Stem and Leaf Plots and Box Plots
1981 Foreign Currency Translation Gains and Losses
(Reduced Groups)

Change Group

VARIABLE=FC81



Non-change Group

VARIABLE=FC81

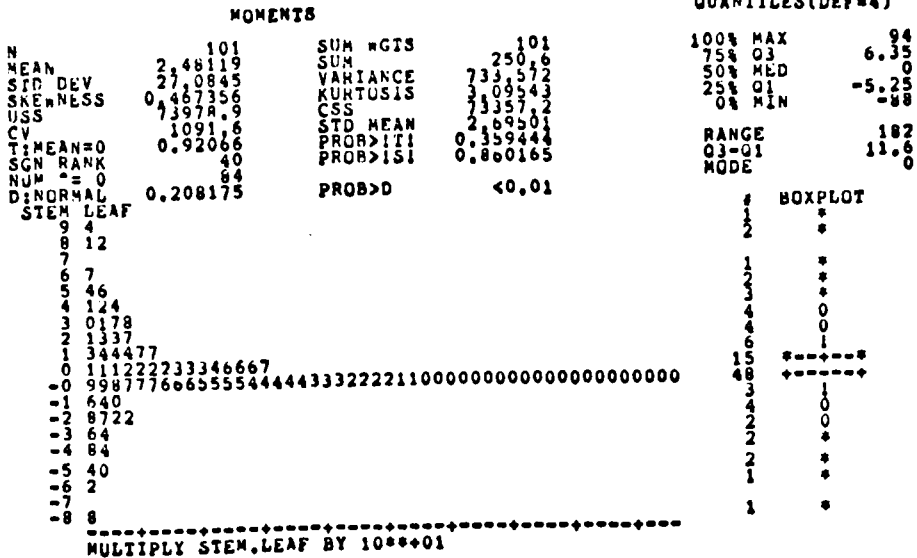


Exhibit 4.C

Stem and Leaf Plots and Box Plots
1981 Primary Earnings Per Share

Change Group

VARIABLE=PEPS81

MOMENTS		QUANTILES(DEF=4)	
N	83	SUM WGTIS	83
MEAN	1.81707	SUM	150.816
STD DEV	3.78805	VARIANCE	14.3554
SKEWNESS	-2.52722	KURTOSIS	9.39484
USS	1451.18	CSS	1177.14
CV	208.515	STD MEAN	0.41588
T:MEAN=0	4.36921	PROR>:TI	0.0001
SGN RANK	1219	PROR>:SI	0.0001
NUM ^= 0	83	PROB>D	<0.01
D:NORMAL	0.219102		

QUANTILES(DEF=4)	
100% MAX	8.83
75% Q3	3.35
50% MED	2.35
25% Q1	1.21
0% MIN	-17.24
RANGE	26.07
Q3-Q1	2.14
MODE	0.25

STEM	LEAF	PROB>D	BOXPLOT
8	8	1	0
7		1	
6	4557	4	0
5	24566	5	
4	00234568	8	
3	00111333379	11	
2	0000112233344445677888	23	-----+
1	023344444668	12	-----+
0	224456789	9	-----+
-0	43	2	
-1		2	
-2	654	3	0
-3			
-4			
-5	4	1	*
-6			
-7	3	1	*
-8	7	1	*
-9			
-10			
-11			
-12	1	1	*
-13			
-14			
-15			
-16			
-17	2	1	*

Non-change Group

VARIABLE=PEPS81

MOMENTS		QUANTILES(DEF=4)	
N	103	SUM WGTIS	103
MEAN	2.81508	SUM	290.015
STD DEV	3.15744	VARIANCE	9.96946
SKEWNESS	-0.0672943	KURTOSIS	0.626389
USS	1833.47	CSS	1016.88
CV	112.138	STD MEAN	0.311112
T:MEAN=0	9.05036	PROR>:TI	0.0001
SGN RANK	2110	PROR>:SI	0.0001
NUM ^= 0	103	PROB>D	0.110
D:NORMAL	0.0791767		

QUANTILES(DEF=4)	
100% MAX	12.09
75% Q3	4.77
50% MED	2.73
25% Q1	0.9
0% MIN	-5.46
RANGE	17.55
Q3-Q1	3.87
MODE	-1.38

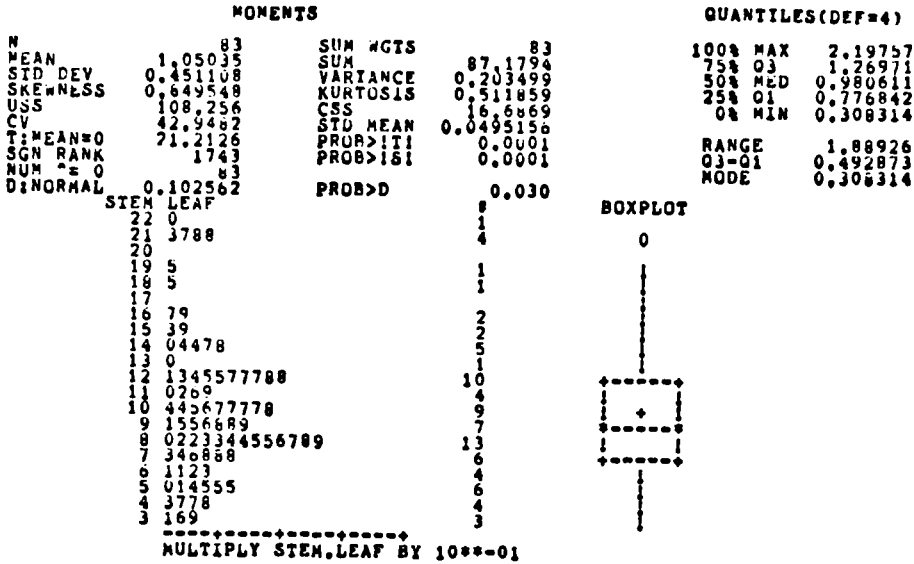
STEM	LEAF	PROB>D	BOXPLOT
12	1	1	0
11	0	1	
10			
9			
8	267	3	
7	148	3	
6	122266	6	
5	0125089	7	
4	0012333550688889	15	-----+
3	11233345667889	14	-----+
2	00222344455666667778	20	-----+
1	0346678	7	
0	23678889	8	
-0	310	3	0
-1	6444330	7	
-2	7540	4	
-3	6	1	
-4	90	2	
-5	5	1	

Exhibit 4.D

Stem and Leaf Plots and Box Plots
Debt to Equity Ratio
December 31, 1981

Change Group

VARIABLE=DER



Non-change Group

VARIABLE=DER

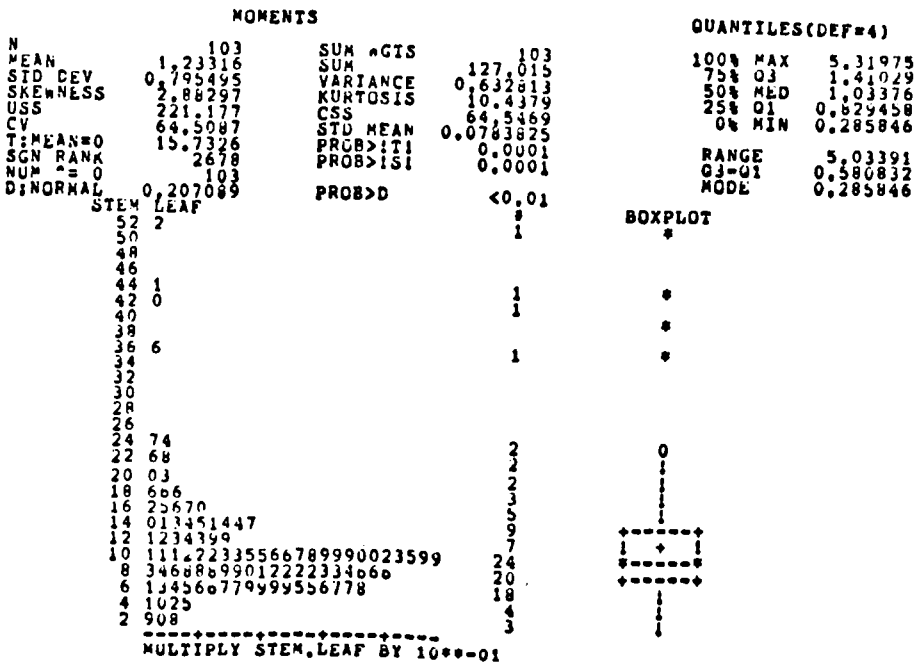
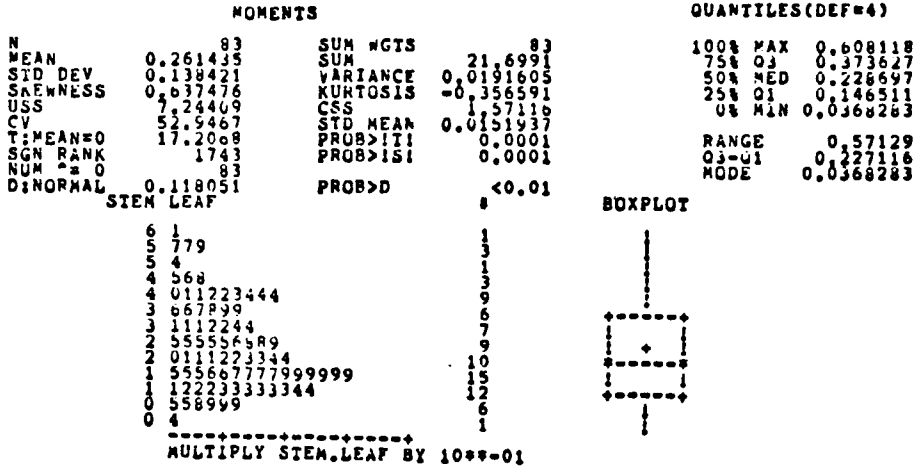


Exhibit 4.E

Stem and Leaf Plots and Box Plots
1981 Foreign Revenue to Total Revenue Ratio

Change Group

VARIABLE=RR



Non-change Group

VARIABLE=RR

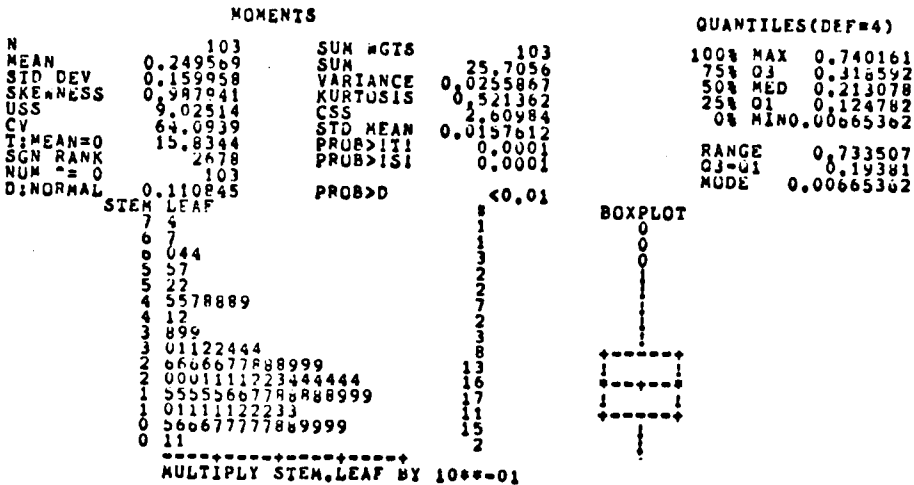
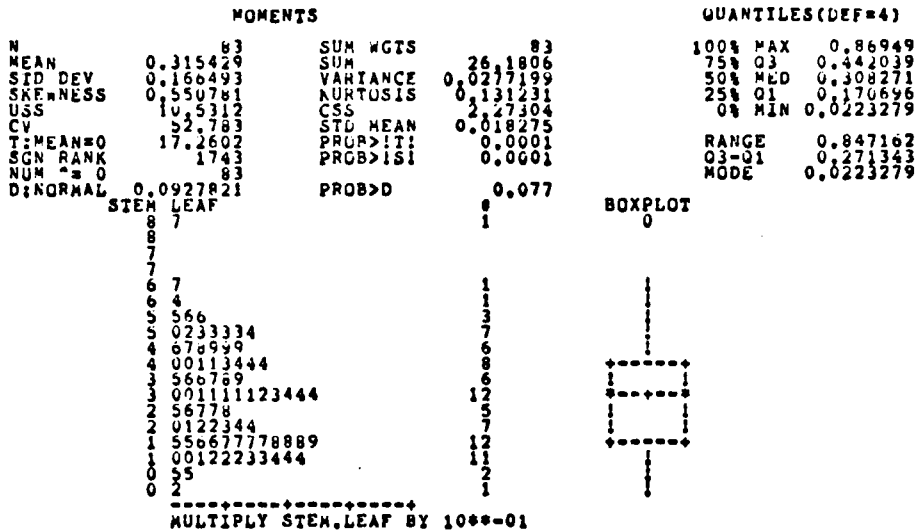


Exhibit 4.F

Stem and Leaf Plots and Box Plots
Foreign Assets to Total Assets Ratio
December 31, 1981

Change Group

VARIABLE=AR



Non-change Group

VARIABLE=AR

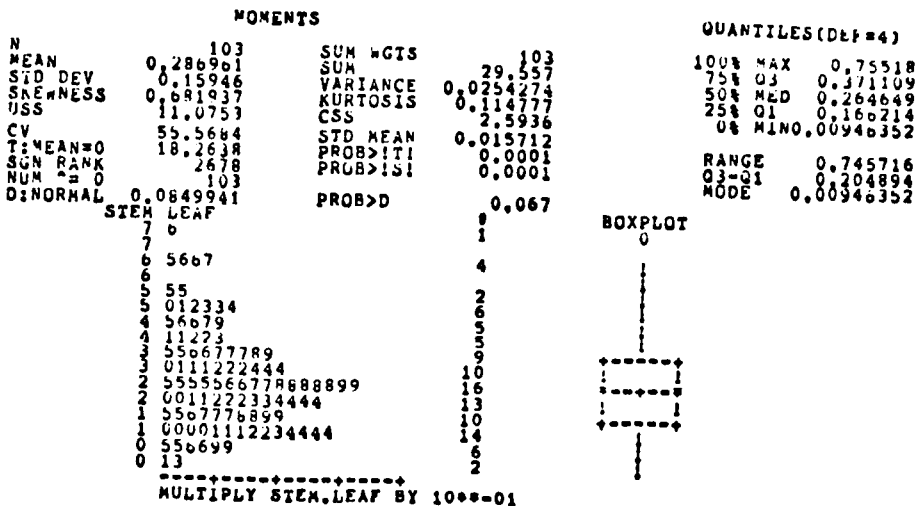
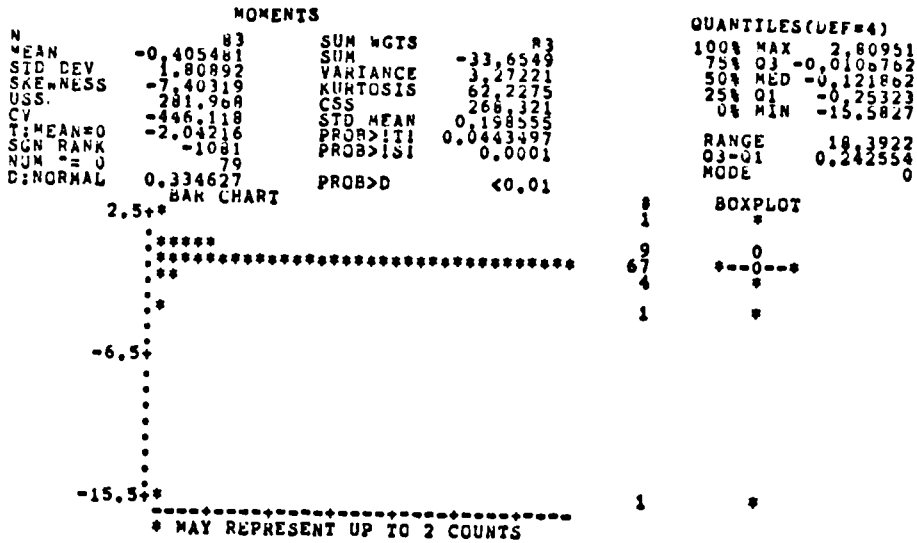


Exhibit 4.G

Stem and Leaf Plots and Box Plots
1981 Translation Gains and Losses to Revenue Ratio

Change Group

VARIABLE=FCR



Non-change Group

VARIABLE=FCR

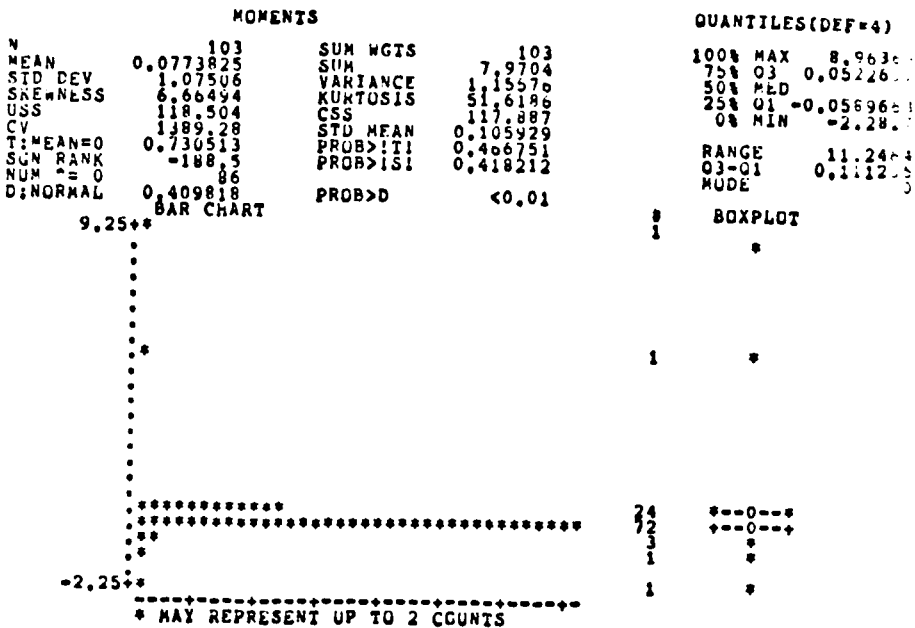


Exhibit 4.H
Scatterplot - 1981 Asset Ratio to Revenue Ratio
Change Group

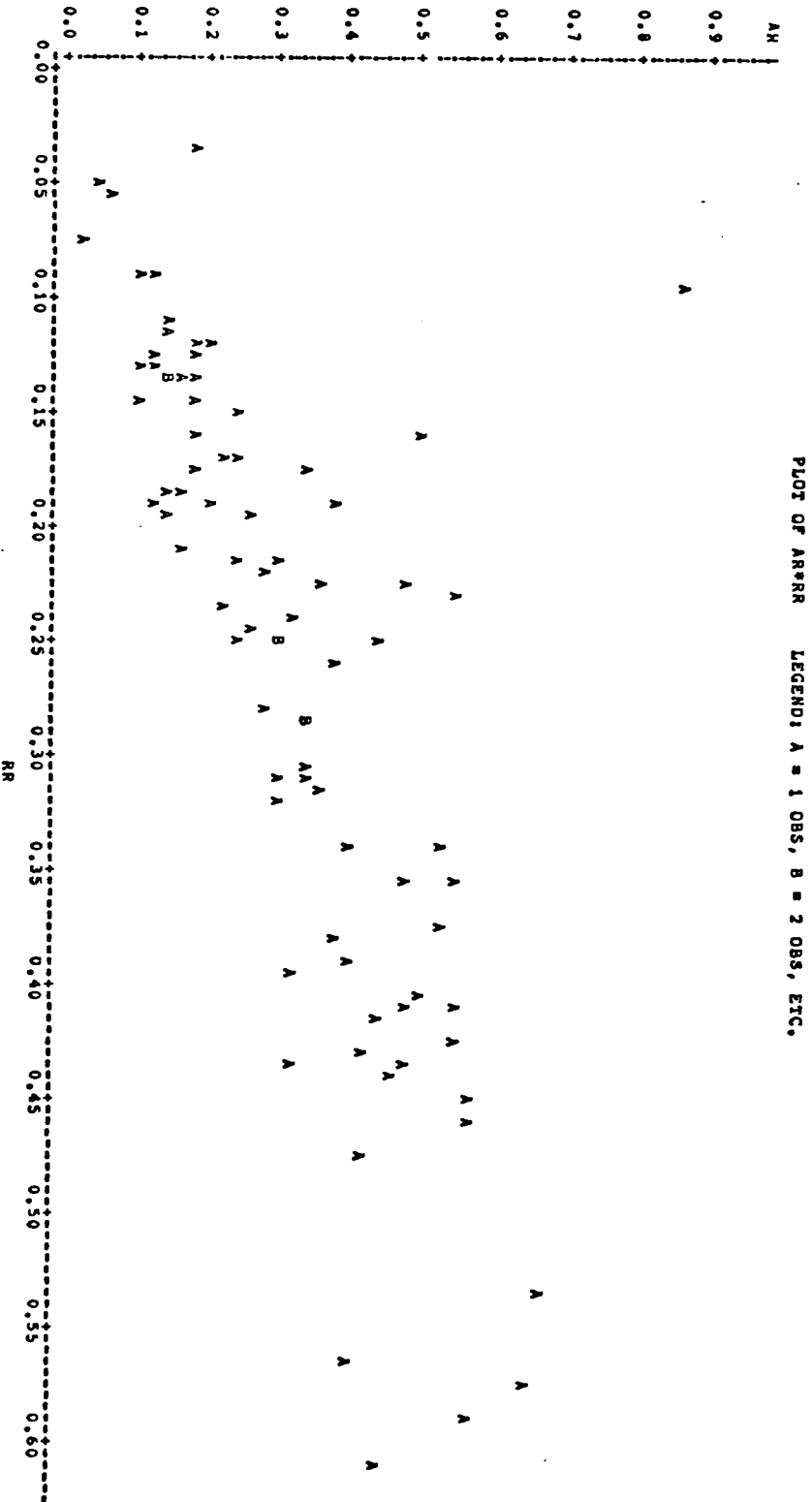


Exhibit 4.1
Scatterplot - 1981 Asset Ratio to Revenue Ratio
Non-change Group

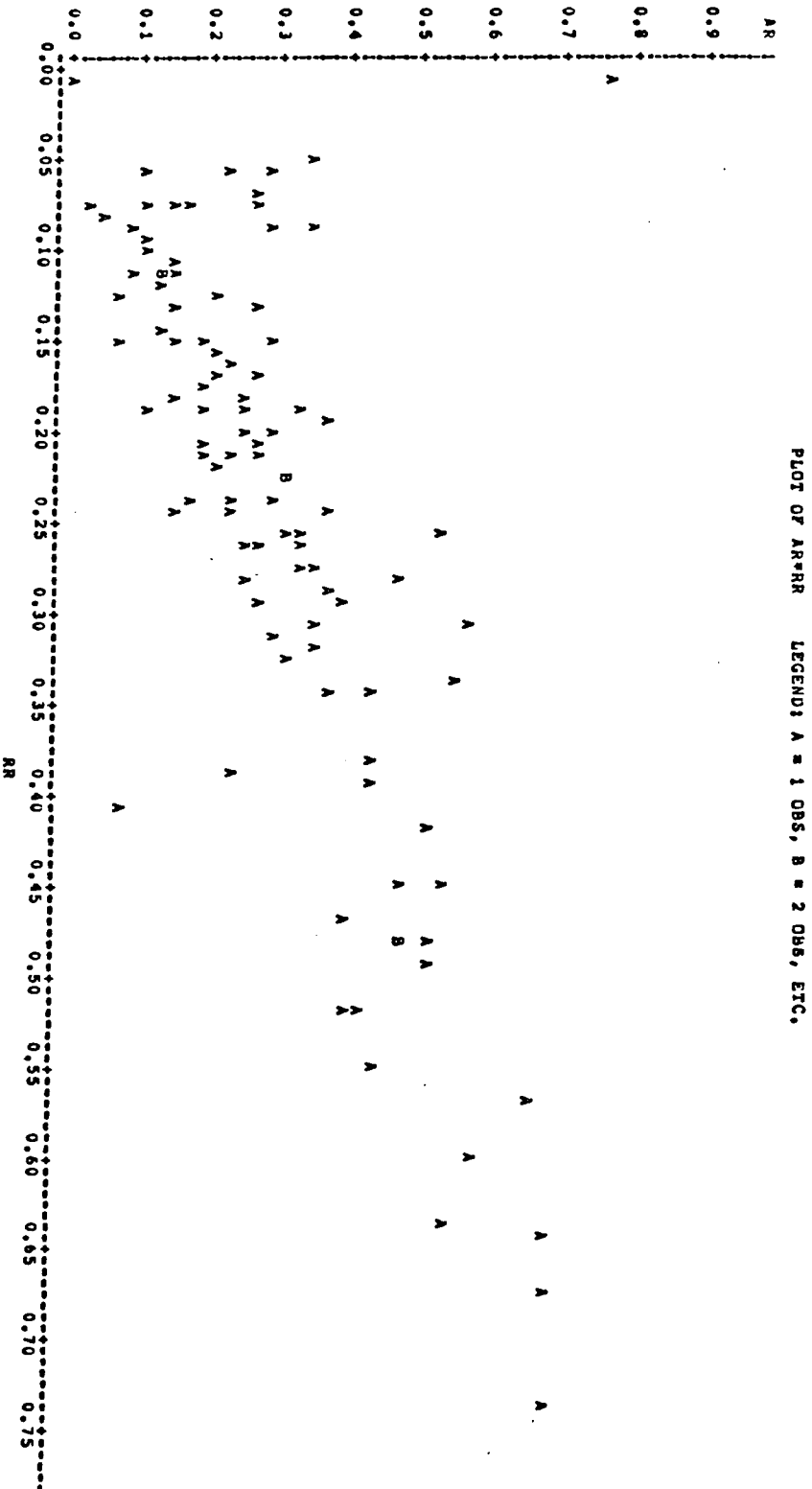


Exhibit 4.J
Scatterplot -- FC81 to PCR
Change Group

PLLOT OF FC81*PCR LEGEND: A = 1 OBS, B = 2 OBS, ETC.

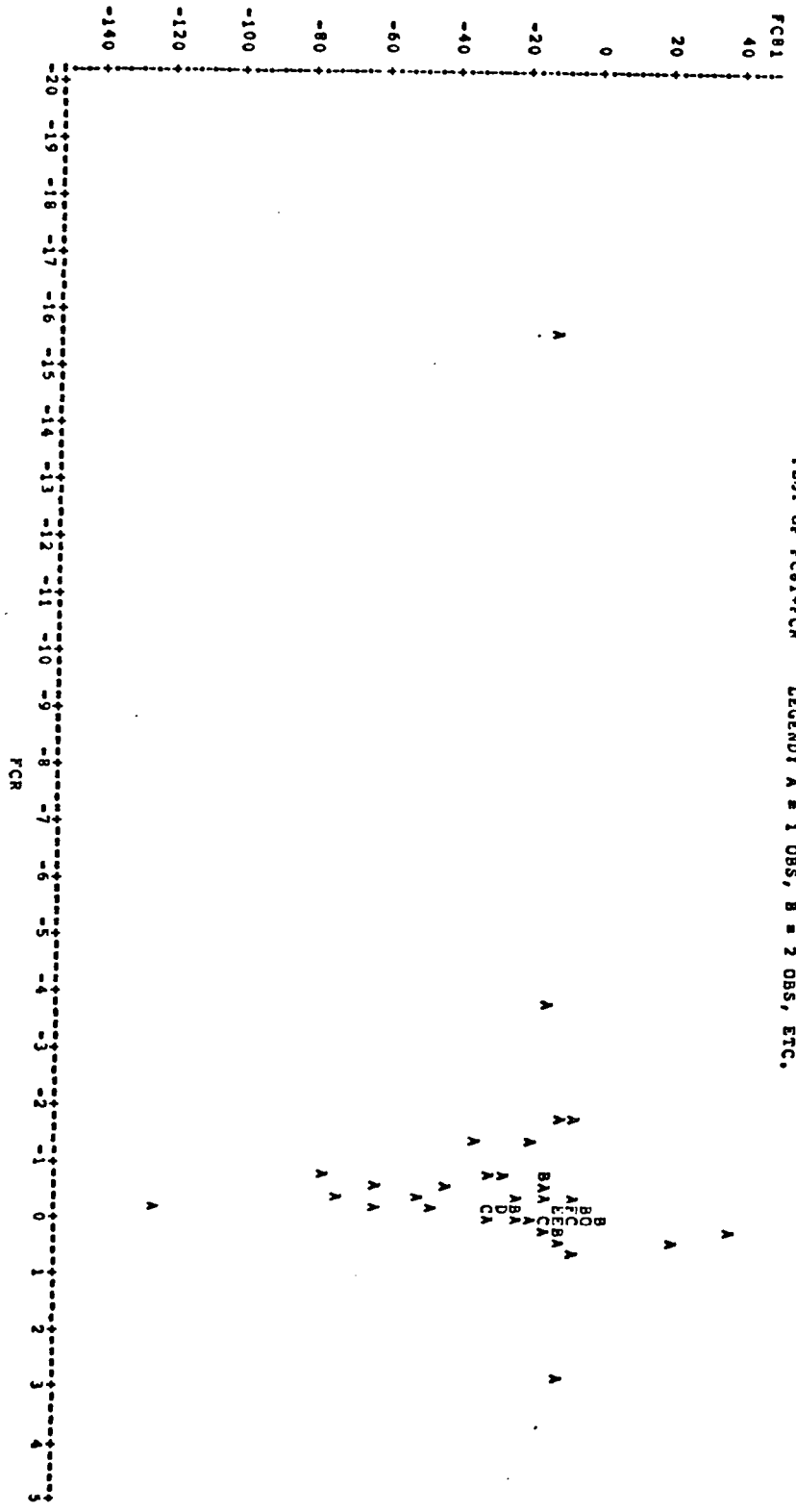


Exhibit 4.K
 Scatterplot - FC81 to FCR
 Non-change Group

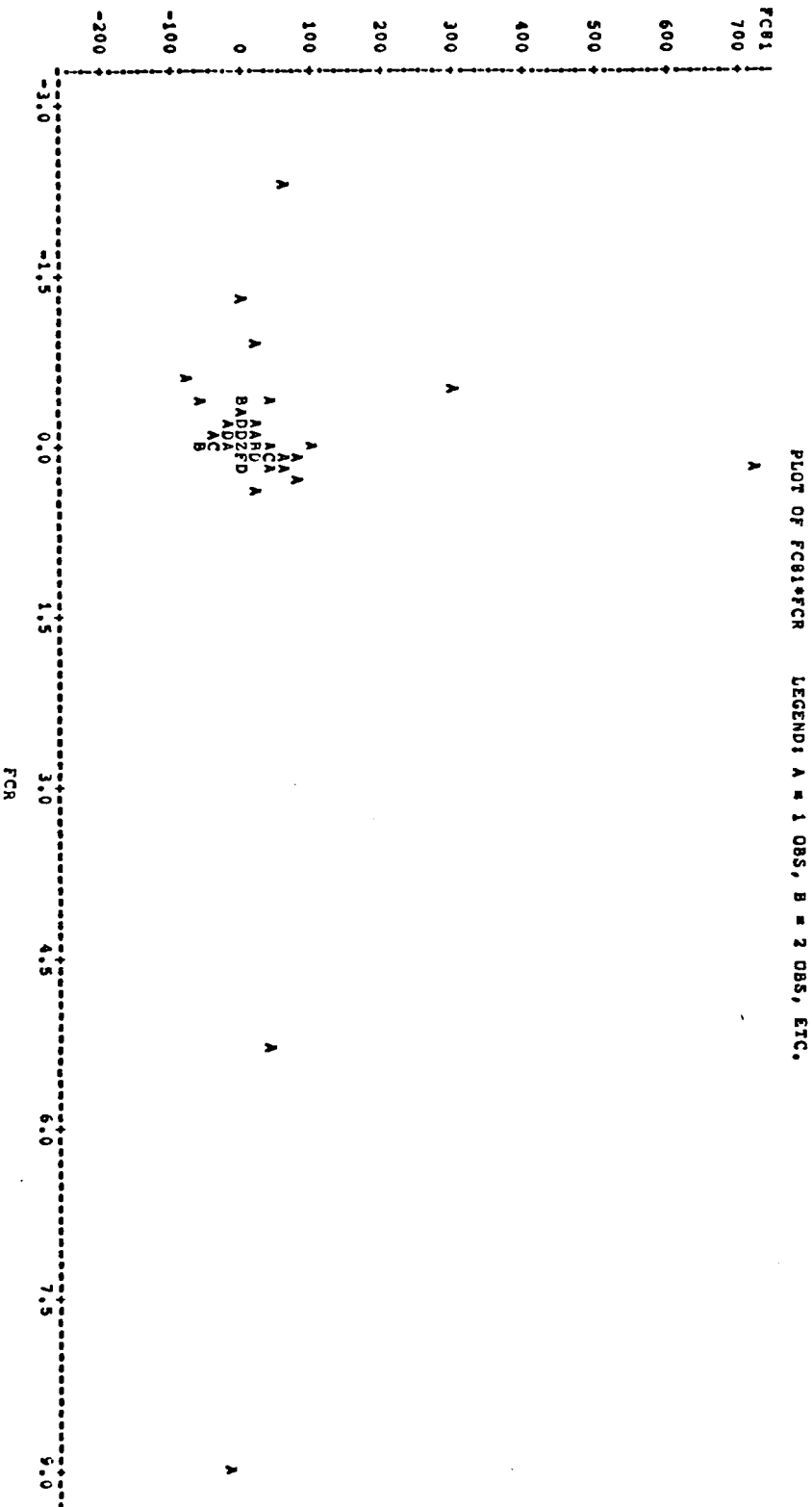


Exhibit 4.1
 Scatterplot - 1981 PEPS to FCR
 Change Group

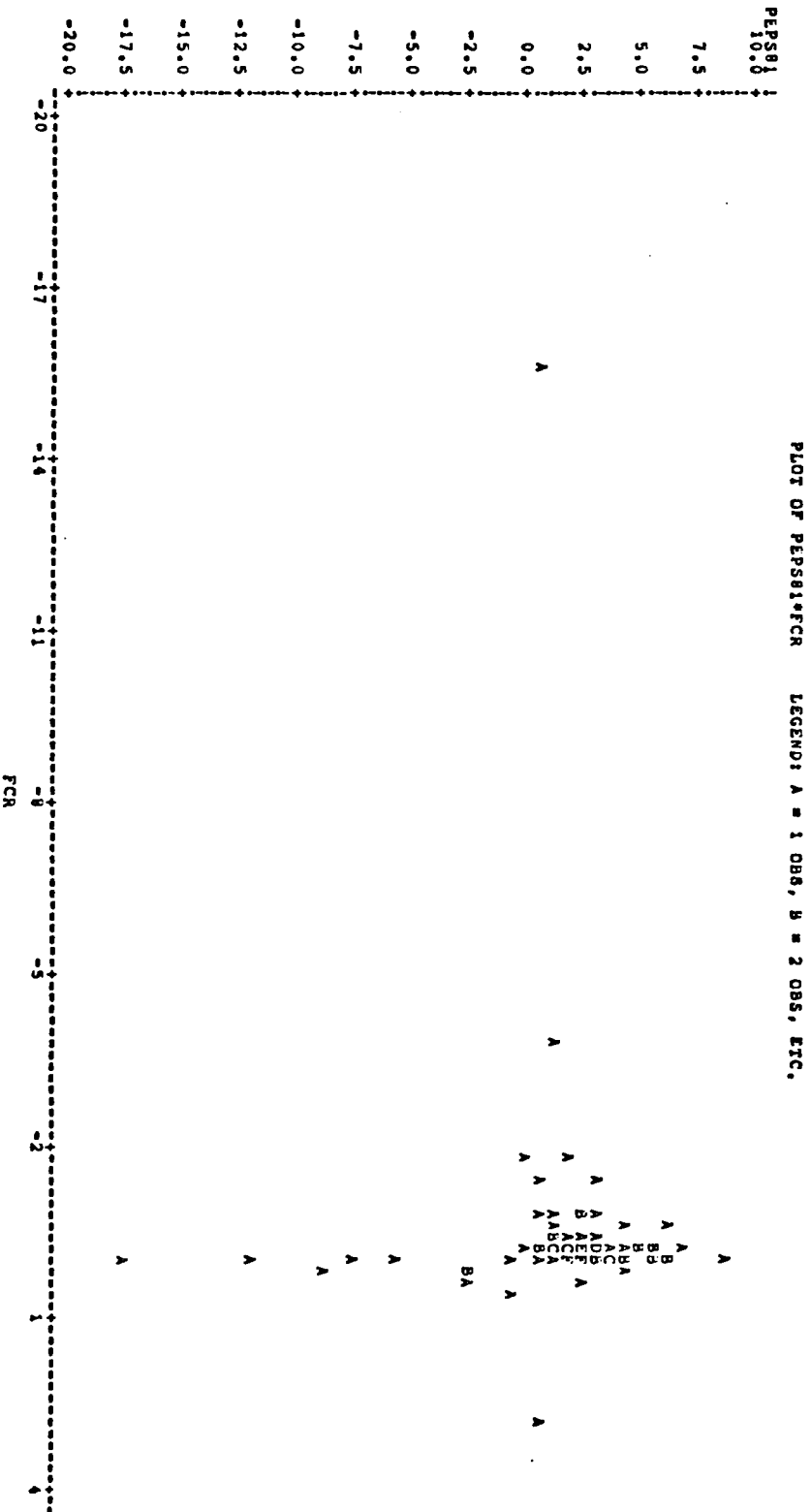


Exhibit 4.M
 Scatterplot - 1981 PEPS to FCR
 Non-change Group

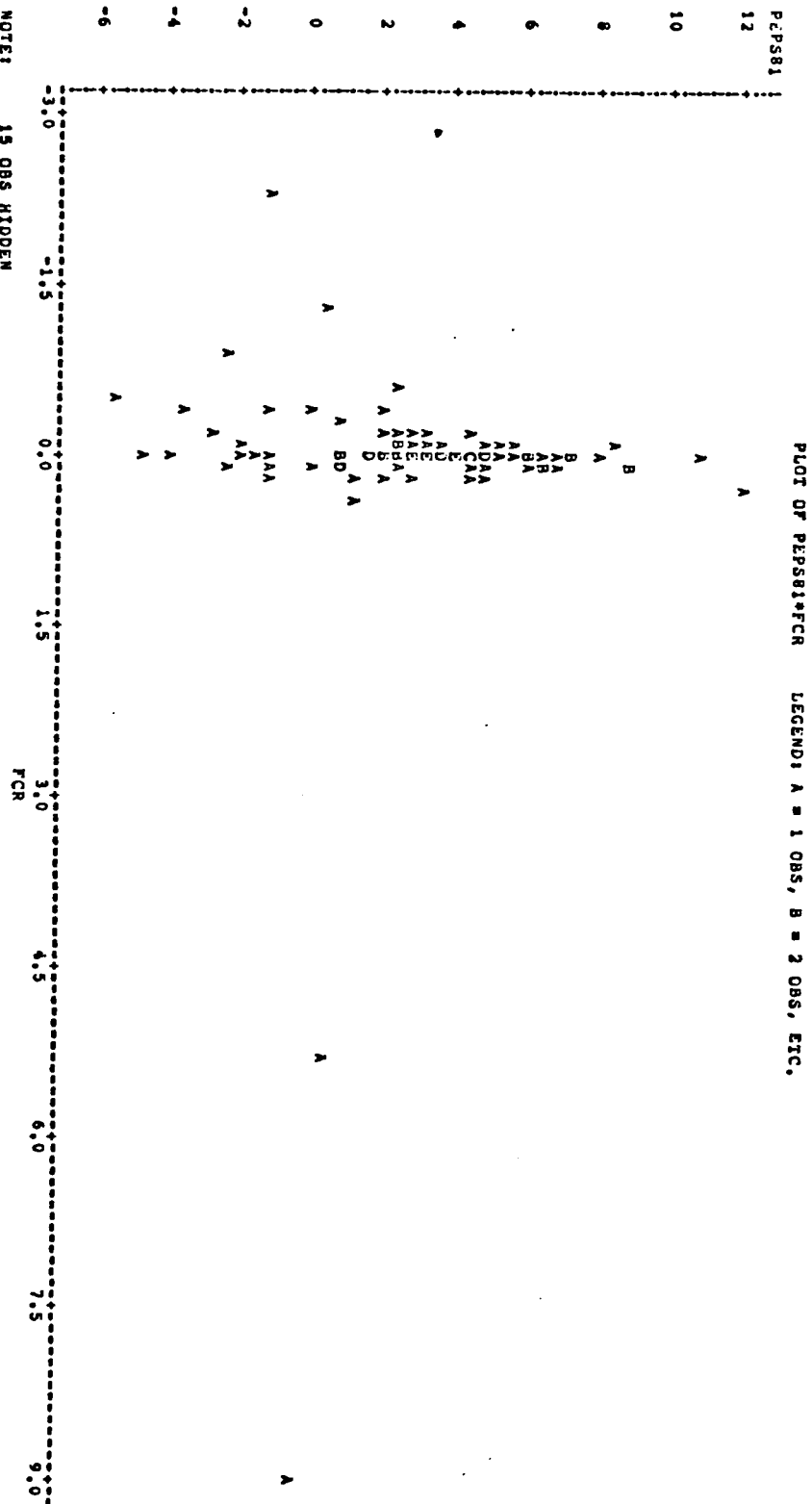


Exhibit 4.N
 Scatterplot - FC81 to FC80
 Change Group

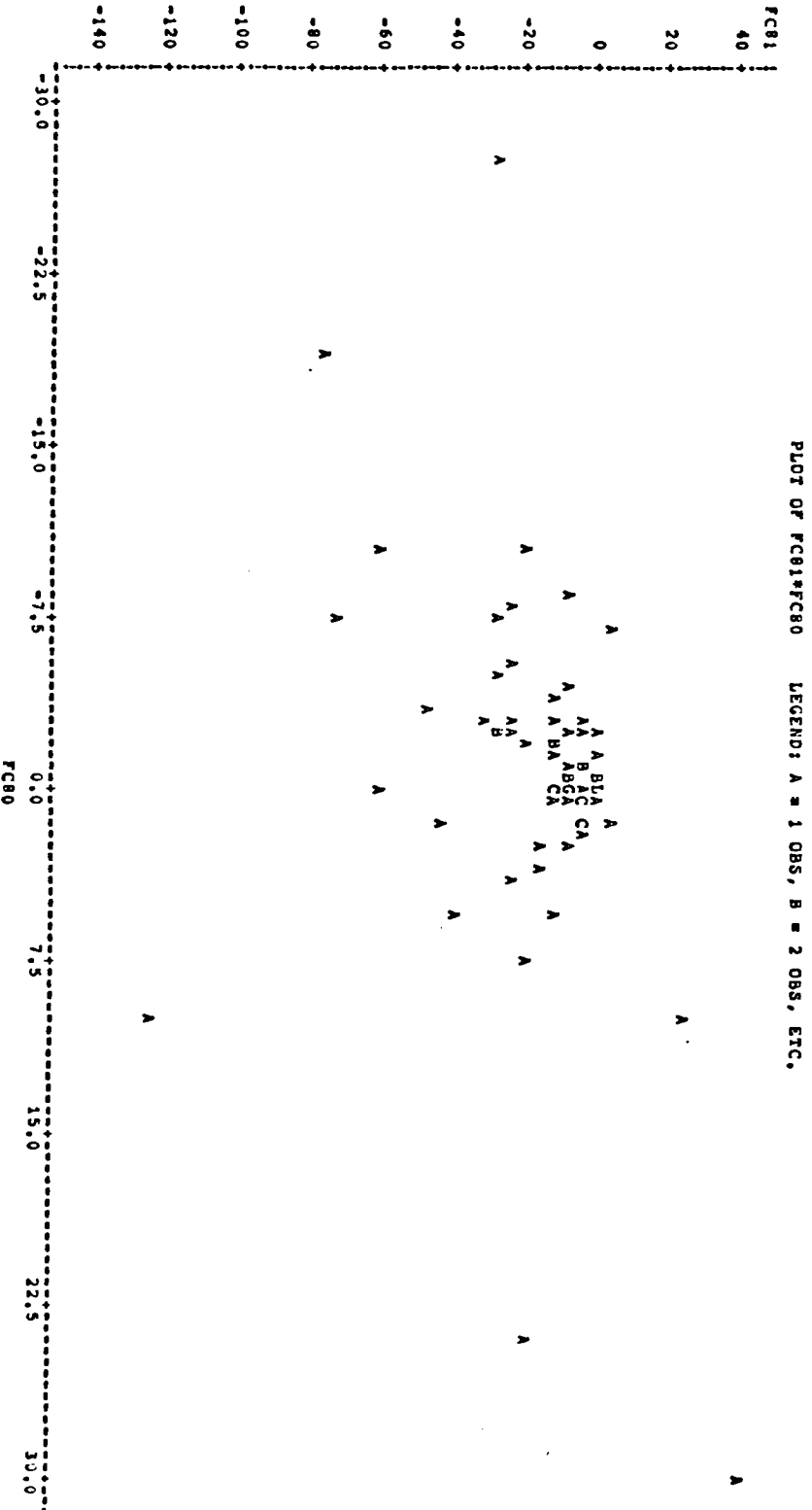
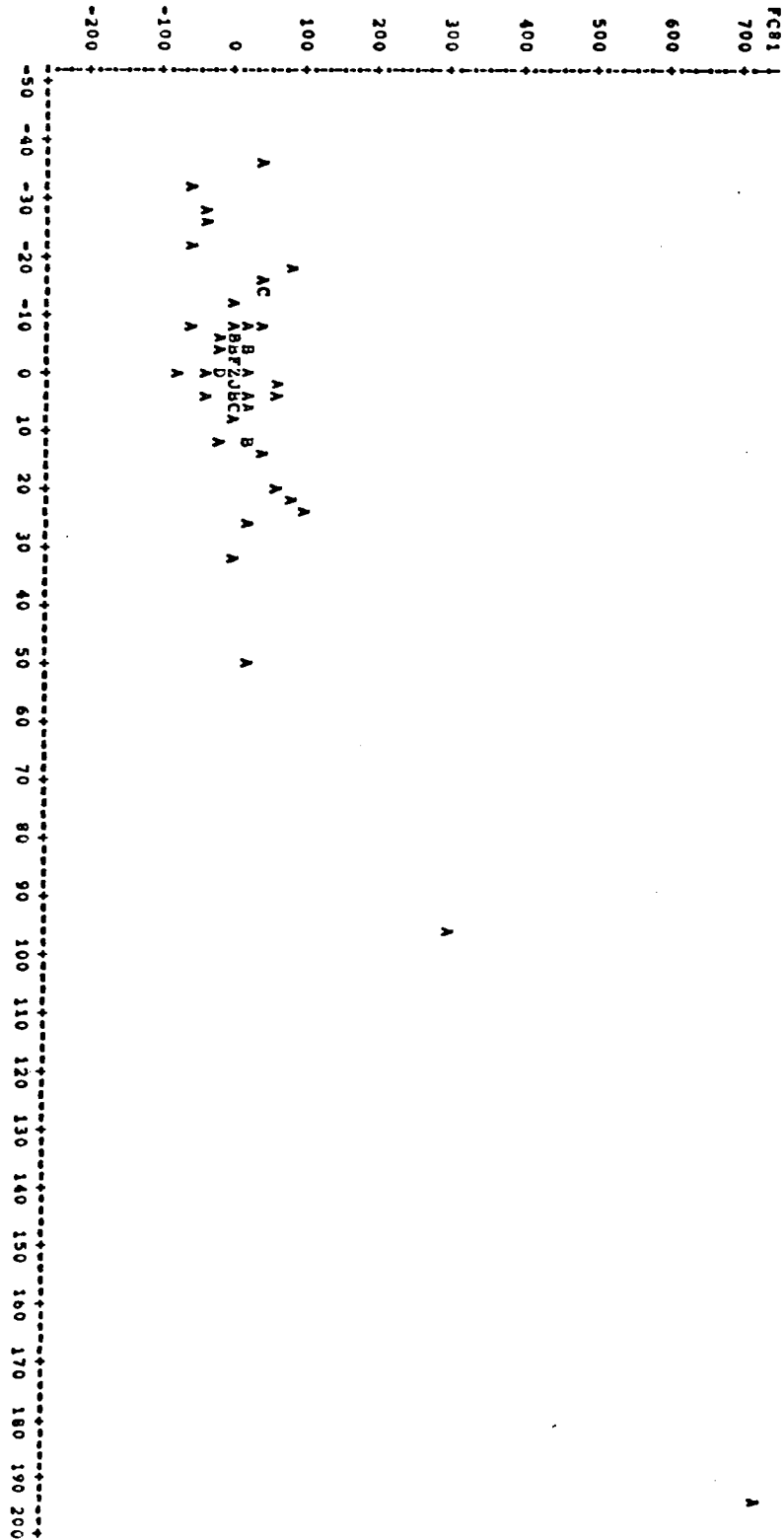


Exhibit 4.0
 Scatterplot - FC81 to FC80
 Non-change Group

PLOT OF FC81*FC80 LEGEND: A = 1 OBS, B = 2 OBS, ETC.



Chapter V

VOLATILITY OF EARNINGS

Robert E. Mays, former member of the FASB and the sole dissenter to the passage of SFAS 8, expressed a fear that was later resounded by financial journalists. He stated ". . . the use of the temporal method with the immediate recognition of the resulting exchange differences as gains and losses will, in the present environment of fluctuating exchange rates, cause erratic changes in the reported results of companies with significant foreign operations, especially for interim periods."⁶⁵

There are two major reasons why financial managers would consider volatility of reported earnings caused by accounting methods to be undesirable. One reason deals with the problem that investors cannot distinguish between variability occasioned by economic conditions and variability resulting from the application of accounting principles. Managers could perceive this as affecting their performance evaluation by the stockholders and the Board of Directors. Another reason is that management compensation is often contractually related to reported

⁶⁵Op. cit., SFAS 8, p. 17.

income. Thus, if earnings fluctuate, management compensation fluctuates accordingly. Either reason could be a motive for attempts to smooth income or to disclose as high profits as possible within the framework of generally accepted accounting principles.

This chapter compares between the two groups of corporations (the "early adoptees" and the non-early adoptees" of SFAS 52) the volatility in earnings that occurred during the five year period that SFAS 8 was in effect. The purpose of this comparison is to determine whether the volatility in earnings was a factor in the decision to adopt SFAS 52 before the mandatory date.

Literature Review

Prior income-smoothing studies were examined to facilitate the selection of a variable and model for measuring volatility. Imhoff reviewed previous empirical research on income smoothing and examined differences in its definition and measurement.⁶⁶ He found that conclusions often depend on the model and variable used to assess smoothing; that is, using alternative models or variables could change results. The two basic models used by Imhoff were the coefficient of variation (CV), which is the mean divided by the standard deviation, and a linear growth model. He discovered that earnings per share (EPS) were less volatile than most other income-smoothing targets.

⁶⁶Eugene A. Imhoff, Jr., "Income Smoothing: An Analysis of Critical Issues," Quarterly Review of Economics and Business, Autumn 1981, pp. 23-42.

Strickland used a sample of bankrupt and non-bankrupt firms to investigate whether or not firms used discretionary accounting changes for the purpose of income smoothing.⁶⁷ Although income adjustments were found to be prevalent, it could not be shown that this was the primary motivation for the change.

Laverdiere used two discretionary costs, advertising and research and development, to determine if firms in high-perceived-uncertainty and low-perceived-uncertainty environments incurred these costs differently.⁶⁸ He concluded that, although the results for the low-uncertainty firms were mixed, high-uncertainty firms did not appear to use these costs to smooth income. Buchanan looked at 52 oil and gas firms for the period 1969 through 1978 and found that approximately one-half of the successful-effort and one-third of the full-cost firms apparently engaged in income-smoothing behavior.⁶⁹ He further concluded that most successful-effort firms used real, rather than artificial, means to smooth income.

Koch, using EPS to measure income-smoothing, conducted a laboratory experiment and found that the degree of trade-off (cost), the type of smoothing variable, and the degree of managerial control affected

⁶⁷ Sherre Geane Strickland, Discretionary Accounting Changes in Relation to Income Smoothing, Firm Characteristics and Bankruptcy Prediction Models, Texas A & M University, Dissertation, 1981.

⁶⁸ Raymond Gilbert Laverdiere, An Empirical Study of the Environment Impact on Income Smoothing, The Pennsylvania State University, Dissertation, 1982.

⁶⁹ Phillip G. Buchanan, Income Smoothing Under Successful Efforts and Full Cost Methods in the Oil and Gas Industry, Temple University, Dissertation, 1983.

smoothing behavior.⁷⁰ Givoly and Ronen examined the volatility of the first three quarters' EPS and found managers employed income-smoothing behavior in firms with extreme deviations from the trend line during the period.⁷¹

Ronen and Sadan analytically examined issues involved in income-smoothing and reviewed previous studies on the topic.⁷² They also concluded that managers attempt to keep reported earnings close to a trend line.

Kross, Chapman, and Strand investigated differences between primary and fully diluted earnings per share by comparing the correlation of the variability of the two numbers with the market assessment of risk (beta).⁷³ They used the coefficient of variation to measure variability. Barefield and Comiskey used the mean square error of earnings above the linear trend line, standardized by dividing the average earnings over the time period considered, to measure earnings variability.⁷⁴ This measure is similar to the coefficient of variation.

⁷⁰Bruce S. Koch, "Income Smoothing: An Experiment," The Accounting Review, July 1981, pp. 574-586.

⁷¹D. Givoly and J. Ronen, "Smoothing Manifestations in Fourth Quarter Results of Operations: Some Empirical Evidence," ABACUS, 1981, pp. 174-193.

⁷²Joshua Ronen and Simcha Sadan, Smoothing Income Numbers - Objectives, Means and Implications, New York: Addison-Wesley Publishing Company, 1981.

⁷³William Kross, Gordon Chapman, and Kenneth Strand, "Fully Diluted Earnings Per Share and Security Returns: Some Additional Evidence," Journal of Accounting, Auditing and Finance, Fall 1980, pp. 36-56.

⁷⁴R. M. Barefield and E. E. Comiskey, "The Smoothing Hypothesis: An Alternative Test," The Accounting Review, April 1972, pp. 291-298.

This study uses only one variable, primary earnings per share (EPS), but three different models for measuring volatility. EPS was selected because Imhoff found in his review of previous income smoothing studies that EPS results in less volatile measures. Consequently, the results of this study would be even more convincing if an EPS analysis revealed significant volatility.

Primary EPS (PEPS) were chosen for availability reasons. All companies listed on the COMPUSTAT tapes show PEPS whereas less than half show fully diluted EPS.

The models used for measuring volatility were: a directional change model, the correlation coefficient, and the coefficient of variation.

Statistical Tests

The null hypothesis to be tested was: There is no difference between the two groups in the volatility in earnings during the period beginning 1976 and ending 1980.

Three measures were used to address the question of whether companies are adopting early in order to decrease their volatility in earnings. The purpose of the first measure is to isolate variability caused by directional changes in PEPS.

$$C_{it} = \frac{\text{Sum of the Absolute Change in PEPS}}{\text{Maximum PEPS less Minimum PEPS}} \quad (6)$$

where C_{it} represents the fluctuations in PEPS for firm i over time t . Each of the variables in the formula is for the period beginning January 1, 1976 and ending December 31, 1980. It has a range of:

$$1 < C_{it} < N-1$$

where N is the number of periods observed.

If the variability is attributable to a trend or if the annual changes in PEPS go in the same direction for all four time spans, C_{it} will be 1. However, if the annual changes go in different directions, C_{it} will be greater than 1. The maximum value for C_{it} is $N-1$ or, for this study, 4.

The primary limitation of this method is that C_{it} will be 1 if changes are in the same direction, regardless of the size of the change. Thus, very erratic changes cannot be detected if they do not change direction. It is likely that the inclusion of foreign currency translation gains and losses in income could cause strong trend changes.

A second measure of volatility is the correlation of PEPS over time for the five-year period, 1976-1980. Correlation, mathematically defined in equation 2, measures how well two variables move together and therefore should detect erratic deviations from the trend line. It has a range of $-1 < r < +1$.

The final measure is the coefficient of variation (CV) for PEPS from 1976 to 1980. Although this measure has some severe limitations when used with both positive and negative numbers, it has been used in previous income-smoothing studies (Imhoff,⁷⁵ Strickland⁷⁶, Laverdiere⁷⁷, among others) because it is purported to standardize and measure total variability.

⁷⁵Op. cit., Imhoff.

⁷⁶Op. cit., Strickland.

⁷⁷Op. cit., Laverdiere.

The equation is:

$$CV = \frac{\text{Standard Deviation of PEPS (1976-1980)}}{\text{Average PEPS (1976-1980)}} \quad (7)$$

All three measures were compared using the t-test and its nonparametric version, the Wilcoxon Rank Sum test. These are mathematically defined in equations one and three.

Results

The C_{it} Measure

The C_{it} value does not indicate differences between the two groups although the number is slightly higher for the change group (1.39435512 versus 1.34121718) as shown in Table 5.1 (all Tables and Exhibits for this chapter are listed at the end of the chapter in APPENDIX B). A comparison of Tables 5.1 and 5.2 reveals that the null hypothesis could not be rejected at the .05 level of significance using either the t-test or the Wilcoxon Rank Sum test. The p-value for the t-test is 0.3494, and the p-value for the Wilcoxon is 0.5304.

The Kolomogorov D statistic, a measure of normality, indicates that neither group is from a normally distributed population at the .01 level of significance, possibly explaining the difference in p-value for the two tests.

A visual comparison of the stem and leaf plots (Exhibit 5.A) of the two groups shows similar distributions. A heavy concentration of observations around 1 is shown for both groups, indicating that many companies had little or no directional change in earnings. The box plot for the change group demonstrates a rather normal distribution with a

few outliers. On the other hand, the box plot for the non-change group indicates a skewed distribution. Some of the deviation between visuals of the groups may be attributable to the scaling factor.

The Correlation Coefficient Measure

As shown in Table 5.1, differences in the correlation coefficient (r) also could not be detected. Although correlation was stronger for the non-change group (0.56148373 as opposed to 0.47247797), indicating less variability around the trend line, the null hypothesis of no difference could not be rejected at the .05 level of significance.

Table 5.1 shows the p-value for the t-test as 0.2930, and Table 5.2 gives the p-value for the Wilcoxon test as 0.3559. Consequently, there is very little difference in the results of the parametric and nonparametric tests even though the Kolomogorov test indicates that neither group is from a normally distributed population.

The visuals (Exhibit 5.B) show interesting and very similar distributions for both groups of companies. One-fourth of the companies in both groups had correlations greater than 0.96, indicating that most of the observations were very close to the trend line. The median correlation for the change group was 0.788, whereas the median for the non-change group was slightly higher at 0.819. Overall, the visuals reinforce the test results that indicate no difference in variability between the two groups of firms.

The CV Measure

The mean coefficient of variation (CV) for the change group is 0.18225225, whereas the CV for the non-change group is higher at

0.42894623, indicating more variability in earnings for the non-change companies (Table 5.1). Although there are differences between the two groups at the .0109 level of significance (t observed = -2.5716), the variability is surprisingly greater in the non-change group. The Wilcoxon Rank Sum test also indicates that variability is higher for the non-change group at the .0012 level of significance (Table 5.2).

The test results are not only counter-intuitive, they are contrary to the other test results in the study. The problem could be the measuring instrument itself. The standard deviation measures the dispersion of observations around the mean. If two groups have similar distribution patterns but higher averages, one would expect the distribution with the higher mean to have a larger standard deviation. The CV attempts to "standardize" the measure of dispersion by dividing the standard deviation by the mean, thereby making the measure of dispersion for the two groups comparable regardless of location.

A confounding factor is introduced when the distribution is comprised of both positive and negative numbers. Averaging positive and negative numbers has a tendency to move the mean toward zero. Of course, the closer the mean moves toward zero, the higher the CV. It is possible for this measure to move toward infinity.

Net income and therefore earnings per share can be either positive or negative. Many of the companies in both groups had negative earnings per share. It is impossible to determine from a simple comparison of the CV whether the two distributions are different. To overcome this limitation, t -tests were run on the mean (AVG) PEPS numbers and the standard deviations (SD) which were used to compute the coefficient of variation. As demonstrated by Exhibit 5.C, the mean PEPS numbers for

the two groups are about the same. The change group had a slightly lower mean (3.53771) than the non-change group (3.84698). As demonstrated by the box plots, one extreme outlier existed in the non-change group, but the variance of the mean is decreased accordingly. The removal of this observation results in a new mean of 3.98633, which is higher than the mean for the complete sample. The stem and leaf plots show several observations in both groups around zero. This will result in high positive or negative CV values.

The difference in the CV, however, seems to be primarily attributable to a larger standard deviation for the non-change group. The mean standard deviation for the this group is 1.54393, while the mean standard deviation for the adopt-early group is .902458 (Exhibit 5.D). A comparison of the stem and leaf and box plots for the two groups shows four extreme outliers for the non-change group and two for the adopt-early group. The variance of the standard deviation variables is much higher for the non-change group (3.30377 as opposed to 0.465624), as can be seen in Exhibit 5.D.

An examination of the bar graph and box plot for the CV of the change group (Exhibit 5.E) shows a tight distribution around the mean of 0.182252 with one extreme outlier. The bar graph and box plot for the non-change group also shows a heavy concentration around the mean of 0.428946 with two extreme outliers. After removing the outliers, a t-test was run on the reduced samples. Although the means did move closer together, (i.e., 0.25302044 for the change group and 0.35813653 for the non-change group), test results still indicate that the two groups are different at the 0.0159 level of significance (Table 5.1).

Further manipulation of the data may eliminate any differences between the groups; however, the results would be questionable at best.

The Kolomogorov test indicates that neither distribution is from a normally distributed population at the .01 level of significance (Exhibit 5.E). Although nonparametric tests are not normally sensitive to outliers, the presence of outliers could shift the location of the mean, possibly confounding the results. The nonparametric test rejected more strongly the null hypothesis that the two groups are alike than did the parametric test with a Z value of -3.2357 and a p-value of 0.0012 (Table 5.2).

Because the difference in the CV between the two groups is attributable to the standard deviation rather than the mean, it seems appropriate to conclude that the non-change group had greater variability in reported primary earnings per share during the five-year period preceding the calendar year 1981. On the other hand, if the CV is a defective measure of variability, the validity of any test results would be questionable.

Conclusion

Test results of the three different measures of volatility are mixed. Two measures, the C_{it} and the correlation coefficient, indicate no difference in volatility of earnings between the two groups, and the third measure, CV, does not indicate that the volatility in earnings was greater for the group that adopted early. Therefore, the overall conclusion is that companies did not elect to adopt SFAS 52 before the mandatory date in order to eliminate a volatility-in-earnings trend.

Limitations

Companies may want to smooth income in the long run; however, this may be less important than the opportunity for a short run increase. SFAS 52 is mandatory for fiscal years beginning on or after December 15, 1982. Therefore, the long-run effect of rescinding SFAS 8 is assured. Would a rational manager forego a short-run benefit (an increase in net income caused by the inclusion of a translation gain) to voluntarily adopt an accounting standard that will be mandatory in two years? The short-term benefit may take precedence over the long-term effect in the decision-making process, especially if executive compensation can be increased in the short run without compensating decreases in future years.

APPENDIX B

Table 5.1

T-Test on Volatility of Earnings

Variable	A-mean	N-mean	tobs	p-value
CIT	1.39435512	1.34121718	0.9381	0.3494
CORR	0.47247797	0.56148373	-1.0545	0.2930
CV complete	0.18225225	0.42894623	-2.5716	0.0109
CV reduced	0.25302044	0.35813653	-2.4417	0.0159
MEAN	3.53771	3.84698		
SD	0.902458	1.81763		

Table 5.2

Wilcoxon Test on Volatility of Earnings

Variable	A-mean	N-mean	Zobs	p-value
CIT	96.23	91.30	0.6273	0.5304
CORR	89.43	96.78	-0.9233	0.3559
CV	79.27	104.97	-3.2357	0.0012

Exhibit 5.A

Stem and Leaf Plots
CIT Measure

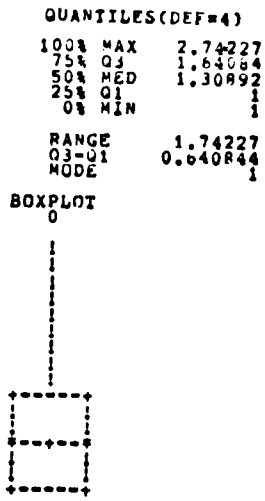
Change Group

VARIABLE=CIT

MOMENTS		QUANTILES(DEF=4)	
N	83	SUM WGTs	83
MEAN	1.39436	SUM	115.731
STD DEV	0.41199	VARIANCE	0.17489
SKEWNESS	1.1555	KURTOSIS	1.02513
USS	175.712	CSS	14.341
CV	29.9923	STD MEAN	0.0459033
T:MEAN=0	30.3759	PROB>T:	0.0001
SGN RANK	1743	PROB>ISI	0.0001
NUM ^= 0	83		
D:NORMAL	0.172844	PROB>D	<0.01

STEM	LEAF	#
27	4	1
26		
25	69	2
24		
23	2	1
22		
21	0	
20	02	1
19	0145	4
18	1479	4
17	045	3
16	03456	5
15	33899	5
14	14668	5
13	1345679	5
12	03367	5
11	0133367	5
10	00000000000000000000000000277889	29
9		

MULTIPLY STEM.LEAF BY 10**=01



Non-change Group

VARIABLE=CIT

MOMENTS		QUANTILES(DEF=4)	
N	103	SUM WGTs	103
MEAN	1.34122	SUM	138.145
STD DEV	0.354188	VARIANCE	0.125421
SKEWNESS	0.578276	KURTOSIS	-1.12728
USS	198.076	CSS	12.7929
CV	26.4049	STD MEAN	0.0348952
T:MEAN=0	38.4356	PROB>T:	0.0001
SGN RANK	2678	PROB>ISI	0.0001
NUM ^= 0	103		
D:NORMAL	0.181568	PROB>D	<0.01

STEM	LEAF	#
21		1
20		
20	1	1
19	679	5
19	00244	5
18	899	5
18	023	3
17	5699	5
17	133	3
16	67989	5
16	33	2
15	555	3
15	12	1
14	77	2
14	02344	5
13	5	1
13	24	2
12	56689	5
12	11	1
11	569	3
11	0334	4
10	526	3
10	00011134	38
9		

MULTIPLY STEM.LEAF BY 10**=01

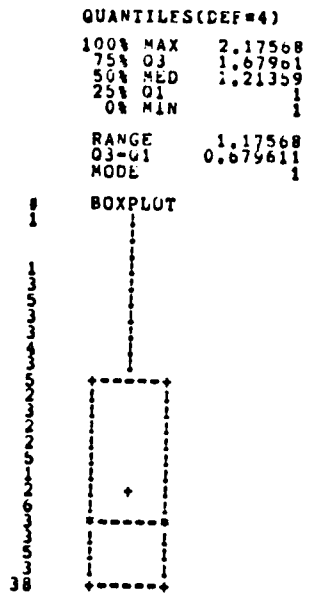


Exhibit 5.B

Stem and Leaf Plots and Box Plots
CORR Measure

Change Group

VARIABLE=CORR

MOMENTS		SUM WGTIS	
N	83	SUM	39.2157
MEAN	0.472478	VARIANCE	0.170359
STD DEV	0.608571	KURTOSIS	-0.506609
SKEWNESS	-0.999977	CSS	30.3694
USS	48.898	STD MEAN	0.0667994
CV	1.28.804	PROP>T1	0.0001
T:MEAN=0	7.07309	PROP>I1	0.0001
SGN RANK	1296	PROB>D	<0.01
NUM = 0	83		
D:NORMAL	0.232348		

STEM	LEAF	
10	00000	5
9	3334445667778888999999	23
8	1223444567789	13
7	056789	6
6	01356	5
5		1
4	457	3
3	658	2
2	359	2
1	3	1
0		1
-1	70	2
-2	2	1
-3	06321	5
-4	42	2
-5	10	2
-6	8	1
-7	7720	4
-8	920	3

MULTIPLY STEM,LEAF BY 10**=01

QUANTILES(DEF=4)

100% MAX	0.997927
75% Q3	0.96037
50% MED	0.786012
25% Q1	0.0287847
0% MIN	-0.692884
RANGE	1.89081
Q3-Q1	0.932053
MODE	-0.692884

BOXPLOT



Non-change Group

VARIABLE=CORR

MOMENTS		SUM WGTIS	
N	103	SUM	57.6329
MEAN	0.561484	VARIANCE	0.292935
STD DEV	0.541234	KURTOSIS	0.596473
SKEWNESS	-1.31106	CSS	29.8793
USS	62.3515	STD MEAN	0.0533244
CV	96.3436	PROP>T1	0.0001
T:MEAN=0	10.5286	PROP>I1	0.0001
SGN RANK	2230	PROB>D	<0.01
NUM = 0	103		
D:NORMAL	0.209083		

STEM	LEAF	
10	000000000	8
9	011223333334555666677788889999999	37
8	1237788	7
7	01144799	9
6	1147	4
5	6678	4
4	79	2
3	2689	4
2	1137	4
1	3388	5
0	59	2
-1	8	1
-2	52	2
-3	1	1
-4	75	2
-5		2
-6	8761	4
-7	9	1
-8	20	2
-9	874	3

MULTIPLY STEM,LEAF BY 10**=01

QUANTILES(DEF=4)

100% MAX	0.999664
75% Q3	0.964356
50% MED	0.616601
25% Q1	0.228328
0% MIN	-0.682921
RANGE	1.88258
Q3-Q1	0.73627
MODE	-0.682921

BOXPLOT

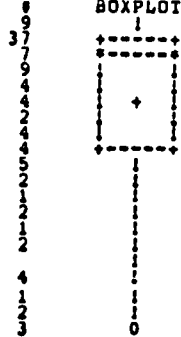
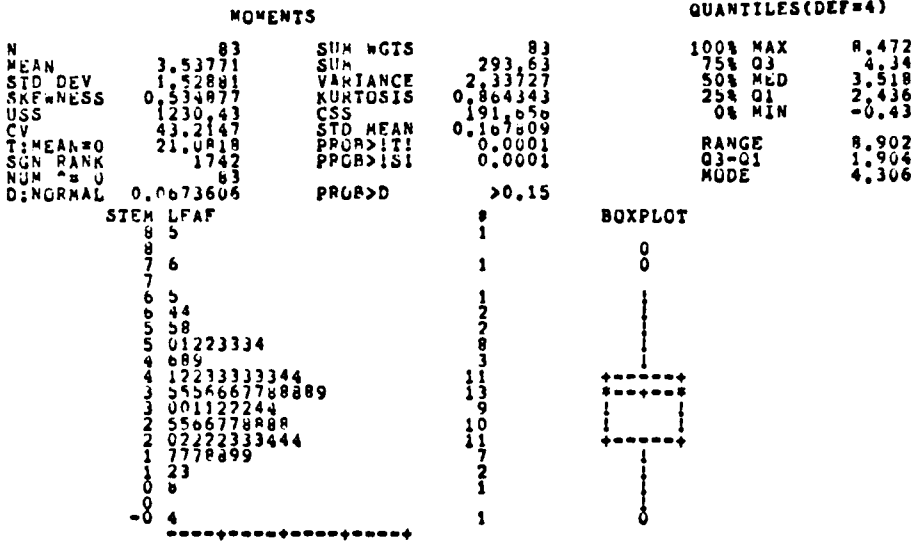


Exhibit 5.C

Stem and Leaf Plots and Box Plots
AVG Variable

Change Group:

VARIABLE=AVG



Non-change Group:

VARIABLE=AVG

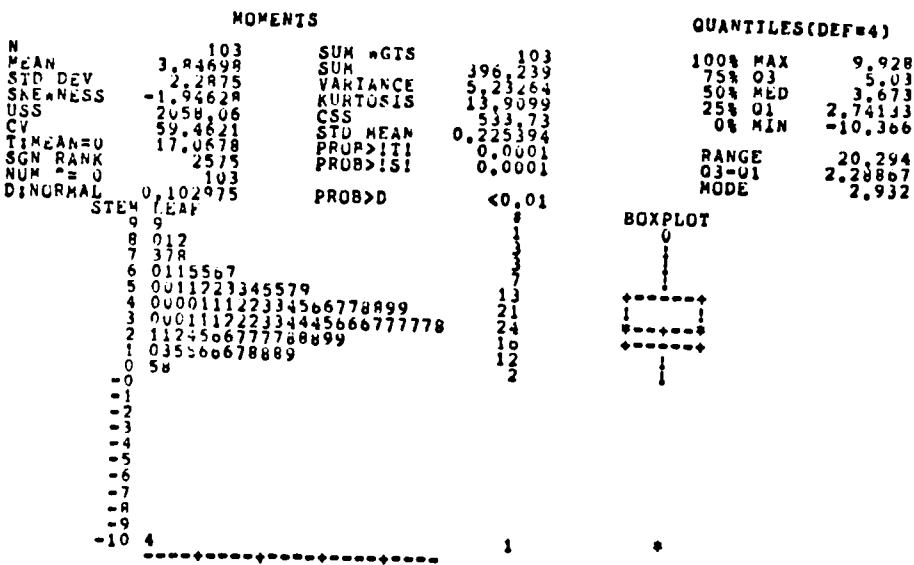
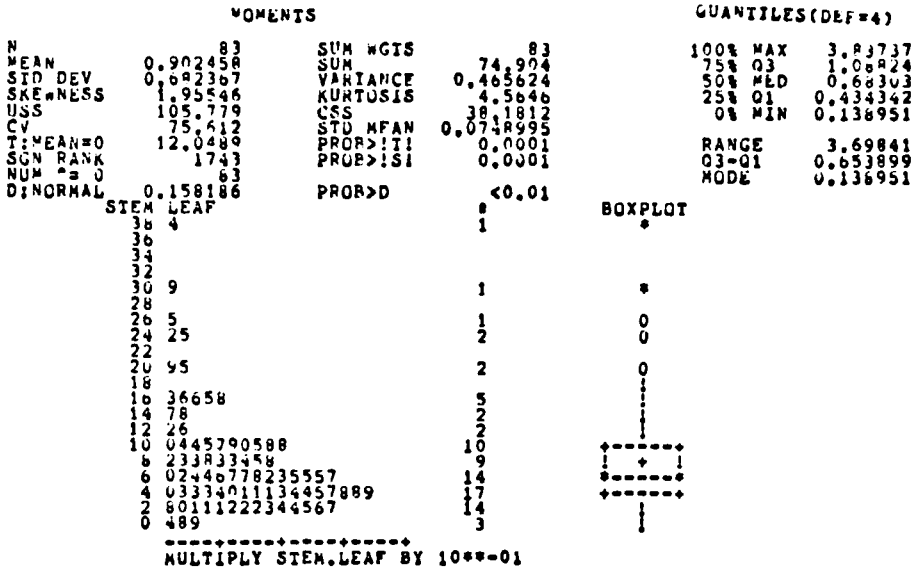


Exhibit 5.D

Stem and Leaf Plots and Box Plots
SD Variable

Change Group

VARIABLE=SD



Non-change Group

VARIABLE=SD

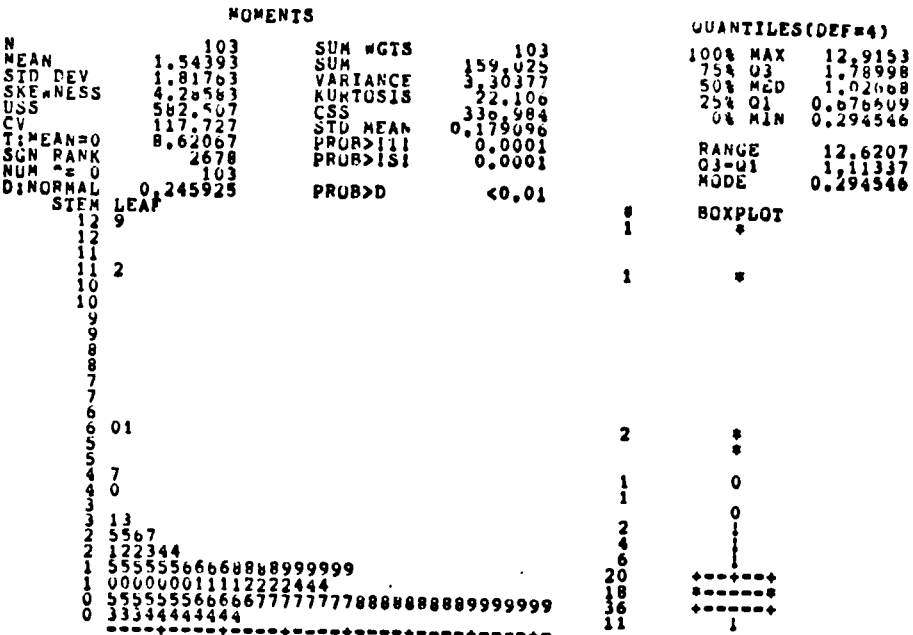
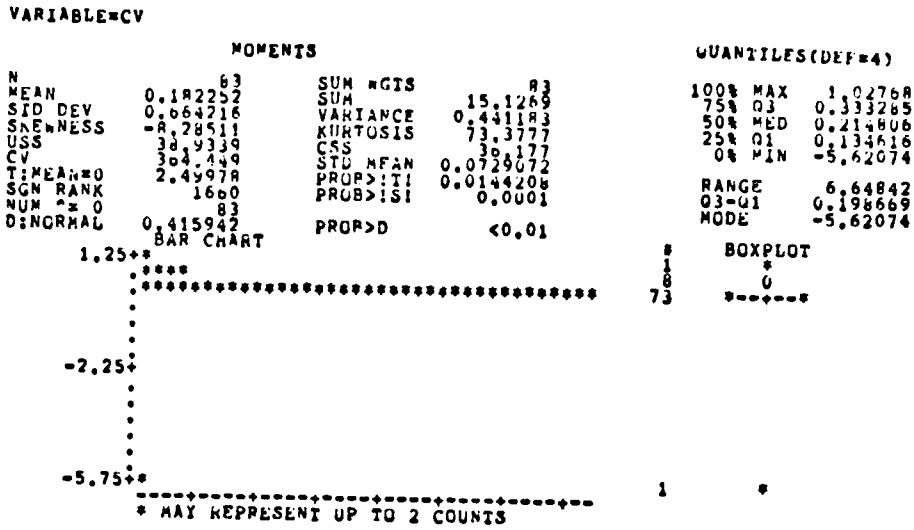


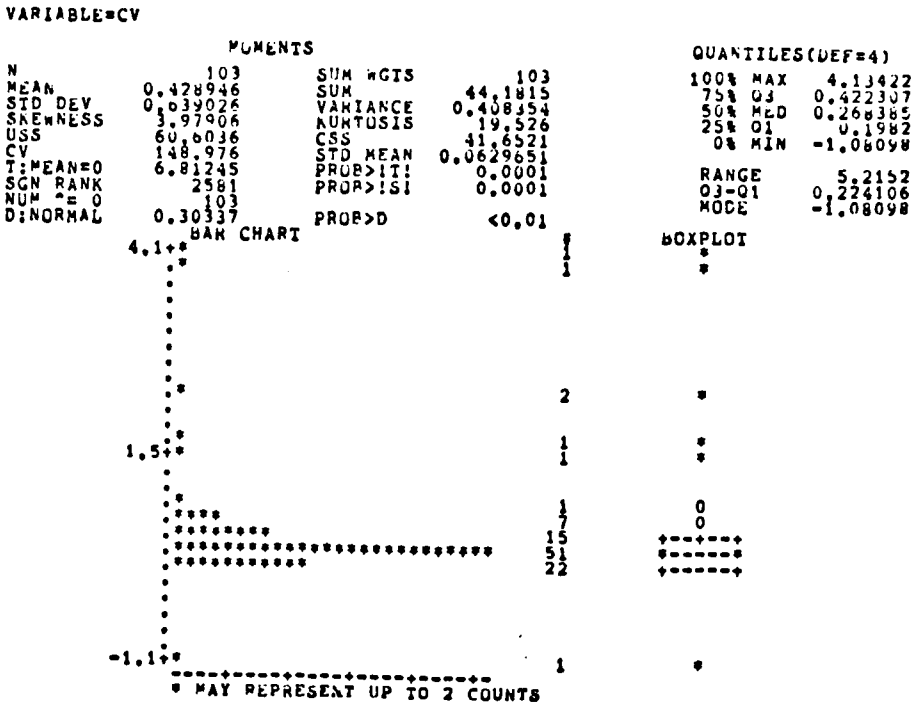
Exhibit 5.E

Stem and Leaf Plots and Box Plots
CV Measure

Change Group



Non-change Group



Chapter VI

MARKET STUDY

The semi-strong form of the efficient market hypothesis (EMH) says the market instantaneously reacts to all publicly available information. Information is generally defined as any revelation or disclosure that changes expectations. Thus, security price changes suggest new information has been released. That information can be broadly based and can affect the market as a whole, or it can be firm specific.

When specific multinational enterprises elected to adopt SFAS 52 before the mandatory date, they typically increased their annual reported profits as discussed in Chapter IV. Since SFAS 52 was a highly publicized standard, the market should have known the effect of the change in standards on net income. In addition, the foreign currency translation losses that were included in third quarter earnings determined according to SFAS 8, but excluded according to SFAS 52 in the computation of annual earnings, were required disclosures in the annual reports. One should not expect an efficient market to interpret the increase in earnings attributable to the exclusion of these losses as improved performance. Thus an efficient market should not react to the change from SFAS 8 to SFAS 52.

If companies are able to influence market behavior through the selection of an accounting standard, the accounting profession should be aware of the effect of accounting principles on investor behavior. The

purpose of this phase of the study is to determine whether the market reacted favorably to an increase in reported profits caused by a change in accounting standards -- specifically, the change from SFAS 8 to SFAS 52.

Literature Review

Accounting Change EMH Studies

Numerous studies have investigated the effects of accounting changes on security returns. Archibald examined accounting changes by looking at companies that switched back to previous depreciation methods.⁷⁸ His findings were consistent with the hypothesis that management may resort to accounting changes to improve reported profits. In a follow-up study, Archibald examined the market reaction to the depreciation switch-back and concluded there was no immediate substantial effect on stock market performance.⁷⁹ Kaplan and Roll also concluded the market recognized when changes in income were solely attributable to accounting changes.⁸⁰

⁷⁸T. R. Archibald, "The Return to Straight-Line Depreciation: An Analysis of a Change in Accounting Methods," Empirical Research in Accounting: Selected Studies, 1967, Journal of Accounting Research, pp. 164-180.

⁷⁹T. R. Archibald, "Stock Market Reactions to the Switch-Back," The Accounting Review, January 1972, pp. 22-30.

⁸⁰Robert Kaplan and R. Roll, "Investor Evaluation of Accounting Information: Some Empirical Evidence," Journal of Business, April 1972, pp. 225-257.

Ball and Brown found a relationship between unexpected earnings and residual stock returns.⁸¹ They also determined most reactions occurred prior to the earnings announcement. Ball examined 430 companies that changed accounting techniques from 1947 to 1960 and found the market was able to distinguish between income fluctuations caused by changes in accounting techniques and those resulting from economic factors.⁸² He also investigated the smoothing hypothesis, which states firms will select accounting techniques that allow them to shift income from prosperous periods to lean periods. However, the results of his smoothing test were inconclusive.

Sunder examined the market reaction to firms that changed their inventory accounting methods between 1946 and 1966.⁸³ He found no evidence to indicate a reduction in earnings caused by the last-in-first-out (LIFO) switch caused a negative security price reaction.

Abdel-khalik and McKeown examined companies that switched to LIFO and found the market reaction to the change differed depending upon the

⁸¹Ray Ball and Philip Brown, "An Empirical Evaluation of Accounting Income Numbers," Journal of Accounting Research, Autumn 1968, pp. 159-178.

⁸²R. J. Ball, "Changes in Accounting Techniques and Stock Prices," Empirical Research in Accounting: Selected Studies, Journal of Accounting Research, 1972, pp. 159-178.

⁸³S. Sunder, "Relationship Between Accounting Changes and Stock Prices: Problems of Measurement and Some Empirical Evidence," Empirical Research in Accounting: Selected Studies, 1973, Journal of Accounting Research, pp. 1-45.

sign of the expected growth in EPS.⁸⁴ They concluded investors were not reacting solely to the LIFO adoptions but to the interaction of the sign of the difference in EPS and the decision to adopt LIFO. Thus, they concluded different market reactions could result from the same accounting event. Biddle and Lindahl point out Abdel-khalik and McKeown may have misclassified some of their sample firms because of timing problems;⁸⁵ that is, some of the EPS forecasts may have included the effect of the LIFO announcement if the forecast was made close to the date of the announcement, thereby confounding the results.

Murray examined the effect of accounting changes on security price behavior by examining LIFO adoptions, changes in response to SFAS 13, and changes in the flow-through method of accounting for the investment tax credit.⁸⁶ Although the LIFO changes were found to contain some information content, the other two changes were found to have none. In other words, the LIFO change had some real effect whereas the other two changes were artificial.

Brown examined the relationship between the switch to LIFO and short-term movement in security prices by looking at residuals twenty

⁸⁴A. R. Abdel-khalik and J. C. McKeown, "Understanding Accounting Changes in an Efficient Market: Evidence of Differential Reaction," The Accounting Review, October 1978, pp. 851-868.

⁸⁵G. C. Biddle and F. W. Lindahl, "Stock Price Reactions to LIFO Adoptions: The Association Between Excess Returns and LIFO Tax Savings," Journal of Accounting Research, Autumn 1982, pp. 551-586.

⁸⁶Dennis Francis Murray, Differential Market Reactions to Selected Accounting Changes, Universtiy of Massachusetts, Dissertation, 1981.

weeks prior to and ten weeks after the announcement date.⁸⁷ He concluded that short-term reactions are present but temporary. Brown did not control for unexpected earnings performance which may affect differences between change and non-change firms; therefore, his results should be interpreted cautiously.

Ricks, using changes in EPS, matched LIFO-change and non-change companies during the 1974-1975 period to control for the earnings effect.⁸⁸ He found change companies exhibited relatively poorer stock price performance beginning six weeks prior to the preliminary announcement date and continuing until four weeks after. He concluded investors negatively reacted to the LIFO changes and therefore the earnings announcement did have information content.

Biddle and Lindahl examined LIFO adoptions from 1973 to 1980, a significantly longer time span than Ricks, and incorporated the magnitude of the tax savings into their study.⁸⁹ Also, they controlled for abnormal earnings performance by regressing the unexpected earnings on the residuals for the period of study. They argued Ricks' tests may have detected investor reaction to earnings announcements rather than LIFO adoptions; that is, even though Ricks used EPS to match firms, the change in "as if" earnings may have been stronger for one group than the

⁸⁷ Robert Moren Brown, "Short-Range Market Reactions to Changes in LIFO Accounting Using Preliminary Earnings Announcement Dates," Journal of Accounting Research, Spring 1980, pp. 38-63.

⁸⁸ William E. Ricks, "The Market's Response to the 1974 LIFO Adoptions," The Journal of Accounting Research, Autumn 1982, pp.367-87.

⁸⁹ Op. cit., Biddle and Lindahl.

other. The overall conclusion was that investor reactions to the change depend on the expected present value of tax-related cash-flow savings.

Several studies use time series models to assess market reactions to quarterly earnings announcements. Foster found a relationship between unexpected quarterly earnings and security price behavior using a time series model to control for seasonality in security price reactions to quarterly earnings announcements.⁹⁰

Bathke and Lorek used three time series models to investigate the relationship between quarterly earnings and residual stock returns.⁹¹ They found seasonal forecast models outperformed nonseasonal models, although fourth quarter results deviated from the expected, possibly due to the "dumping" effect that often occurs in the fourth quarter. They further concluded that "the information content of earnings appears to account for only about 15 percent of the total information conveyed to the market as of the announcement date." The full impact of the accounting change from SFAS 8 was reflected at the end of the fourth quarter of 1981 since SFAS 52 was not promulgated until December of that year.

Bremser investigated differences between 80 accounting-change companies and a sample of non-change companies occurring intermittently

⁹⁰George Foster, "Quarterly Accounting Data: Time Series Properties and Predictive Ability Results," The Accounting Review, January 1977, pp. 1-21.

⁹¹Allen W. Bathke, Jr. and Kenneth S. Lorek, "The Relationship Between Time-Series Models and the Security Market's Expectation of Quarterly Earnings," The Accounting Review, April 1984, pp. 163-176.

from 1965 to 1970.⁹² He found reported discretionary accounting changes were more likely to have a relatively poor EPS trend or a marginal ROI. Harrison examined companies making both discretionary and nondiscretionary changes.⁹³ He found stock price movement for both types of changes if the change increased net earnings, however, the movement was negative for discretionary change companies and positive for nondiscretionary change companies. This suggests the discretion available to management possesses information content.

Although 1981 compliance with SFAS 52 is a discretionary change in the short run, it is not a discretionary change in the long run since SFAS 52 is mandatory for years beginning on or after December 15, 1982. The LIFO accounting changes that occurred in 1974 and 1975 are similar to the SFAS 52 change in that many companies made a similar accounting change at the same point in time, thereby allowing researchers to control other extraneous variables. On the other hand, the LIFO changes are dissimilar in that they were entirely discretionary and have an economic effect resulting from the increased present value of future cash flows.

⁹²Wayne G. Bremser, "The Earnings Characteristics of Firms Reporting Discretionary Accounting Changes," The Accounting Review, July 1975, pp. 563-573.

⁹³Tom Harrison, "Different Market Reactions to Discretionary and Nondiscretionary Accounting Changes," Journal of Accounting Research, Spring 1977, pp. 84-107.

Other EMH Studies

A recent study by Lev and Ohlson reviews and summarizes previous market-based accounting research.⁹⁴ The authors state, "When the scope of inquiry is extended to include effects on management compensation and contractual arrangements, it appears that almost all accounting changes can have real effects." Prakash and Rappaport argued changes in accounting numbers may lead to dysfunctional behavior on the part of managers and creditors which, in turn, affects security returns.⁹⁵

Lewellen and Huntsman demonstrated management compensation is significantly correlated with a firm's profit rate.⁹⁶ Holthausen examined the relationship between the effect of a change in depreciation methods on employee compensation plans and security return behavior and the relationship between loan covenants and security returns.⁹⁷ He failed to find a relationship between management compensation plans and stock price changes. On the other hand, he did find the security prices of more highly leveraged firms did not perform as well as lower leveraged firms. Many loan covenants require firms to maintain certain minimum profitability ratios, based on reported income numbers. Any

⁹⁴Baruch Lev and James A. Ohlson, "Market-Based Empirical Research in Accounting: A Review, Interpretation, and Extension," Journal of Accounting Research, 1982, pp. 249-322.

⁹⁵Prem Prakash and Alfred Rappaport, "Information Interdependencies: System Structure Induced Accounting Information," The Accounting Review, October 1975, pp. 723-734.

⁹⁶Op. cit., Lewellen and Huntsman.

⁹⁷R. W. Holthausen, "Evidence on the Effect of Bond Covenants and Management Compensation Contracts on the Choice of Accounting Techniques," Journal of Accounting and Economics, March 1981, pp. 73-109.

accounting standard that affects reported profits can, in turn, affect a firm's debt to equity ratio if the debt has a covenant requiring the company to maintain a minimum profitability ratio. Thus, a firm's financial leverage can be indirectly affected by the inclusion or exclusion of amounts in net income. Financial managers of multinational enterprises may be forced to adopt a less than optimal foreign monetary asset to foreign liability ratio (financial exposure) to protect their domestic financial leverage.

Several empirical studies focused on the impact of SFAS 8 on corporate risk management. Evans, Folks, and Jilling concluded the impact on earnings caused by the inclusion of translation gains and losses in net income was the primary concern of most multinational companies.⁹⁸ Moreover, in 84 of the 156 companies in their study, corporate executives felt that translation gains and losses were confusing to investors. Another study surveyed corporate treasurers and concluded that the reporting of translation gains and losses affected management practices.⁹⁹ Cooper, Fraser and Richards¹⁰⁰ and Stanley and Block¹⁰¹ also indicated that SFAS 8 was influencing corporate practices. On the other hand, Mathur concluded that vice presidents of finance did

⁹⁸Op. cit., Evans, Folks, and Jilling.

⁹⁹Op. cit., Mathur and Loy.

¹⁰⁰Op. cit., Cooper, Fraser, and Richards.

¹⁰¹Marjorie T. Stanley and Stanley B. Block, "Accounting and Economic Aspects of SFAS 8," International Journal of Accounting Education and Research, Spring 1979, pp. 135-155.

not consider SFAS 8 important in management practices.¹⁰² Thus there seems to be some ambiguity about the effects of SFAS 8 on corporate practices.

Other studies (Dietman¹⁰³, Feskoe¹⁰⁴, Choi¹⁰⁵, and Smith¹⁰⁶) primarily addressed the problem of defining exposure and determining risk factors in coping with the effects of SFAS 8. These imply management considered compliance with the requirements of SFAS 8 in the preparation of financial statements to be a problem. This suggests management may have perceived that certain "agency costs" (costs arising from conflicts between interests of owners and managers) were resulting from the use of SFAS 8.

Four efficient market studies on SFAS 8 found this standard had no measurable effect on security return behavior, thus supporting the EMH. Dukes divided the multinational firms in his study into six portfolios, based on the accounting method used by the firm prior to SFAS 8.¹⁰⁷ The test results did not reveal any differences in returns between any of the multinational portfolios and their comparison control sample portfolio.

¹⁰²Ike Mathur, "Attitudes of Financial Executives Toward Foreign Exchange Issues," Financial Executive, October 1980, pp. 22-26.

¹⁰³Op. cit., Dietman.

¹⁰⁴Op. cit., Feskoe.

¹⁰⁵Op. cit., Choi.

¹⁰⁶Op. cit., Smith.

¹⁰⁷Roland E. Dukes, An Empirical Investigation of the Effects of Financial Accounting Standards Board Statement No. 8 on Security Return Behavior, Stamford, Connecticut:FASB, December 1978.

Jain investigated the effect of SFAS 8 on both security price behavior and the financial structure of multinationals.¹⁰⁸ Although the results indicated no significant effects on security returns, some effect on the financial structure of selected firms was detected.

Shank, Dillard and Murdock measured changes in systematic risk (beta) for the months surrounding the release of SFAS 8 and used this in measuring changes in return.¹⁰⁹ No changes in the rate of return for multinational companies were indicated after allowing for systematic risk.

Cheng used the Box and Jenkins univariate autoregressive integrated moving average (ARIMA) time series model to assess market reactions to the SFAS 8 standard setting process.¹¹⁰ He found reactions to two of the seven postulated intervention events, implying changes in accounting standards may affect wealth redistribution. A time series model would have been more cost beneficial for Cheng's study since it covers a longer continuous time period than most efficient market studies.

The market model, based on the work of Markowitz¹¹¹ and Sharpe¹¹² has been used to compute residuals. Many market studies have used the

¹⁰⁸ Rohit Jain, An Empirical Investigation of Some Economic Consequences of FASB Statement No. 8: Foreign Currency Translation, University of Florida, Dissertation, 1980.

¹⁰⁹ John K. Shank, Jesse F. Dillard, and Richard J. Murdock, "Assessing the Economic Impact of FASB 8," Financial Executive, February 1980, pp. 18-23.

¹¹⁰ Thomas Tong Cheng, Impact of the FAS 8 Standard-Setting Process on Security Returns of Multinationals, University of Missouri-Columbia, Dissertation, December 1981.

¹¹¹ Harry Markowitz, "Portfolio Selection," Journal of Finance,
(Footnote Continued)

familiar cumulative-average-residual (CAR) technique, developed by Fama, Fisher, Jensen, and Roll¹¹³, for detecting changes in security price behavior. The primary limitation of this technique is the inability to control for the non-stationarity of the beta coefficient in the market model; that is, the residual term has two components - a change in the systematic risk of the security (beta), and the pure residual component. Studies by Blume^{114&115} and Meyers¹¹⁶ indicate the beta coefficient in the market model varies over time. Blume found that the betas in a portfolio tended to regress toward the grand mean (1.0) over time although he was unable to explain why this phenomenon occurred.¹¹⁷ Levy¹¹⁸ and Baesel¹¹⁹ found that beta stationarity increases with the length of the estimation period. Spiceland and Trapnell investigated

(Footnote Continued)
March 1952, pp. 77-91.

¹¹²William F. Sharpe, "A Simplified Model for Portfolio Analysis," Management Science, January 1963, pp. 377-392.

¹¹³Eugene F. Fama, Lawrence Fisher, Michael C. Jensen, and Richard Roll, "The Adjustment of Stock Prices to New Information," International Economic Review, February 1969, pp. 1-22.

¹¹⁴M. E. Blume, "On the Assessment of Risk," Journal of Finance, March 1971, pp. 1-10.

¹¹⁵M. E. Blume, "Betas and Their Regression Tendencies," Journal of Finance, June 1975, pp. 785-795.

¹¹⁶S. L. Meyers, "The Stationarity Problem in the Use of the Market Model of Security Price Behavior," The Accounting Review, April 1973, pp. 319-322.

¹¹⁷Op. cit., Blume, 1975.

¹¹⁸Robert A. Levy, "Stationarity of Beta Coefficients," Financial Analysts Journal, November-December 1971, pp. 55-62.

¹¹⁹Jerome B. Baesel, "On the Assessment of Risk: Some Further Considerations," Journal of Finance, December 1974, pp. 1491-1494.

the stationarity of the market model parameters over time and found both alpha and beta do differ significantly during periods of market advances and market declines for stocks in both high-risk and low-risk categories, based on their beta.¹²⁰

Jose examined the stock market reaction to proposed corporate mergers using a random coefficient approach to estimating beta, a technique that controls for the systematic risk component.¹²¹ His model, based on the work of Theil¹²², Fabozzi and Francis¹²³, and Chen and Lee¹²⁴ has not been proven to be cost beneficial at this point. Nevertheless, it may be useful in the future.

Studies examining security price reactions to unexpected earnings caused by changes in accounting standards generally concluded that the market was able to distinguish between changes caused by explicit economic phenomena and those caused solely by accounting standards; however, consensus was not achieved. Therefore, further investigation into the validity of the semi-strong form of the EMH is needed.

¹²⁰J. David Spiceland and Jerry E. Trapnell, "The Effect of Market Conditions and Risk Classifications on Market Model Parameters," The Journal of Financial Research, Fall 1983, pp. 217-222.

¹²¹Manuel L. Jose, A Random Coefficient Approach to a Residual Analysis of the Effect of Acquisitions on Stockholder Wealth, Virginia Polytechnic Institute and State University, Dissertation, 1983.

¹²²H. Theil, Principles of Econometrics, New York: John Wiley and Sons, Inc., 1971.

¹²³F. J. Fabozzi and J. C. Francis, "Beta as a Random Coefficient," Journal of Financial and Quantative Analysis, March 1978, pp. 101-116.

¹²⁴Son-Nan Chen and Cheng F. Lee, "Bayesian and Mixed Estimators of Time Varying Betas," Journal of Economics and Business, October 1982, pp. 154-159.

Statistical Analyses

The null hypothesis to be tested is: There are no significant differences in the cumulative average residuals for the two groups of companies.

The market model was used to compute the cumulative average residuals (CARs). The model is defined as follows:

$$R_{it} = \alpha + \beta R_{mt} + \epsilon_{it} \quad (8)$$

where:

R_{it} = $(P'_{it} - P_{it-1}) / (P_{it-1})$ = The rate of return of security i in period t .

P'_{it} = The price of security i , adjusted for dividends, splits and new offerings, at the end of period t .

α_i, β_i = The intercept and slope of the linear relationship between R_{it} and R_{mt} .

R_{mt} = The return on the market in period t .

ϵ_{it} = The residual or the individual component of the return on security i in period t .

The cumulative average residuals (CARs) from the market model for twenty weeks preceding the year end and twenty-three weeks after the year end were computed and analyzed. Since the period of study begins mid-August, 1981, it includes the announcement of the third quarter earnings where all companies reported in compliance with SFAS 8. Also included in this period is the actual release of the annual financial

statements. This has allowed for assessment of both short term and long term reactions, if six months after year end is assumed to be long term.

The cumulative average residuals are computed as follows:

$$CAR = \frac{1}{N} \sum_{t=1}^N \epsilon_{it} \quad (9)$$

Biddle and Lindahl controlled for differences in expected earnings by regressing changes in earnings between time periods on the cumulative average residuals for the period of study.¹²⁵

The model is stated as follows:

$$CR_i = \alpha + \beta(UE)_{it} + \epsilon_i \quad (10)$$

where:

CR_i = The cumulative residuals for firm i .

$(UE)_{it} = 100 \times \frac{(NI)'_{it} - (NI)_{it-1}}{\text{Beginning of the year share price} \times \text{shares outstanding at beginning of year}}$

$(NI)_{it}$ = Reported net income for firm i , in year t .

$(NI)'_{it} = (NI)_{it} + \text{effect of change in net income.}$

UE_{it} represents the "as if" change in earnings as a percentage of the aggregate market value of shares outstanding at the beginning of the change year. Therefore, UE_{it} represents an earnings forecast error where the prediction comes from a random walk model. Biddle and Lindahl also used a model that included a ten-year drift term, however, the

¹²⁵Op. cit., Biddle and Landahl.

differences in results between the two models were insignificant. Thus the simpler model was selected under the cost benefit constraint. Correlations were computed and analyzed between the cumulative residuals and unexpected earnings.

Brown's study used a 2½ year period to compute the betas.¹²⁶ This study used weekly returns for the three-year period beginning July, 1978, and ending August, 1981, to estimate the model parameters.

A series of t-tests were used to assess the differences in the residuals for each week in the period of study. Although this technique has some statistical limitations, it has been widely used because it enables the researcher to identify "instantaneous" reactions by pinpointing the time when the residuals for the two groups become different. In addition, the nonparametric version of the t-test, the Wilcoxon rank sum test was used. Visual displays helped the determination of normal distributions.

To test for possible structural shifts in beta, model parameters were computed for the period of June, 1982, to December, 1982. A paired t-test was computed on the betas from the two time periods.

Results

Unexpected Earnings

Unexpected earnings do not appear to be related to cumulative residuals for either group of companies. For the adopted-early group,

¹²⁶Op. cit., Brown.

foreign currency translation losses, excludable from net income under SFAS 52 for self-contained foreign subsidiaries, were subtracted from reported net income to approximate the "as if not adopted" net income amounts. No adjustments were necessary for the group that did not adopt early.

The coefficient of determination, R^2 , which indicates the proportion of the variation in the dependent variable, cumulative residuals, that can be explained by variation in the independent variable, unexpected earnings, is only .0298 for the adopt-early group. For the group of companies that did not adopt early, R^2 is slightly higher at .1042.

In addition, the cumulative residuals for the adopt-early group were regressed against the unadjusted unexpected earnings. In other words, the "as if" effect was eliminated, and only unexpected earnings based on reported earnings were used. The R^2 from the regression was also slightly higher at 0.0459; therefore, the residuals were better correlated with the reported change in earnings than the "as if" change in earnings although the improvement could not be considered significant.

The unexpected earnings are not significantly related to cumulative residuals for either group. There is a stronger relationship between the CRs and changes in reported net income than CRs and changes in unreported net income, even though those changes are disclosed in the financial footnotes. This suggests that investors may be more aware of reported net earnings than earnings adjusted for financial footnote disclosures.

Changes in the Beta Coefficient

The beta coefficient, β , measures the extent to which an individual firm's stock return moves with the market return. The tendency of an individual stock to move with the market constitutes a stock's systematic risk or the component of risk that cannot be diversified. A beta of 1.0 means that a stock has an average systematic risk, whereas a beta greater than 1.0 indicates a higher than average systematic risk, and a beta of less than 1.0 indicates a lower than average systematic risk.

The average beta for the securities in the "adopt-early" group was 0.95991700 for the 2½ year period prior to the period of study, indicating a lower than average systematic risk for the stock of this group of companies (Table 6.1 -- all Tables and Exhibits for this chapter are listed at the end of the chapter in APPENDIX C). The beta for the six month period after the period of study shifted slightly upward to 0.98970156 thus moving the group of securities closer to the average systematic risk. Although the average difference between the two betas was -0.02978456, it was not significantly different from zero. The null hypothesis that the difference was zero could not be rejected at the .05 level of significance. The test resulted in a t observed of -0.66 with a p-value of 0.5140. The p-value means that the likelihood of these differences resulting from chance alone is 0.5140.

The group of securities that did not adopt SFAS 52 as of December 31, 1981, had an average beta of 1.08004991 for the period preceding the period of study and an average beta of 1.03950668 for the post-study period. Once again, the difference between the two betas was not significant with a mean difference of only 0.04054323. The t observed

is 1.12, and the p-value is 0.2651. The likelihood of the differences resulting from chance alone is less for this group than for the change group.

Both groups of companies have betas close to 1.0. Because all of the sample companies are Fortune 500 companies and the market index used in this study is the value weighted average of NYSE stocks, it is logical that the systematic risk of these companies would not be significantly different from the market average. Since neither group could be considered either high risk or low risk, the results of this study are not inconsistent with the results of the Spiceland and Trapnell study.¹²⁷ The group that adopted early had a slightly lower systematic risk than the group that did not adopt early. It is interesting to note that the before and after betas for the two groups moved in opposite directions, with both betas moving closer to the average systematic risk. This is consistent with the results of Blume's study that showed betas measured in a subsequent period are closer to 1.0 than betas of the same portfolio measured in an earlier time period.¹²⁸ It could not be determined if the change in accounting standards affected the systematic risk of the two groups.

The Cumulative Average Residuals

The CARs for the adopt early group steadily increased from mid-August through the end of the third quarter, indicating the

¹²⁷Op. cit., Spiceland and Trapnell.

¹²⁸Op. cit., Blume, 1975.

anticipation of higher earnings. This is consistent with previous studies showing market reactions prior to the earnings announcement date.¹²⁹ The residuals turned positive during the weeks ending September 25 and October 2 (Table 6.2). This indicates that the return on the individual securities was increasing relative to the return on the market. The residuals peaked during this period and again turned negative. All of the companies in this group had annual translation losses which would have been reported in third quarter earnings. The CARs remained negative through October, November, and most of December before becoming positive close to the end of the reporting period. The residuals remained positive through May of 1982, when the period of study ended.

Although the CARs for the non-change companies remained negative for the entire 43-week period, there was some upward movement toward zero at the end of the third quarter, and then the CARs turned downward until mid-December when they appeared to stabilize.

A comparison of the CARs for the two groups over the 43-week period indicates both a long-term and a short-term reaction to the change in accounting standards. This suggests that the market is not recognizing the increased earnings as an accounting change only.

The increase in accounting income may favorably affect loan covenants; however, since compensation would directly vary with earnings, any effect on employee compensation should unfavorably affect net earnings. Holthausen failed to find a relationship between

¹²⁹Op. cit., Ball and Brown (among others).

compensation plans and security price behavior.¹³⁰ Instead, he found a relationship between security prices and the degree of leverage within a firm. Thus it is possible that the effect of changes in net income on loan covenants could affect the residuals.

Although there are no significant differences in the CARs until the end of the first week in January, the trend toward significant differences began in mid-December, 1981. The first significant change, with a p-value of 0.0209, was for the week ending January 8, 1982, a week before the Wall Street Journal announced any earnings, further supporting pre-announcement reaction results. The next week, when one company announced, the difference was still significant at 0.0257. The third, fourth, and fifth weeks after year end, when 9, 18 and 17 of the change companies announced their earnings, the p-values were respectively 0.0691, 0.0424, and 0.0878. The differences were not as significant during the primary announcement weeks as they were the two weeks immediately after year-end.

During the second week in February, the differences once again became significant at the .0365 level and remained significantly different through mid-June. The p-values are more significant in the two weeks prior to the end of the first quarter of 1982 indicating differences in earnings expectations between the two groups. The p-values stabilized from April through the remainder of the study period. This is different from the results of Brown's study that showed a short-term reaction but not a long-term reaction to accounting

¹³⁰Op. cit., Holthausen.

changes.¹³¹ Since Brown was looking at LIFO changes, other effects may be causing the differences in results.

There is movement in the CARs for the group that did not adopt early; however, the movement does not appear strong. The differences between the groups are primarily attributable to changes in the CARs for the group that adopted early.

A visual inspection of a graph of the residuals (Exhibit 6.A) supports this analysis. Although the residuals for the non-change group generally are scattered lower than the residuals for the change group, the differences are not immediately obvious until the two weeks preceding year-end. The residuals for the non-change group shift slightly to the left toward zero, but most of the difference is attributable to the larger shift in the residuals of the change group. It is concluded that the entire return for the market increased, although the return for the companies that adopted SFAS 52 increased somewhat more than the market as a whole.

The sizes of the two groups are relatively large (83, 103); therefore, nonparametric tests should yield similar results to the parametric tests. The results of the Wilcoxon rank sum tests (Table 6.3) are very similar to the results of the t-tests. The only differences between the p-values of the two tests occur toward the end of the third and fourth quarters, when much of the reaction was occurring. The differences in p-values did not last more than four

¹³¹Op. cit., Brown.

weeks for either time period. Generally, the nonparametric tests also indicate a market reaction to the change in accounting standard.

Conclusions

In summary, test results indicate the firms that adopted SFAS 52 before the mandatory date had positive (CARs) from year-end to the first of June. Positive CARs indicate the stocks performed better than expected during that period. On the other hand, the companies that did not adopt SFAS 52 during 1981 had slightly poorer performance than expected.

Limitations

Although the shifts in the beta coefficients for both groups were not significantly different from zero, there was a slight shift for each group. The researcher is unable to explain why the betas for both groups shifted closer to the average beta of 1.0; however, previous studies have shown the same phenomenon. It is logical to conclude that some of the differences in the CARs for the two groups are attributable to a shift in the systematic risk of the securities. The pure residual component of the overall residuals could not be completely isolated for either group.

Serial correlation is inherent in the cumulative average residual technique. Each comparison of means for the 43-week period is serially related to the preceding and following weeks. A series of t-tests on serially correlated variables tends to result in a confusion of the

alpha risks because each alpha risk is not independent of the others. Since all companies in both groups are calendar-year, Fortune-500 companies, it is assumed that seasonal factors similarly affected all companies.

Moreover, since all companies in the study are large, it may not be appropriate to generalize results to smaller companies. Also, companies self-selected themselves into categories based on their decision to adopt or not adopt SFAS 52 as of December 31, 1981.

In addition, the data used to derive the "as-if-not-adopted" income for the unexpected earnings test is a crude approximation. The magnitude of the net losses generated by the current rate method of SFAS 52 would differ from those of the temporal method of SFAS 8.

The effect of the early adoption on employee compensation plans and loan covenants was not controlled in this study. The effect of SFAS 52 on loan covenants and management compensation for these companies may be a fruitful area for future research.

APPENDIX C

Table 6.1

Paired T-Test on Betas

	Beta(1)	Beta(2)	difference	tobs	p-value
Adopted Early	0.95991700	0.98970156	-0.02978456	-0.66	0.5140
Not Adopted Early	1.08004991	1.03950668	0.04054323	1.12	0.2651

Table 6.2
T-Test on CARs

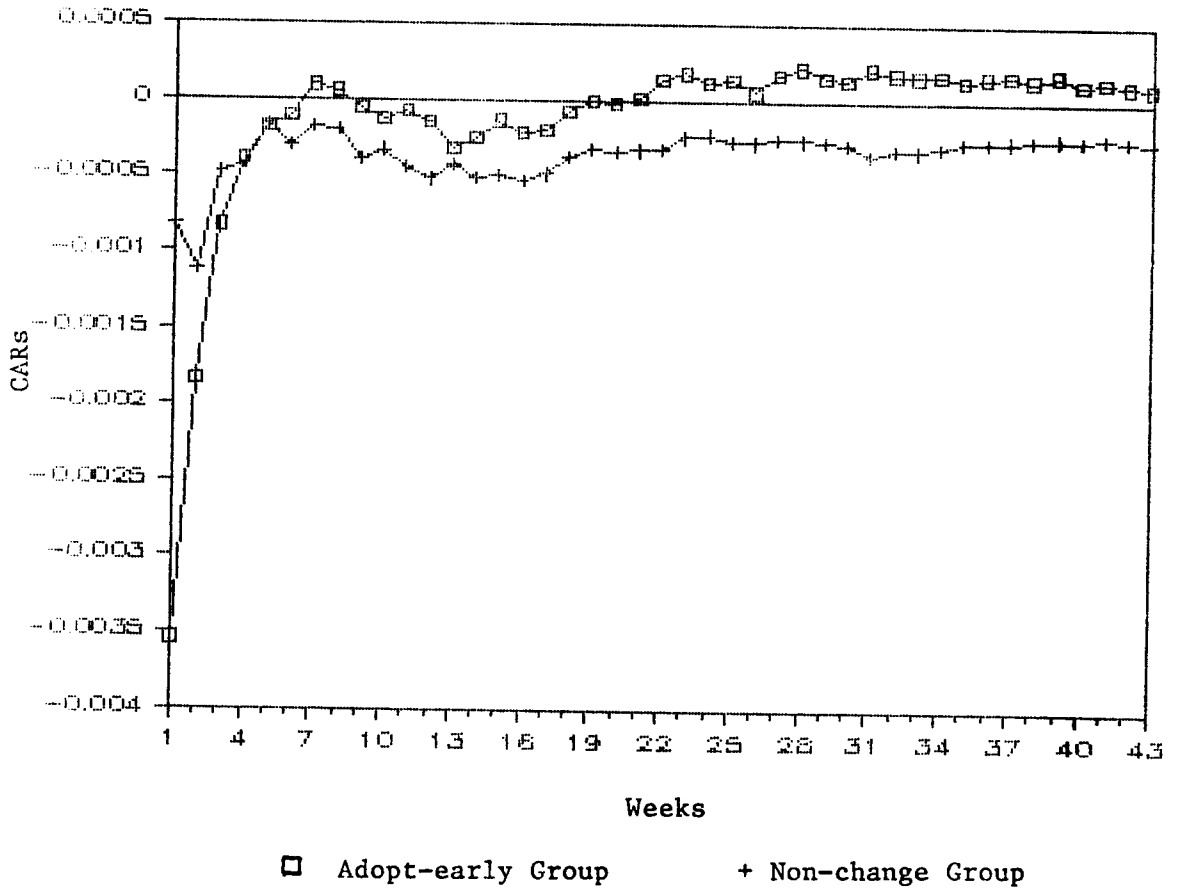
WEEK	#	A-Mean	N-Mean	tobs	p-value	
8-14-81	1	-0.00354566	-0.00081372	-2.8280	0.0052	
8-21-81	2	-0.00183735	-0.00112139	-1.0862	0.2790	
8-28-81	3	-0.00082869	-0.00048023	-0.7328	0.4647	
9-04-81	4	-0.00038430	-0.00041155	0.0663	0.9472	
9-11-81	5	-0.00017946	-0.00015637	-0.0591	0.9529	
9-18-81	6	-0.00010935	-0.00030165	0.5415	0.5889	
9-25-81	7	0.00009734	-0.00017727	0.8044	0.4224	
10-02-81	8	0.00005902	-0.00019013	0.7935	0.4286	
10-09-81	9	-0.00004899	-0.00038430	1.1981	0.2326	
10-16-81	10	-0.00012505	-0.00032771	0.7901	0.4305	
10-23-81	11	-0.00007186	-0.00044272	1.4206	0.1572	
10-30-81	12	-0.00014170	-0.00051643	1.3861	0.1675	
11-06-81	13	-0.00031227	-0.00041546	0.3744	0.7086	
11-13-81	14	-0.00024135	-0.00051146	1.0749	0.2839	
11-20-81	15	-0.00013330	-0.00049424	1.5127	0.1321	
11-27-81	16	-0.00020816	-0.00052488	1.3265	0.1864	
12-04-81	17	-0.00018958	-0.00048099	1.2913	0.1982	
12-11-81	18	-0.00006723	-0.00036710	1.5095	0.1329	
12-18-81	19	0.00000300	-0.00031544	1.6568	0.0993	
12-24-81	20	-0.00002248	-0.00033703	1.6105	0.1090	
12-31-81	21	0.00001518	-0.00032531	1.7617	0.0798	
1-08-82	22	0.00013412	-0.00031956	2.3299	0.0209	
1-15-82	23	0.00018489	-0.00023451	2.2496	0.0257	1*
1-22-82	24	0.00012502	-0.00021986	1.8289	0.0691	9*
1-29-82	25	0.00013331	-0.00025862	2.0439	0.0424	18*
2-05-82	26	0.00006220	-0.00027031	1.7165	0.0878	17*
2-12-82	27	0.00016781	-0.00024950	2.1069	0.0365	12*
2-19-82	28	0.00021998	-0.00025231	2.3580	0.0194	12*
2-26-82	29	0.00016118	-0.00026976	2.0603	0.0408	9*
3-05-82	30	0.00014289	-0.00028749	2.1225	0.0352	4*
3-12-82	31	0.00021618	-0.00035440	2.7413	0.0067	
3-19-82	32	0.00018092	-0.00031930	2.6375	0.0091	
3-26-82	33	0.00016672	-0.00032123	2.5759	0.0108	
4-02-82	34	0.00016763	-0.00029780	2.4456	0.0154	
4-08-82	35	0.00013808	-0.00026060	2.1069	0.0365	
4-16-82	36	0.00016289	-0.00025911	2.2139	0.0281	
4-23-82	37	0.00017328	-0.00025503	2.2754	0.0241	
4-30-82	38	0.00014578	-0.00024961	2.1198	0.0354	
5-07-82	39	0.00018199	-0.00023904	2.2990	0.0226	
5-14-82	40	0.00011967	-0.00024745	2.0392	0.0429	
5-21-82	41	0.00013714	-0.00022920	2.0861	0.0384	
5-28-82	42	0.00011575	-0.00024981	2.0789	0.0391	
6-04-82	43	0.00009822	-0.00026061	2.0020	0.0468	

* Indicates the number of earnings announcements for change companies.
(The earnings announcement of one company could not be located in The Wall Street Journal Index.)

Table 6.3
Wilcoxon Rank Sum Test on CARs

WEEK	#	Zobs	p-value
8-14-81	1	-2.6000	0.0093
8-21-81	2	-1.3822	0.1669
8-28-81	3	-1.3069	0.1913
9-04-81	4	0.0370	0.9705
9-11-81	5	-0.0863	0.9312
9-18-81	6	0.0000	1.0000
9-25-81	7	0.0726	0.9421
10-02-81	8	0.3425	0.7320
10-09-81	9	0.9301	0.3523
10-16-81	10	0.8110	0.4174
10-23-81	11	1.2877	0.1979
10-30-81	12	1.2959	0.1950
11-06-81	13	0.2507	0.8021
11-13-81	14	0.8288	0.4072
11-20-81	15	1.1699	0.2420
11-27-81	16	1.1192	0.2631
12-04-81	17	0.6329	0.5268
12-11-81	18	0.6343	0.5259
12-18-81	19	1.1534	0.2487
12-24-81	20	1.3000	0.1936
12-31-81	21	1.2315	0.2181
1-08-82	22	2.0672	0.0387
1-15-82	23	2.3165	0.0205
1-22-82	24	1.8356	0.0664
1-29-82	25	2.1178	0.0342
2-05-82	26	2.0425	0.0411
2-12-82	27	2.2946	0.0218
2-19-82	28	2.2561	0.0115
2-26-82	29	2.1904	0.0285
3-05-82	30	2.2151	0.0268
3-12-82	31	2.4521	0.0142
3-19-82	32	2.4178	0.0156
3-26-82	33	2.4274	0.0152
4-02-82	34	2.2877	0.0222
4-08-82	35	1.9206	0.0548
4-16-82	36	2.0178	0.0436
4-23-82	37	2.1480	0.0317
4-30-82	38	1.9617	0.0498
5-07-82	39	2.0630	0.0391
5-14-82	40	1.8000	0.0719
5-21-82	41	1.9466	0.0516
5-28-82	42	1.9713	0.0487
6-04-82	43	1.8165	0.0693

Exhibit 6.A
Graph of Residuals



Chapter VII

SUMMARY, CONCLUSIONS, AND IMPLICATIONS FOR FUTURE RESEARCH

SFAS 8 evoked harsh criticism from its inception. The "yo-yo" effect of including foreign currency translation gains and losses in the computation of net income was the reason most often cited for opposing SFAS 8. The Board reacted to the criticism by issuing SFAS 52. Since this statement contained a relatively long transition period, it provided a unique opportunity to examine differences in companies adopting SFAS 52 early and companies not electing such early compliance. Such an examination could provide evidence why companies favor one accounting standard over another.

U.S. accounting standards have at some point in time used all alternatives for both the translation of foreign currency financial statements and the treatment of the resulting translation gains and losses: the current/noncurrent translation method of ARB 43 which recognized translation losses currently, but deferred translation gains; the monetary/nonmonetary translation method allowed by APB 6; the temporal and all-inclusive income method required by SFAS 8; and

finally, the current rate and owners' equity adjustment method mandated by SFAS 52 for foreign entities whose local currency serves as the functional currency. Historically, U.S. accounting standards for the reporting of foreign subsidiary financial statements appear to have been promulgated in response to crisis situations rather than on any sound theoretical grounds. Circumstances surrounding the issuance of SFAS 52 suggest this standard may also have been issued hastily to quiet current translation criticisms caused by fluctuating exchange rates.

The exclusion of translation gains and losses from the income statement violates the comprehensive income concept of SFAS 3. Although it has been mandated that translation gains and losses related to "self-contained" foreign entities not be recognized in current net income, it still needs to be resolved whether translation gains and losses are "real" in nature and actually affect the financial position of multinational enterprises, or are merely by-products of the translation process.

Summary and Conclusions

This study examined three topics related to differences between companies adopting SFAS 52 early and those not electing to comply early. The first phase of the study examined differences in specific attributes of the two groups of companies. The second section looked at the volatility of earnings by comparing the two groups using three different measures of volatility. Finally, differences in security price behavior between the two groups were examined.

The seven attributes examined in the first part were: (1) the debt to equity ratio as of December 31, 1981, (2) foreign currency translation gains and losses for 1980 and (3) 1981, (4) 1981 translation gains and losses as a percent of net income, (5) the ratio of foreign revenues to total revenues in 1981, (6) the ratio of foreign identifiable assets to total identifiable assets as of December 31, 1981, and (7) 1981 primary earnings per share. The attributes were compared using both univariate and multivariate tests.

The results of the univariate tests indicate that the most significant difference between the two groups is in the amount of 1981 foreign currency translation gains and losses. Virtually every company that adopted SFAS 52 as of December 31, 1981, was able to improve its reported profits in comparison to what they would have been under SFAS 8. On the other hand, approximately one-half the companies continuing to report under SFAS 8 had translation gains that they were able to keep in reported earnings by complying with SFAS 8. Thus, both groups of companies were able to maximize net income: one by adopting SFAS 52 early, thereby excluding translation losses from net income, the other by delaying adoption, thereby including translation gains in net income.

Significant differences were also found in reported primary earnings per share, the ratio of foreign currency translation gains and losses to net income, and the debt to equity ratio. The non-change group had relatively higher reported primary earnings per share, a lower proportion of foreign currency translation gains and losses to net income, and a larger debt to equity ratio.

No significant differences between the groups were found for 1980 foreign currency translation gains and losses, the ratio of foreign

revenues to total revenues in 1981, and foreign identifiable assets to total identifiable assets as of December 31, 1981. Thus, the extent of a company's multinational operations or previous translation gains and losses apparently did not have any bearing on the decision to adopt SFAS 52 early.

Since the results of the univariate tests were found to be mixed, the multivariate test was needed to arrive at a overall conclusion about the differences between the two groups. The results of the Hotelling multivariate T^2 test indicate that the two groups are not alike.

The results of this phase of the study raised questions as to the desirability of allowing a long transition period for the adoption of a new accounting standard. It may not be desirable to permit such a long transition period since companies apparently have misused the flexibility during the transition to bolster reported profits.

The second section of the study focused on the volatility of earnings during the five-year period that SFAS 8 was in effect. Comparisons between the two groups were made using three different measures. One of these measures, the coefficient of variation, indicated there was a difference between the two groups in the variability of reported earnings per share in that the non-change group showed a higher variability. If reduction of volatility were a motive for adopting SFAS 52 early, one would expect the change group to have more variability.

The measure attempting to isolate the variability attributable to up-and-down movements examined absolute changes in EPS. Although no significant differences were found, the change group showed slightly

more up-and-down movement, suggesting more earnings fluctuations for this group.

The other measure, the correlation coefficient, also did not show any significant differences between the groups. However, the correlation is not as strong for the adopt-early group, indicating more variability around the trend line.

Overall, the results are mixed for these tests, and the one significant difference suggests more variability in the group that did not adopt early. The other two measures contradict the first by showing more variability in the change group, even though the differences were not statistically significant. It is concluded, therefore, that variability in reported earnings was not a significant factor in the decision to adopt SFAS 52 before the mandatory date.

The third and final part of the study used the familiar market model to examine differences in security price behavior between the two groups. The residuals for the group that adopted SFAS 52 as of December 31, 1981, showed a significant increase several weeks before year-end. The companies in this group were able to avoid reporting an average translation loss of \$13.78 million, thereby increasing their reported profits. The residuals for the adopt-early group became positive at year-end, indicating a higher than expected return. The residuals for the non-change group remained negative for the entire period of study, indicating a lower than average expected return. Since the average translation gain for this group was \$12.33 million, many companies were able to bolster reported earnings by not changing standards.

Significant differences between the residuals for the two groups developed at year-end and remained for the balance of the period of

study. This suggests that the market reacted favorably to the improved profits attributable to the exclusion of foreign currency translation losses from reported profits.

The test results are contrary to previous EMH studies that indicate investors can distinguish between economic changes and pure accounting changes. A possible explanation for the unexpected reaction could be the perceived effect of the new standard on management risk practices; that is, investors could perceive that the new standard may decrease dysfunctional behavior on the part of financial managers, such as a decrease of hedging so-called accounting exposures.

Implications for Future Research

Future research studies would be desirable to examine changes in accounting exposure before and after the change to SFAS 52 from two different viewpoints . First, using only publicly available data, the capital structures of firms before and after the adoption should be compared. If pre-translation copies of the financial statements can be obtained, a comparison of accounting exposure before and after the change would be possible. Such a study would overcome the limitation of this inquiry that translation differences for the change group under the temporal method were not available. In addition, such a study could be useful in assessing the effect of accounting changes on corporate risk management practices.

A behavioral study, using questionnaires, may provide additional information about these effects. Corporate managers should be surveyed

regarding changes in their management practices related to or caused by the changes from SFAS 8 to SFAS 52.

The results of this study seem to question the validity of the semi-strong form of the efficient market hypothesis, since the market evidently reacted to a change in reported income caused by a change in accounting methods. Investors may have perceived other signals resulting from the decision to voluntarily change accounting standards before the mandatory date. Consequently, the study should be replicated using actual "if not changed" translation differences. Perhaps it should also be extended to cover a longer time period.

A behavioral study may provide additional information about investors' perceptions of the true nature of foreign currency translation gains and losses. The inclusion of foreign currency translation gains and losses in net income under the all-inclusive income concept adopts the viewpoint that these amounts are "real" in nature and therefore should be recognized in current net income. In contrast, the owners' equity adjustment method views them as a mechanical result of translation. It may be helpful to determine if the method of disclosure changes investors' perceptions of translation gains and losses.

Also, previous studies have indicated that the market reacts differently to discretionary accounting changes as opposed to mandatory changes. When the Board allowed a long transition period for the adoption of SFAS 52, they made early adoption a discretionary change. Although this study provided some insight into the effect on security price behavior of the discretion allowed during a long transition period, additional studies are needed.

The traditional market model was used to assess differences in security price behavior between the two groups. Although this model has been extensively used in the past, it has severe limitations because of the serial correlation of the residuals and the inability to control for shifts in the beta component. Cheng used an ARMINA time series model to overcome the autocorrelation problem, but his model has not been widely accepted.¹³² Jose used a random coefficient approach to control for possible shifts in beta but his model was extremely complex.¹³³ Thus, it may be fruitful to compare the results of the traditional model to results obtained using one or both of the other two models. If the same results are obtained from the three models, this would lend support to the validity of the market model for comparing security price behavior between two groups. However, if different results are obtained from the three models, additional research would be required to determine which of these models, if any, is the superior one.

¹³²Op. cit., Cheng.

¹³³Op. cit., Jose.

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APPENDIX D

Companies That Adopted SFAS 52 as of December 31,1981

CRSP Loc	CUSIP Number	Company Name
5	800	ACF Inds
12	1688	AMF Inds
107	17372	Allegheny International Inc
125	19645	Allis-Chalmers Corp
165	24703	American Brands Inc
170	24843	American Can Co
181	25321	American Cyanamid Co
232	29717	American Standard Inc
249	31897	AMP Inc
310	42170	ARMCO Inc
380	54303	Avon Products
445	67806	Barnes Group
484	77851	Bell & Howell Co
491	81437	Bemis Co
519	89671	Big Three Industries
557	99725	Borg-Warner Corp
614	118745	Bucyrus-Erie Co
744	143483	Carnation Co
809	158525	Champion International Corp
811	158663	Champion Spark Plug
843	167898	Chicago Pneumatic Tool Co
865	172172	Cincinnati Millicron Inc
884	181396	Clark Equipment Co
916	194162	Colgate-palmolive Co
1003	211452	Continental Group
1060	224399	Crane Co
1081	228255	Crown Cork and Seal Co Inc
1127	235811	Dana Corp
1129	237410	Dart & Kraft Inc
1170	248631	Dennison Mfg Co
1193	252741	Diamond Shamrock Corp
1238	260003	Dover Corp
1281	268457	EG&G Inc
1298	278058	Eaton Corp
1345	291210	Emhart Corp
1390	297659	Ethyl Corp
1411	302491	FMC Corp
1459	315405	Ferro Corp
1555	351604	Foxboro Co
1700	375766	Gillette Co
1731	382388	Goodrich (BF) Co
1733	382550	Goodyear Tire & Rubber Co
1737	383492	Gould Inc
1854	415864	Harsco Corp
1900	427056	Hercules Inc

2035	452308	Illinois Tool Works
2059	456866	Ingersoll-Rand Co
2081	458702	Interlake Inc
2168	478160	Johnson & Johnson
2212	487836	Kellogg Co
2236	493782	Kidde Inc
2239	494368	Kimberly-Clark Corp
2361	530000	Libbey-Owens-Ford Co
2409	549271	Lubrizol Corp
2540	580628	McGraw-Edison Co
2636	604059	Minnesota Mining & Mfg Co
2735	631226	Nashua Corp
2892	671400	Oak Industries Inc
2898	676346	Ogden Corp
2949	693506	PPG Industries Inc
3043	709317	Pennwalt Corp
3108	724479	Pitney-Bowes Inc
3223	749285	RCA Corp
3282	759200	Reichhold Chemicals Inc
3310	761525	Revlon Inc
3348	770552	Robertson (HH) Co
3491	809877	Scott Paper Co
3494	810640	Scovill Inc
3688	852245	Squibb Corp
3714	854616	Stanley Works
3728	857721	Stauffer Chemical Co
3742	859264	Sterling Drug Inc
3776	866645	Sun Chemical Corp
3813	871140	Sybron Corp
3832	872649	TRW Inc
3969	892892	Trane Co
4067	909160	Uniroyal Inc
4113	912027	US Gypsum Co
4129	913017	United Technologies Corp
4149	915302	Upjohn Co
4156	918204	VF Corp
4252	934436	Warner Communications Inc
4403	984121	Xerox Corp

Companies That Did Not Adopt SFAS 52 as of December 31,1981

CRSP Loc	CUSIP Number	Company Name
26	2824	Abbott Laboratories
115	19087	Allied Corp
141	22249	Aluminum Co of Amer
150	23551	Amerada Hess Corp
251	32037	Ampco-Pittsburg Corp
314	42476	Armstrong World Inds Inc
351	48825	Atlantic-Richfield Co
417	58732	Bally Mfg Corp
460	71707	Bausch & Lomb Inc
461	71892	Baxter Travenol Laboratories
548	97383	Boise Cascade Corp
556	99599	Borden Inc
589	110097	Bristol-Myers Co
611	117043	Brunswick Corp
638	122781	Burroughs Corp
646	124800	CBI Industries Inc
664	126149	CPC International Inc
769	149123	Caterpillar Tractor Co
773	150843	Celanese Corp
817	161177	Charter Co
835	165339	Chesebrough-Pond's Inc
861	171196	Chrysler Corp
899	189486	Cluett, Peabody & Co
903	190441	Coastal Corp
906	191216	Coca-Cola Co
927	196864	Colt Industries
935	200273	Combustion Engineering Inc
1015	212363	Control Data Corp
1040	219327	Corning Glass Works
1085	228669	Crown Zellerbach
1097	231021	Cummins Engine
1239	260543	Dow Chemical
1256	263534	Du Pont (EI) De Nemours
1297	277461	Eastman Kodak Co
1360	292845	Engelhard Corp
1407	302290	Exxon Corp
1445	313549	Federal-Mogul Corp
1465	316549	Fieldcrest Mills
1543	345370	Ford Motor Co
1576	359370	Fruehauf Corp
1583	361428	GAF Corp
1642	369604	General Electric
1667	370838	General Signal Corp
1688	374280	Getty Oil Co
1739	383883	Grace (WR) & Co
1803	402460	Gulf Oil Corp
1805	402496	Gulf Resources & Chemical

1949	438506	Honeywell Inc
1991	444492	Hughes Tool Co
2030	451542	Ideal Basic Industries Inc
2089	459200	IBM Corp
2186	483008	Kaiser Aluminum & Chemical Corp
2384	539821	Lockheed Corp
2394	542290	Lone Star Industries
2402	546268	Louisiana Land & Exploration
2478	565097	MAPCO Inc
2583	589331	Merck & Co
2619	597715	Midland-Ross Corp
2653	607059	Mobil Corp
2658	608030	Mohasco Corp
2669	611662	Monsanto Co
2692	620076	Motorola Inc
2709	626717	Murphy Oil Corp
2717	628862	NCR Corp
2722	629156	NL Industries
2726	629525	Nabisco Brands Inc
2729	629853	Nalco Chemical Co
2936	690734	Owens-Corning Fiberglass Corp
2937	690768	Owens-Illinois
3056	713448	Pepsico Inc
3074	717081	Pfizer Inc
3075	717265	Phelps Dodge Corp
3081	718167	Philip Morris Inc
3084	718507	Phillips Petroleum Co
3258	755111	Raytheon Co
3314	761753	Reynolds (RJ) Inds
3315	761763	Reynolds Metals Co
3364	775371	Rohm & Haas Co
3436	793453	St Regis Corp
3474	806605	Schering-Plough
3513	812302	Searle (GD) & Co
3580	826622	Signal Cos
3603	829302	Singer Co
3612	832110	Smith International Inc
3613	832377	Smithkline Bechman Corp
3687	852206	Square D Co
3702	853683	Standard Oil Co (Calif)
3703	853700	Standard Oil Co (Indiana)
3779	866762	Sun Co Inc
3797	868273	Superior Oil Co
3877	880370	Tenneco Inc
3887	881694	Texaco Inc
3897	882508	Texas Instruments Inc
3909	883203	Textron Inc
3935	887224	Time Inc
3938	887389	Timken Co
4055	905581	Union Carbide Corp
4126	912656	US Steel Corp
4254	934488	Warner-Lambert Co
4316	960402	Westinghouse Electric Corp
4322	962166	Weyerhaeuser Co

4372	977385	Witco Chemical Corp
4396	982526	Wrigley (WM) Jr Co

SAS Program to Put COMPUSTAT Variables on Disk

```

DATA ADPTA:
INFILE IN1;
INPUT   @1      DNUM      RB4.
        @5      CNUM      RB4.
        CONAME $48-76
        @15121  DI5Y81    RB4.
        @15125  DI6Y81    RB4.
        @15137  DI9Y81    RB4.
        @15173  DI18Y81   RB4.
        @15209  DI27Y81   RB4.
        @15241  DI35Y81   RB4.
        @15333  DI58Y81   RB4.
        @15401  DI75Y81   RB4.
        @14509  DI27Y80   RB4.
        @14633  DI58Y80   RB4.
        @13809  DI27Y79   RB4.
        @13933  DI58Y79   RB4.
        @13109  DI27Y78   RB4.
        @13233  DI58Y78   RB4.
        @12409  DI27Y77   RB4.
        @12533  DI58Y77   RB4.
        @11709  DI27Y76   RB4.
        @11833  DI58Y76   RB4.;

IF CNUM = XXX ..... OR CNUM = XXXX THEN DO;
PEPS81 = (DI58Y81/DI27Y81);
PEPS80 = (DI58Y80/DI27Y80);
PEPS79 = (DI58Y79/DI27Y79);
PEPS78 = (DI58Y78/DI27Y78);
PEPS77 = (DI58Y77/DI27Y77);
PEPS76 = (DI58Y76/DI27Y76);
SUM = (PEPS80 + PEPS79 + PEPS78 + PEPS77 + PEPS76);
AVG = (SUM/5);
VAR = (((PEPS80**2)+(PEPS79**2)+(PEPS78**2)+(PEPS77**2)+(PEPS76**2))-
        ((SUM**2)/5))/4);
SD = (SQRT(VAR));
CV = (SD/AVG);
TOTAL = ((ABS(PEPS76-PEPS77))+ (ABS(PEPS77-PEPS78))+ (ABS(PEPS78-PEPS79))+
        (ABS(PEPS79-PEPS80)));
AMAX = (MAX(PEPS76 PEPS77 PEPS78 PEPS79 PEPS80));
AMIN = (MIN(PEPS76 PEPS77 PEPS78 PEPS79 PEPS80));
CIT = (TOTAL/(AMAX-AMIN));
DER = ((DI5Y81+DI9Y81+DI75Y81+DI35Y81)/(DI6Y81-
        (DI5Y81+DI9Y81+DI75Y81+DI35Y81)));
NI = DI18Y81;
SXX = (((1)**2)+((2)**2)+((3)**2)+((4)**2)+((5)**2))-
        (((1+2+3+4+5)**2)/5));
SYY = (((PEPS76)**2)+((PEPS77)**2)+((PEPS78)**2)+((PEPS79)**2)+
        ((PEPS80)**2))-(((PEPS76+PEPS77+PEPS78+PEPS79+PEPS80)**2)/5));
SXY = (((1)*(PEPS76))+((2)*(PEPS77))+((3)*(PEPS78))+((4)*(PEPS79))+
        ((5)*(PEPS80)))-(((1+2+3+4+5)*(PEPS76+PEPS77+PEPS78+PEPS79+
        PEPS80))/5));
CORR = (SXY/(SQRT(SYY*SXX)));

```

```
OUTPUT;  
END;  
DATA ADPTAA;  
SET ADPTA;  
KEEP CNUM CONAME PEPS80 PEPS81 CV CIT DER CORR NI;  
PROC PRINT;
```

SAS Program To Put SEC Variables On Disk

```
DATA SEC;
INFILE IN1;
  INPUT CNUM FC80 FC81 FA TA FR TR FT;
AR = FA/TA;
RR = FR/TR;
FCT = FC81+FT;
DATA SECA;
SET SEC;
KEEP CNUM FC80 FCT81 AR RR;
DATA OUT.SECA;
SET SECA;
PROC PRINT;
```


SAS Program To Merge Variables in Two Data Sets

```
DATA ADPTAA;  
SET IN1.ADPTAA;  
PROC SORT;  
BY CNUM;  
DATA SECA;  
SET IN2.SECA;  
PROC SORT;  
BY CNUM;  
DATA COMPA;  
MERGE ADPTAA SECA;  
BY CNUM;  
FCR = FCT81/NI;  
DATA OUT.COMPA;  
SET COMPA;  
PROC PRINT;
```

SAS Program To Compare Attributes

```
DATA COMPA;  
  SET IN1.COMPA;  
ID = 1;  
DATA COMPN;  
  SET IN2.COMPAN;  
ID = 2;  
DATA COMP;  
  SET COMPA COMPAN;  
PROC TTEST;  
CLASS ID;  
VAR FC80 FCT81 PEPS81 DER RR AR FCR;  
PROC NPARIWAY WILCOXON;  
VAR FC80 FCT81 PEPS81 DER RR AR FCR;  
CLASS ID;
```

SAS Program To Compare Volatility of Earnings

```
DATA COMPA;  
  SET IN1.COMPA;  
  ID = 1;  
DATA COMPN;  
  SET IN2.COMPAN;  
  ID = 2;  
DATA INC;  
  SET COMPA COMPAN;  
PROC TTEST;  
  CLASS ID;  
  VAR CV CIT CORR;  
PROC NPARIWAY WILCOXON;  
  VAR CV CIT CORR;  
  CLASS ID;
```

BMDP Program To Compute Hotelling T^2

```
/PROBLEM TITLE ID 'HOTELLING T TEST ON SEVEN VARIABLES'.  
/INPUT      VARIABLES ARE 8.  
            FORMAT IS FREE.  
            UNIT = 16.  
/VARIABLE NAMES ARE ID,FC80,FCT81,PEPS81,DER,RR,AR,FCR.  
            GROUPING IS ID.  
/TEST      VARIABLES ARE FC80,FCT81,PEPS81,DER,RR,AR,FCR.  
            HOTELLING.  
            CORRELATIONS.  
/END
```

SAS Program To Compute Betas

```
DATA RET1 RET2 RET3;
INFILE IN1;
INPUT LOC DAT RET MRET;
IF DAY =4787 THEN OUTPUT RET1;
IF DAY =4788 AND DAY =4996 THEN OUTPUT RET2;
IF DAY =4997 THEN OUTPUT RET3;
DATA RET11;
SET RET1;
KEEP LOC RET MRET;
PROC REG DATA = RET11;
BY LOC;
MODEL RET=MRET;
DATA RET33;
SET RET3;
KEEP LOC RET MRET;
PROC REG DATA = RET33;
BY LOC;
MODEL RET=MRET;
DATA OUT.ADAPTA;
SET RET2;
```

SAS Program To Compare Betas

```
DATA PARA;  
INFILE IN1;  
INPUT LOC BETA1 BETA2;  
DIFF = BETA1-BETA2;  
PROC MEANS MEAN STDERR T PRT;  
VAR DIFF;  
TITLE PAIRED-COMPARISONS T TEST;
```

SAS Program To Merge Security Price Data

```
DATA PARA;
INFILE IN1;
INPUT LOC ALPHA BETA1 BETA2;
PROC SORT;
BY LOC;
DATA CRSP;
INFILE IN2;
INPUT LOC DAY RET MRET;
PROC SORT;
BY LOC;
DATA RES;
MERGE PARA CRSP;
BY LOC;
RES=(RET-(ALPHA-(BETA1*MRET)));
KEEP LOC DAY RES;
DATA _NULL_;
FILE MARKET;
SET RES;
PUT LOC 1-4 DAY 6-9 RES 11-20 6;
```

Fortran Program to Compute CARs

```
DIMENSION IV(3569,2),SR(3569)
88 FORMAT (I4,1X,I4,1X,F10.6)
98 FORMAT (1X,I4,3X,I4,3X,F10.6)
78 FORMAT (1X,I4,3X,I4,3X,F10.6,3X,F10.6,3X,I4)
READ (16,88) ((IV(I,K),K=1,2),(SR(I)),I=1,3569)
WRITE (6,98) ((IV(I,K),K=1,2),(SR(I)),I=1,3569)
DO 500 J=1,83
  SUM = 0.0
  DO 400 L=1,43
    K= L+(43*(J-1))
    SUM = (SUM + SR(K))
    DI = L
    CAR = SUM/DI
  WRITE (17,78) IV(K,1),IV(K,2),SR(K),CAR,K
400 CONTINUE
500 CONTINUE
  STOP
  END
//GO.FT16F001 DD DSN=ULU.@BUSNO28.MARKETA,DISP=(OLD,KEEP)
//GO.FT17F001 DD DSN=ULU.@BUSNO28.CARA,DISP=(OLD,KEEP)
```


SAS Program To Compare CARS

```
DATA CARA;  
INFILE IN1;  
INPUT LOC DAY RES CAR K;  
ID = 1;  
DATA CARN;  
INFILE IN2;  
INPUT LOC DAY RES CAR K;  
ID = 2;  
DATA CAR;  
SET CARA CARN;  
PROC TTEST;  
CLASS ID;  
VAR CAR;  
BY DAY;  
PROC NPARIWAY WILCOXON;  
VAR CAR;  
BY DAY;  
CLASS ID;  
PROC PRINT;
```

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the scanned document**