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INTERNATIONAL COMPARISON OF CONSERVATIVE ACCOUNTING PRACTICES IN INCOME MEASUREMENT

by

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ABSTRACT

This study is intended to order and classify countries based on the degree of conservatism of their accounting standards and practices. We explain the results in terms of natural, economical, information, political, social, and legal factors.

We define that the conservative accounting procedure is the one by which current term's net profit is appropriated in the direction of understatement on an assumption of inflationary trend.

The established accounting standards or individual firm's attitude in selecting accounting alternatives determine the degree of conservatism of accounting standards and accounting practices of each country. Such accounting standards of firm's attitudes are considered to be determined by the natural, economical, information, political and legal environment.

We apply Multiple Regression Analysis for determination of the relation between the degree of accounting conservatism and the above factors, and Cluster Analysis for classfication of countries. Data are taken from the survey of accounting principles and reporting practices for 64 countries conducted by the Price Waterhouse International.

I. Introduction

Accounting is a comprehensive means to measure the performance or effect of various operational efforts of business firms including production control, quality control and research and development efforts. For those outsiders who are interested in activities of business firms and who have no ready access to their inside information, perhaps accounting is the only mean by which they can correctly measure and evaluate business performance.

Accounting is a complex art to recognize, record and report individual business transactions of business firms which have any effect or potential effect on their assets, liabilities, capital, earnings and/or expenses. Many accounting methods have been developed in business history. Some of them were developed as *a priori* or a norm and others as customary accounting conventions through hundreds of years of day-to-day accounting

practices which met the economic, social and political environments of the times. The purpose of accounting, which is a decisive factor in selecting any particular accounting method or methods from among numerous alternatives, are often determined by the particular needs of the users of accounting information. Their needs vary depending upon the types of economic activities in which they are engaged and the nature and purposes of decisions which they are going to make with accounting information. Thus it is not strange that there are two or more alternative accounting methods to measure and evaluate the same transaction or economic phenomenon.

Now that accounting has become one of essential social systems, many countries have accounting standard-setting organizations of their own to determine, accounting methods which suit the best to the circumstances in respective countries. At the level of individual business firms, if they are permitted to do so, they choose a procedure among various accounting alternatives which are considered to fit the best to their circumstances. Thus accounting practices are affected by not only the character of the accounting standard-setting organization but also the circumstances of business firm. The variation of regulation and environment around firms cause significant international differences in accounting practices.

In the developing countries, their cultural, political, legal and economic ties with their respective ex-suzerains are so close and long-standing that great influence of the accounting standards of their respective ex-suzerains is often seen in their counterparts. In addition, the fact that we now see many giant multi-national corporations in industrialized nations may have given significant impacts on the standard-setting organizations there and/or the selection of accounting procedures by business firms there.

Significant difference, if any, in accounting practices among nations may have stemmed from difference among them in natural, economic, information, political, social and legal environments.

Based on the foregoing assumption and using the results of a certain comparative study on accounting practices conducted and published by Price Waterhouse International in 1973 to which we will refer in more detail later, Frank, W. G. [1979] classified the 38 countries covered by the Price Waterhouse study into four groups, namely British Commonwealth Model, Latin American Model, Continental European Model and United States Model. In his study he constructed a discriminant function, using nine variables including the country's official language(s), as a proxy for cultural ties between the countries; a group of economic structure variables consisting of per capita income, private consumption, balance of trade and average annual change in consumer prices and export/import ratios between the countries as a proxy for economic ties betwseen them. He attempted to see if his discriminant function could properly classify the countries into any of the four groups. It was a matter of course that his study could bring him accurate discriminant results, since the data used for the construction of the discriminant models and prediction data were identical. Given some discount in that respect, the results he obtained from his discriminant study were nevertheless fairly and sufficiently accurate to claim the validity of his discriminant function. Nair, R.D. and Frank, W.G. [1980] also conducted a similar discriminant analysis. In their joint analysis, they classified accounting prac-

tices into two groups, measurement practices — practices which permit the use of various alternative accounting procedures to create different accounting results with respect to one and same transaction — and disclosure practices, using the results of Price Waterhouse International's comparative studies made in 1973 and 1975. With respect to measurement practices they succeeded in adequately distinguishing one group from the other with environmental variables, but failed to obtain any decisive evidence with respect to disclosure practices.

When these two discriminant studies are compared, the latter, we believe, is better than the former in that accounting practices were classified into two groups, measurement practices and disclosure practices, and that a discriminant analysis was conducted with respect to each of the two group.

In our study, an attempt was made to analyze accounting practices in more detail by accounting standards, placing an emphasis on accounting conservatism.

What is accounting conservatism? It is an idea which requires all foreseeable losses to be correctly picked up on one hand and strictly prohibits any contingent gains from being picked up or which encourage accounting practitioners to correctly pick up all liabilities on one hand and to limit assets to be picked up only to those which are undoubtedly certain. In other words, it is an idea which, when preparing a periodical income statement to correctly show the earning power of a business firm as a going concern, pursues the necessity of sound accounting practices to prevent or eliminate any possible overstatement of income or earnings.

In our study we first selected, from numerous accounting practices, those in which a significant effect or influence of the accounting conservatism was seen. Then the degree of influence of accounting conservatism on each and every one of the countries covered by our study was determined based upon the extent to which each one of the accounting practices so selected spread in such country. One of the primary purposes of our study was to identify the relations between the extent to which accounting practices of each individual country were influenced by the accounting conservatism and such environmental variables such as natural, economic, information, political, social and legal factors. Another primary purpose of our study was to classify the countries into several groups by accounting practices and to analyze the relations between such groups and the above-mentioned environmental variables to distinguish one group from the others.

II. Methodology

1. Data Base and Accounting Conservatism Index ("ACI")

Price Waterhouse International conducted an extensive study of financial accounting practices in as many as 64 non-communist countries as of January 1, 1979 and published the results thereof in late 1979. In the study they identified as many as 267 different accounting principles and reporting practices ranging from a very general and historical cost convention that assets, liabilities, revenues and expenses must be reported at the amounts at which the transactions concerned took place to a very specific reporting practice regarding receivables that all receivables from officers must be disclosed. To build a data

source for the study, Price Waterhouse established an eight-grade scale by which to measure the extent to which each individual accounting principle or reporting practice was accepted and applied in any given country, namely, (i) Required; (ii) Insisted Upon; (iii) Predominant Practice; (iv) Minority Practice; (v) Rarely or Not Found; (vi) Not Accepted; (vii) Not Permitted; and (viii) Not Applicable.[1)]

In order to quantify and indexate the degree of accounting conservatism in each individual country, we selected from the 267 propositions used in Price Waterhouse study those which had something to do with the accounting conservatism. For such selection purpose, we defined "conservative accounting practices" under an inflationary condition as accounting practices which require conservative statement of earnings for the current year. According to this definition, we selected 50 propositions from the 267 propositions. Among these 50 propositions, some could stand by themselves to determine the degree of accounting conservatism in any country based solely upon replies thereto, such as provision for expected losses on long-term construction contracts ("PELLC"), while others could not but instead were required to be paired or combined with any other proposition or propositions to determine the degree of accounting conservatism in any country such as methods of depreciation ("MDPE").[2)]

As a result of such pairing or combination, the initial list of propositions consisting of 50 propositions was reconstructed as a new list consisting of 23 revised propositions. The reason why we put a qualification, "under an inflationary condition," when we defind the term "conservative accounting practices" as used in our study was because such qualification, we thought, was necessary to correctly determine which was a more conservative accounting practice in relation to carrying base of investment in marketable

1) "Required" as used with respect to any accounting principle or reporting practice in any country means that its application is required by a pronouncement of a professional accountancy body or by law of that country. "Insisted Upon" means that its application is so fundamental by the profession in the country that even in the absence of any professional or statutory pronouncement, a failure to comply with it is normally expected to give rise to a qualified audit opinion. "Predominant Practice" means that such principle or practice is the only one that is followed in the country or, if there are any alternatives, the one which is most frequently followed in the country, or, if that term is used with respect to disclosure of any particular information, that the information is generally disclosed. "Minority Practice" means that the principle or practice is followed less frequently than any other available alternative in the country or, if that term is used with respect to disclosure of any particular information, that the disclosure of the information is found but not in majority of the cases. "Rarely or Not Found" means that the principle or practice is not followed in financial statements in the country or is found in isolated examples only or, the principle or practice is followed by a particular industry only. "Not Accepted" means the converse of "Insisted Upon" where its adherence constitutes an offense against any fundamental principle and is normally expected to cause the profession in the country to issue a qualified audit opinion. "Not Permitted" means that its application is prohibited by a pronouncement of a professional accountancy body or by law in the country. "Not Applicable" means that there arise no situations in the country where its application becomes a question, or a situation where is application is precluded by reason of a response to any other related principle or practice.

2) MDPE is the proposition that was paired with DEPRECIATION-1 which meant that depreciation is provided by the straight-line method and DEPRECIATION-2, which meant that depreciation was provided by the declining balance or other method having similar effect such as sum-of-the-years-digits.

securities included in current assets ("CBIMSC"), first-in first-out or last-in first-out. Under an inflationary condition generally it may be said that last-in first-out is more conservative than first-in first-out in that the former produces less profits than the latter.

Table 1. List of Accounting Alternatives

1	ECCFA	Elements of cost of construction of fixed assets
2	WDFA	Write-down of fixed assets
3	ULFA	Estimation of useful life of fixed assets
4	MDEP	Methods of depreciation
5	MVI	Interpretation of market value of inventories
6	CBI	Carrying bases of inventories
7	ECI	Elements of cost of inventories
8	MINV	Methods of inventories
9	CBIMSC	Carrying bases of investments in marketable securities included in current assets
10	CBIMSL	Carrying bases of investments in marketable securities included in long-term assets
11	DIVI	Treatments of dividends of investments exceeding an investor's share of earnings
12	RWDII	Reverse of write-down for impairment of investments
13	PLCC	Recognition standards for profits on long-term construction contracts
14	PELLC	Provision for expected losses on long-term construction contracts
15	PELUPC	Provision for expected losses on unexpired purchase contracts
16	PELUSC	Provision for expected losses on unexpired sales contracts.
17	DAEPNM	Deferment of advertising expenses related to products not yet marketed
18	DRESC	Deferment of research costs
19	DDEVC	Deferment of development costs
20	GDFA	Gains on disposal of fixed assets
21	EGLFFS	Exchange gains and losses arising from translation of foreign currency financial statements
22	EGUST	Exchange gains on unsettled transactions
23	ELUST	Exchange losses on unsettled transactions

We then established Accounting Conservative ranking score to evaluate the degree of compliance of each one of the 23 revised propositions by each of the 64 countries to determine the degree of accounting conservatism prevailing in such country. More particularly, taking the proposition relating to depreciation methods, for example, the answer from the 64 countries with this proposition fell under any of four categories, the lowest value of 1 was given to cases where the declining balance method was a predominant practice, and the straight-line method was a minority practice; the second lowest value of 2 was given to cases where both declining balance and straight-line methods were a minority practice; the third lowest value of 3 was given to cases where the straight-line method was a predominant practice, and the declining balance method was a minority practice and the highest value of 4 was given to cases where the straight-line method a predominant practice, and the declining balance method was rarely or not found.[3)]

Then we constructed the following formula to define ACI:

3) Determination of Accounting Conservatism Ranking

(1) Taking the proposition "Carrying Bases of Investments in Marketable Securities Classified as Current (CBIMSC)" appearing in Table 1 for example, we provided four accounting or evaluation alternatives to determine the degree of accounting conservatism of any given country with respect to such proposition, namely (i) the case where marketable securities included in current assets are stated

$$ACI_c = 1 - (\sum_i RAC_{ic}/\max_c RAC_{ic})/23 \quad \text{..... (1)}$$

Wherein RAC_{ic} is the ranking of Country c on the accounting conservatism scale with respect to Proposition i.

Then we determined the value of ACI of each of the 64 countries using the above formulation. A range was set for the value of ACI from 0 to 1, with 1 to represent the strongest accounting conservatism.

2. Relation between ACI and Environmental Variables

As shown in Table 2, we selected 28 environmental variables as surrogates for natural, economic, information, political, social and legal factors. Two variables, "ENESS" and "FREELO" are considered to simultaneously represent two environmental factors each. Those which are marked with "*" are dummy variables. Now some explanation may be due here with respect to some of those surrogate variables and what are represented thereby. The variables "Energy Self-Supply" or "ENESS," "Arable Land to Economically Active Population" or "AL/ECP" and "Arable Land to Surface Area" or "AL/SAREA" represent the degree of abundance of such country in natural environments. The variables "Energy Consumption Per Capita" or "ENEC" and "National Income Per Capita" or "NINC" represent the degree of its economic development. All political

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at the lower of cost or market value, each security being evaluated individually; (ii) the case where marketable securities included in current assets are stated at the lower of cost or market value, the entire portfolio being valued as one asset; (iii) the case where marketable securities included in current assets are stated at cost; provided that no permanent diminution in value has occurred; or (iv) the case where marketable securities included in current assets are stated at market value although this may exceed cost. In our study, a country where the case mentioned in (i) above is "REQUIRED" and the cases mentioned in (ii), (iii) and (iv) above are "NOT ACCEPTED" is considered to be maintaining the strongest degree of accounting conservatism with respect to the proposition, while a country where the case mentioned in (iv) above is "REQUIRED" and the cases mentioned in (i), (ii) and (iii) above are "NOT-ACCEPTED" is considered to be a least conservative country in accounting practices with respect thereto. And there come 23 other groups in between those most conservative and least conservative groups. Thus each of the 64 countries which we initially selected for our study purposes falls in one of those 25 groups with respect to the proposition. Among those 25 groups some can be considered to rank *pari passu* with each other. Taking this into consideration, we prepared a 14-degree scale of accounting conservatism and classified those 25 groups according to the scale and gave a ranking point to each individual country depending on which degree it belonged, with 1 point given to each individual country belonging to the most conservative group, and 14 points to the least conservative group on the scale.

(2) Taking the proposition "Provisions for Expected Losses for Long-Term Construction Contracts (PELLC)" appearing in Table 1 for example, we provided no accounting alternatives but one; "Provision is made for all expected losses on long-term construction contracts." The answers from the 64 countries with respect to this proposition fell under any of the four categories, "REQUIRED," "PREDOMINANT PRACTICE," "MINORITY PRACTICE," and "RARELY OR NOT FOUND." For accounting conservatism ranking purposes with respect to this proposition, we gave those countries who answered "REQUIRED" 1 point each, those who answered "PREDOMINANT PRACTICE" 2 points each, those who answered "MINORITY PRACTICE" 3 points each and those who answered "RARELY OR NOT FOUND" 4 points each.

Table 2. List of Environmental Variables

I. Natural environment		
1	POPULAT	Population
2	SAREA	Surface area
3	ENESS	Energy, Self-supply
4	AL/ECP	Arable land to Economically active population
5	AL/SAREA	Arable land to Surface area
II. Economical environment		
6	ENEC	Energy consumption per capita
7	NINC	National Income per capita
8	FREELO	Freedom of land ownership
(3)	ENESS	
III. Information environment		
9	RADIO	Number of radio receivers per capita
10	NEWSP	Number of daily general-interest newspaper issued per capita
IV. Political environment		
11	PARL	Parliamentary government*
12	MONA	Monarchy*
13	REP	Republic*
14	CAPIPP	Power of capitalistic political parties
15	OPPART	Existence of opposition parties
16	PARLSYS	Development degree of parliamentary system
17	MILIT	Military expenditures per capita
(8)	FREELO	
V. Social environment		
18	AGP/ECP	Agricultural population to Economically active population
19	CITY	Number of cities with 100,000 and more inhabitants
20	PHYSIC	Number of physicians per 10,000 inhabitants
21	COLLEGE	Number of enrollments in college-level institutions per 1,000 inhabitants
VI. Legal environment		
22	ROMAN	Roman legal system*
23	GERMAN	German legal system*
24	N-EURO	North-European legal system*
25	COMMON	Common-law legal system*
26	F-EAST	Far-East legal system*
27	ISLAM	Islamic legal system*
28	HINDU	Hindu legal system*

* dummy variable

environment variables except "Military Expenditures Per Capita" or "MILIT" represent the type of the political establishment it has. The variable "Military Expenditures Per Capita" or "MILIT" represents the degree of public approval to its military expenditures.[4] The variable "Number of Physicians Per 10,000 Inhabitants" or "PHYSIC" represents the level of education in such country and "Number of Enrolements in College-Level Institutions Per 1,000 Inhabitants" or "COLLEGE" denotes the degree of equality among its people as well as its level of education. The variable "Legal System" represents not only factors relating to the legal way of thinking of its people and its governmental

4) Political System Indices

We can classify the 64 countries into three political system type namely, parliamentary government

structure but also its cultural and political factors, because of its close relevance to its official language(s) and exsuzerain.[5] The environmental data we used for our study were obtained from materials published by internationally recognized authoritative sources

type, monarchy type and republic type.
By the degree of freedom of land ownership, the 64 countries were classified into three categories, namely countries where land was owned by public ("Publicly-Owned Group"), countries where freedom of land ownership was guaranteed under certain qualifications ("Qualified Freedom Group") and countries where freedom of land ownership was unqualifiedly guaranteed ("Freedom Group").
By the degree of influence of a capitalists political party or parties, they were classified into three groups, namely, countries where their existence was nil or not recognized ("Non-Existence Group" or "Non-Recognized Group"), countries where they occupied a half or less of the seats in the national legislature ("Less Than a Half Group") and countries where they occupied more than a half of the seats in the national legislature ("More Than a Half Group").
By the degree of influence of opposition parties, they were also classified into three groups, namely, countries where there existed no opposition party at all or no political party at all ("Non-Existence Group" or "Non-Recognized Group"), countries where one party rule prevailed with the exclusion of all the other parties and there were signs of a civil war ("Exclusion Group") and countries where were plurality or coalition of political parties ("Existence Group" or "Coalition Group").
By the degree of development of parliamentarism, they were classified into three categories, namely, countries where there existed no parliament or any counterpart thereof ("Non-Existence Group", countries where the people had a qualified election system ("Qualified Election Group") and countries where the people had an unqualified or general election system ("Unqualified Election Group").

5) Legal Systems
First we determined seven major legal systems in the world according to "*Einfürun In Die Rechtsvergleichung Auf Dem Gebiete Des Privatrechts*" by K. Zweigert and H. Kötz, namely (i) Roman legal system (ii) German legal system (iii) North European legal system; (iv) common law legal system: (v) Far East legal system; (vi) Islamic legal system; and (vii) Hindu legal system, and then the 64 countries were classified into these seven groups.
In classifying legal systems, Zweigert and Kötz introduced a new concept, "style of law," which consists of five elements, namely, "historical traditions," "peculiarity in legal ways of thinking," "peculiarity in the legal system," "nature and interpretation of the source of law" and "ideology."
"Roman legal system" as defined by them is a system wherein the French private law is the core and which has succeeded to the spirit of Le Code Civil.
They distinguished the German legal system from the other Continental legal systems by reason of its judicial system and nature of legal profession. The German legal system also can be characterized by many abstract points in its form and substances.
"North European legal system," they say, is different from the other Continental legal systems such as the Roman and German legal systems in that it received no influence of the Roman law until the traditional rules and systems of its own incorporating its own historical and geographical factors had been established.
"Common law legal system" is a system wherein law consists primarily of judge-made law and wherein "trust" is permitted as a typical form of doing business and there is "trust law" to govern it.
"Far East legal system" should, we believe, be considered as an independent legal system because the view of peoples in the Far East region is significantly different from that of peoples in the other parts of the world with respect to law as means to control their community life. The Japanese and Chinese legal systems come into this category.
"Islamic legal system" is a system applicable solely to the Moslem. The system uniformly governs all parts of their living.
"Hindu legal system" is a system applicable to the Hindu alone.

such as the United Nations and the UNESCO. As our study progressed, Bahamas, Bermuda, Botswana, Fiji, Hong Kong, Jersey, South Africa, Taiwan and Uruguay were dropped out of the initial list of 64 countries because of difficulty in obtaining reliable, up-to-date data with respect to those nine countries, reducing the total number of countries subject to our study to 55 states.

We then determined the correlation coefficients of each one of the 28 environmental variables except the dummy variables, to show the relation between it and ACI. We also classified the 55 sample states based on the dummy variables and calculated the mean and standard deviation of ACI with respect to each group of countries. We used the "Stepwise Multiple Regression Analysis" technique to show the comprehensive relations between each individual environmental variable and ACI.

3. Classification of the 55 States into Several Groups by Conservative Accounting Practice Patterns

We conducted Cluster Analysis to classify the 55 states into several groups based on their respective rankings on the accounting conservatism scale with respect to each of the 23 propositions. For the Cluster Analysis purposes, we invariably applied the furtherest neighbor method. For similarity or distance, we used the correlation coefficients we determined or Maharanobis' Distance. As the last step of our study, we calculated, for each one of the groups of countries, its mean and standard deviation with respect to each one of the 28 environmental variables to distinguish one group from another.

III. Results

1. Analysis of the Degree of Accounting Conservatism

The value of ACI of each of the 55 states as we determined is shown in Fig. 1. Fig. 1 indicates:

(1) that Northern and Central European countries and the United States are very conservative;
(2) that Mediterranean Europe countries are not conservative; and
(3) that Canada, the United Kingdom, Ireland, Australia, New Zealand, Singapore, India and Japan come right in the middle of the 55 countries.

These facts are very interesting particularly in view of the fact that accounting conservatism is generally believed to have its origin in the Stewardship Accounting developed in England.

The fact that Japan, together with 7 other countries, comes right in the middle of 55 countries well reflects, we believe, the fact that it is one of the national characteristics of the Japanese to take the middle-of-the-road course.

Table 3 shows the correlations between the environmental variables and the values of ACI we determined. Table 3 indicates:

(1) that the greater value a country has in its ENEC — energy consumption per capita — and NINC — national income per capita, the more conservative

managers. He states, 'Employees of Matsushita Electric are very diligent. They lead everyday worklife following the example of those who are ahead of them by five to ten years in terms of service years. They work obediently without complaints. Nothing can be changed without changing those who show an example, i. e. department and section managers.' Kaoru Hirota[18], president of Sekisui Chemical, also stresses the importance of middle managers, saying that the ability of the employees depends largely on the ability of the middle managers who manage their subordinates. He mentions, 'I tell every middle manager to evaluate each subordinate by clarifying answers to the following question; if the ability of the subordinate in question could have been different under a different manager, or if there was a mistake in the recruitment. I believe an employee's ability depends greatly on the first manager he works with.' Many other presidents are of the opinion that middle managers are to be appraised not by the financial achievement they have made but by the number of excellent subordinates they have fostered. Activation of middle managers is essential for the activation of an organization.

In activating middle managers, training and education conducted and supported directly by the top management is indispensable. It seems difficult for middle managers to serve as product champions and take the lead in activating the organization as pointed out in some literature in the U. S.[19] It is because in Japan, where lifetime employment system still persists, if a middle manager takes an initiative in challenging something new and fails, most likely does he become alienated in the organization, unless the president gives a consideration, based on merit marking, or there is a well-arranged personnel rating system.

Hiroshi Ueda[20], president of The Seiyu Ltd., attaches an importance to middle management education conducted by the top management. He states, 'I regard shop managers' education as of crucial importance. I would like to foster the middle managers, who are at the forefront of operation of the organization, by giving them education positively, delegating powers and exposing them to outside atmosphere. I want to see an entrepreneurial spirit in them. For that purpose, we must renovate thinking of the top management first.' Hiroshi Hidaka[21], president of Takashimaya Co., Ltd., says, 'Currently we hold seminars for executives and department managers. So far, it has been difficult to convene sales department managers for such seminars due to an apparent reason that business comes first in their minds. Department managers are given a significant role of communicating president's ideas to field personnel, as well as that of drawing opinions from young workers and female workers, who are informed better of new consumer behaviors. I have designed the seminar to cultivate such ability.' He emphasizes that an initiative of president himself is vital to the training and education of the middle management.

The purpose of training and education for the middle management is, like that for

18) *Ibid.* (6) Vol. 30, No. 6

19) Maidique, Modesto A.; Entrepreneurs, Champions and Technical Innovation, in "Generating Technological Innovation," Edited by Roberts, Edward B., Oxford University Press, 1987.

20) Shimizu, Ryûei; Interview Survey · · · <MITA SHOGAKU KENKYU> (7) Vol. 31, No. 2

21) *Ibid.* (9) Vol. 31, No. 6

accounting practices it follows. In other words, the greater economic power country has, the more conservative accounting practices it follows;

(2) that the greater value a country has in its NEWSP — the number of daily general-interest newspapers per capita — and RADIO — the number of radio receivers per capita, the more conservative accounting practices it follows. In other words, the richer a country's information environments are, the more conservative accounting practices it follows;

(3) that the greater value a country has in its MILIT — military expenditures per capita, the more conservative it is in accounting practices and that the degree of public approval to its military expenditures is more closely correlated to accounting conservatism in the country than the degree of development of democracy or parliamentarism in the country is;

(4) that the greater value a country has in its AL/ECP — arable land to economically active population, ENESS — energy self-supply and AL/SAREA — arable land to surface area, the less conservative it is in accounting practices. In other words, the less a country is blessed with natural environments, the more conservative it is in accounting practices;

(5) that the greater value a country has in its AGP/ECP — agricultural population to economically active population, the less conservative it is in accounting practices. In other words, agricultural nations are generally less conservative in accounting practices.

As mentioned earlier, we classified the 55 countries into several groups using certain dummy variables. We then calculated the mean of ACI values with respect to each one

Table 3. Correlation Coefficient between Environmental Accounting Conservatism Index

Environmental variables		Correlation coefficient
1	POPULAT	0.087
2	SAREA	0.248
3	ENESS	−0.122
4	AL/ECP	−0.023
5	AL/SAREA	−0.159
6	ENEC	0.398
7	NINC	0.434
8	FREELO	0.123
9	RADIO	0.254
10	NEWSP	0.389
14	CAPIPP	0.149
15	OPPART	0.148
16	PARLSYS	0.209
17	MILIT	0.375
18	AGP/ECP	−0.207
19	CITY	0.198
20	PHYSIC	0.195
21	COLLEGE	0.234

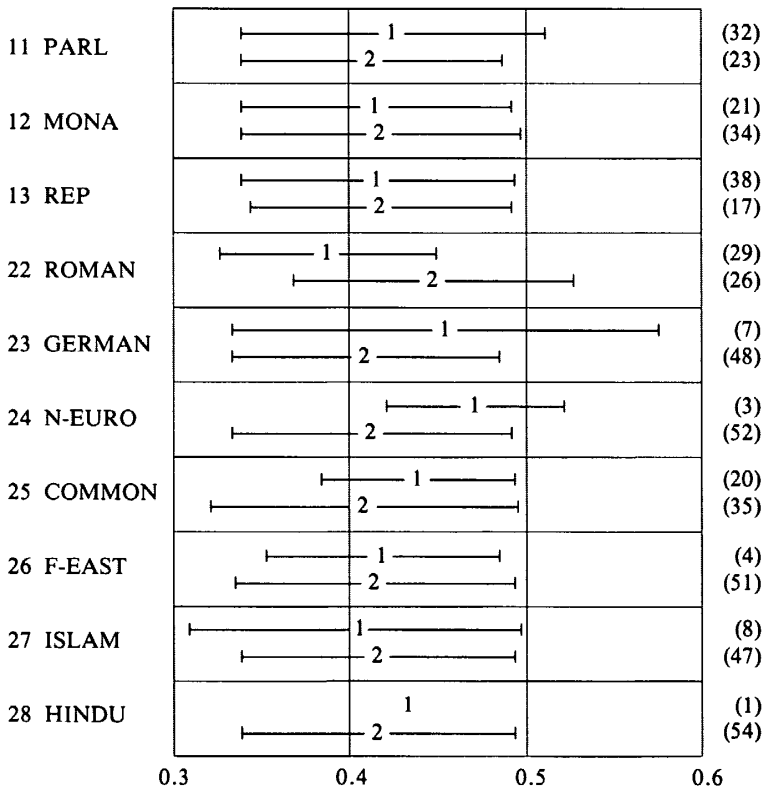
of the groups. The results of the calculation and the standard deviation of each one of the groups are shown in Fig. 2. Fig. 2 indicates;

(1) that countries whose legal systems are classified as "ROMAN" — Roman law countries — are less conservative in accounting practices than the other countries;

(2) that countries whose legal systems are classified as "N-EURO" — North-European law countries — are more conservative in accounting practices than the other countries:

(3) that countries whose legal systems are classified as "COMMON" — common law countries — are more conservative in accounting practices than the other countries, with relatively minor variance in the degree of accounting conservatism among them; and

(4) that countries whose legal systems are classified as "GERMAN" — German law countries — are slightly more conservative in accounting practices than the other countries, with relatively large variance in the degree of accounting conservatism among them.



Group 1 : the group containing countries which values of environmental variables are 1(yes).

Group 2 : the group containing countries which values of environmental variables are 0(no).

( ) : number of countries

Figure 2. Mean and Standard Deviation of Accounting Concervatism Index

Table 4 shows the results of a study which we conducted using three regression models. Model-A is a regression model wherein the threshold value of F by which to determine both entry in and removal from the regression model of any variables is fixed at 2.0. Model-B is a model which requires the least number of explanatory variables when the value of the multiple correlation coefficient is 0.7 or more. Model-C is a model in which all 28 environmental variables are put.

Table 4. Regression Models

		Model-A	Model-B	Model-C
	Constant	0.39551	0.35622	0.30242
	Variable	Coefficient		
1	POPULAT		0.00009	0.00005
2	SAREA			0.00095
3	ENESS	−0.00004	−0.00003	−0.00003
4	AL/ECP			−0.00012
5	AL/SAREA		−0.10953	−0.03999
6	ENEC		0.00203	0.00173
7	NINC	0.00182	0.00139	0.00085
8	FREELO			−0.01615
9	RADIO		−0.09344	−0.13024
10	NEWSP			0.22925
11	PARL			0.02001
12	MONA		0.05793	0.07260
13	REP	0.04264	0.08803	0.09088
14	CAPIPP		0.01354	0.00408
15	OPPART		−0.01883	−0.02051
16	PARLSYS			0.01514
17	MILIT			0.29864
18	AGP/ECP			0.00090
19	CITY			−0.00031
20	PHYSIC	−0.00478	−0.00422	−0.00422
21	COLLEGE			0.00124
22	ROMAN	−0.03196	−0.02922	−0.01749
23	GERMAN			0.01456
24	N-EURO			−0.05601
25	COMMON		0.01986	0.03471
26	F-EAST		−0.02519	−0.04403
27	ISLAM			0.00753
28	HINDU			−0.00436
Multiple Correlation Coefficient		0.6059	0.7009	0.7245

The value of the multiple correlation coefficient used in Model-A is smaller than that used in Model-C by 20%. This is a natural consequence of the fact that both F values are fixed at 2.0 when constructing Model-A. In Model-A five environmental variables are used as explanatory variables, namely, ENESS which stands for energy self-supply; NINC which stands for national income per capita; REP which stands for republic; PHYSIC which stands for the number of physicians per 10,000 inhabitants; and ROMAN

which stands for Roman legal system. The sign attached to those explanatory except PHYSIC is same as that attached to the correlation coefficient. Model-A indicates that republic and non-Roman law countries that they are relatively less blessed with energy resources than the rest of the countries, with relatively greater national income per capita and relatively a less number of physicians per 10,000 inhabitants than the rest of the countries have a tendency to become more conservative in accounting practices than the rest of the countries.

The multiple correlation coefficient of Model-B and that of Model-C are so nearly indentical that we do not think that the accuracy of Model-B in assessing the degree of accounting conservatism in any country would have been augmented to any material extent.

2. Grouping and Characteristics of Each Group

As mentioned earlier, we defined accounting conservatism ranking among the 55 states with respect to each of the 23 different accounting alternatives and checked their resulting ranking scores each other to determine the degree of the similarity —— ranking score similarity —— among them, if any. We then classified the 55 countries into several groups by applying the Cluster Analysis technique to the degree of ranking score similarity among them. As shown in Table 5, we prepared 6 cluster models in which correlation coefficients were used to determine the degree of such similarity, and another 6 cluster models in which Maharanobis' distances were used instead of correlation coefficients. Cluster models M4 through M9 are models using Maharanobis' distances, and cluster models C4 through C9 are those using correlation coefficients.

Table 5. Cluster Models

Model	Number of Cluster	Distance or Similarity	Number of Countries Cluster Number									Number of Mis-classification
			1	2	3	4	5	6	7	8	9	
M4	4	71.586	23	19	11	2						0
M5	5	71.447	23	19	10	2	1					0
M6	6	71.135	23	18	10	2	1	1				0
M7	7	66.330	11	18	10	12	2	1	1			0
M8	8	64.226	11	18	10	7	2	5	1	1		0
M9	9	63.557	11	16	10	7	2	2	5	1	1	0
C4	4	−0.39364	7	17	9	22						0
C5	5	−0.29710	7	17	9	11	11					1*
C6	6	−0.20610	7	17	9	4	7	11				0
C7	7	−0.15728	7	11	9	6	4	7	11			0
C8	8	−0.11029	7	11	3	6	4	7	11	6		0
C9	9	−0.08403	4	11	3	3	6	4	7	11	6	0

(*): Misclassification of the Group 4 as the Group 5.
(*1): Furthest Neighbor method is applied to all models.
(*2): Mahalanobis' square distances are applied to M models.
(*3): Correlation coefficients are applied to C models as similarity.

After those classifications we conducted a discriminant analysis with respect to the resulting groups of each of the 12 cluster models and found no misclassification cases at all with respect to any of the 12 models except that one misclassification case (Nicaragua) occurred in Model C5 — the model in which the 55 countries were classified into five groups using correlation coefficients as the means to determine the degree of ranking score similarity.

Fig. 3 shows the results of the grouping of the 55 countries conducted using the degree of similarity among them in their accounting practices — accounting practice similarity — as the grouping basis. One can say, when taking a single look at the figure, that the 55 countries are more evenly distributed among the groups resulting from cluster models in which correlation coefficients were used than those resulting from cluster models using Maharanobis' distances. As shown in Fig. 3-1, when we used correlation coefficients to determine the degree of accounting practice similarity, we classified the 55 countries into 9 groups, taking into consideration the way in which the value of the correlation coefficient decreased from one group to another. Here we are going to make some discussions with respect to the characteristics of each of the 9 country groups in terms of environmental variables and prevailing accounting practices.

(1) Latin Model-I (C9 — G1)

This group consists primarily of Latin countries with the Roman legal system. The group can be characterized by the fact that the countries in the group use non-conservative accounting practices with respect to writing-down of fixed assets ("WDFA"); methods of depreciation ("MDEP"); treatment of dividends on investment paid in excess of the investor's proportionate share of earnings ("DIVI"); and deferment of advertising expenses related to products not yet marketed ("DAEPNM").

(2) North European Law/Far East Law Model (C9 — G2)

This group consists primarily of North European law countries and Far East law countries. Generally the countries in the group are relatively highly developed countries with freedom of land ownership and highly developed parliamentarism. They maintain a relatively higher degree of accounting conservatism. The group can be characterized by the fact that its constituent countries use conservative accounting practices with respect to provisions for expected losses on long-term construction contracts ("PELLC"); and provisions for expected losses on long-term purchase contracts ("PELUPC"), on one hand while they use non-conservative practices with respect to the interpretation of market value of inventories ("MVI"); and method of inventory evaluation ("MINV"), on the other.

(3) German Law Model (C9 — G3)

This group consists of liberalistic German law countries. They maintain stronger accounting conservatism than the countries in any other group. The group can be characterized by the fact that its constituent countries use conservative accounting practices with respect to estimation of the useful life of fixed assets ("ULFA"); recognition standards losses on contracts of certain specific types; and deferment of advertising expenses related to products not yet marketed ("DAEPNM") and deferment of research and development costs ("DRESC" and "DDEVC").

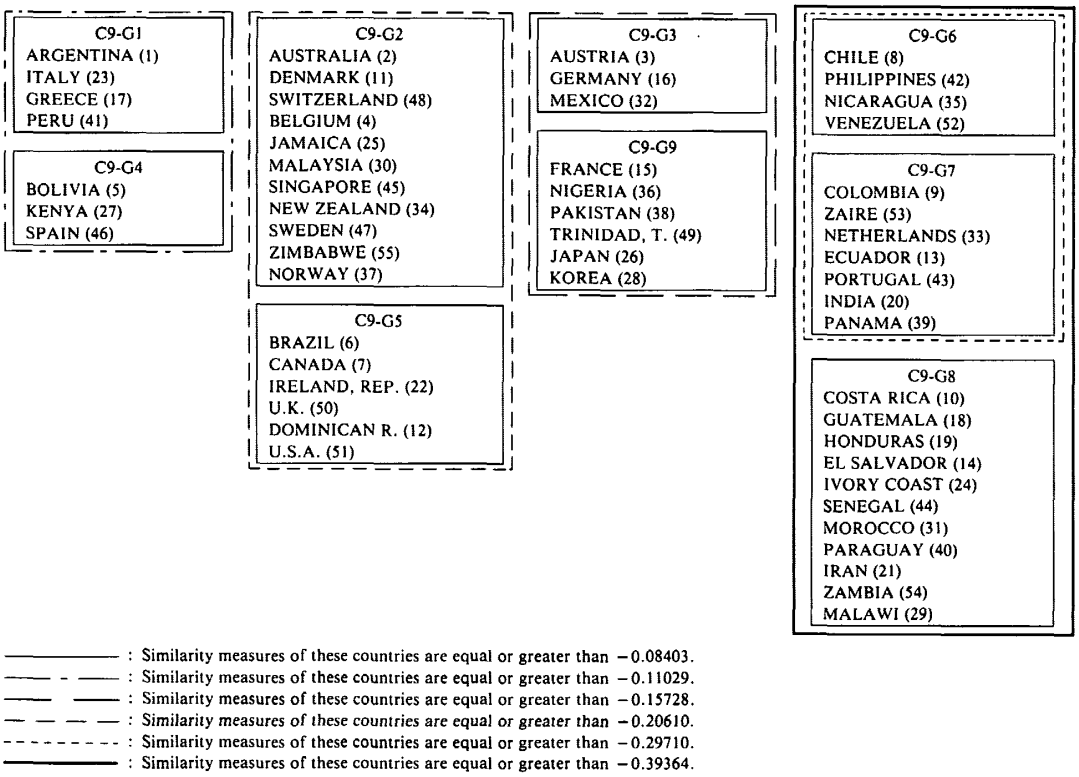


Figure 3-1. Results of Country Groupings (C Models)

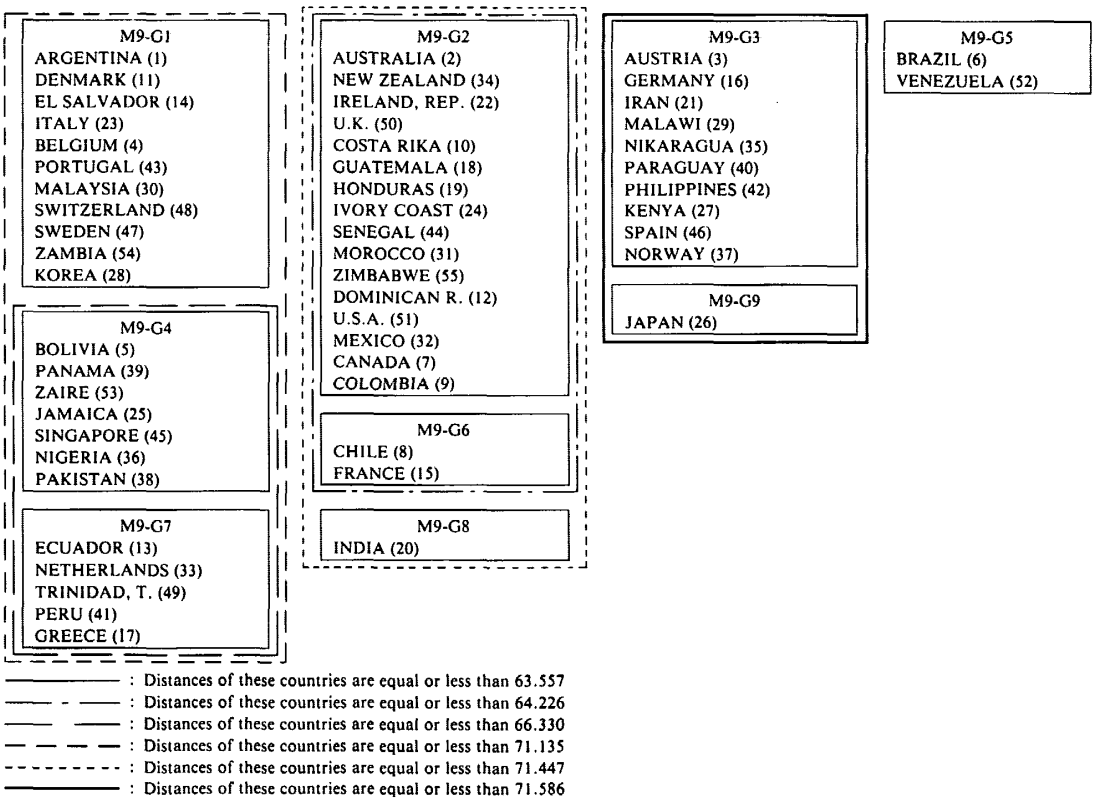


Figure 3-2. Results of Country Groupings (M Models)

(4) Latin Model-II (C9 — G4)

This group consists of countries where business environments are relatively unfavorable, with liberalism and information environments still being under a development stage. They maintain a moderate degree of accounting conservatism. The group can be characterized by the fact that its constituent countries use conservative accounting practices with respect to carrying bases of investments in marketable securities and gains from disposition of fixed assets ("GDFA"), on one hand, while they use non-conservative practices with respect to MVI and deferment of development costs ("DDEVC"), on the other.

(5) Common Law/Anglo-American Model (C9 — G5)

This group consists of common law countries. They are culturally and economically developed countries where democracy has well developed and business environments are generally favorable. They maintain relatively strong accounting conservatism. The groups can be characterized by the fact that its constituent countries use conservative accounting practices with respect to WDFA; ULFA; DIVI; the reversing of writing-down for impairment of investments ("RWDII"); provisions for expected losses on certain contracts; and DRESC, on one hand, while they use non-conservative practices with respect to elements of cost of inventories ("ECI"); MINV; PLCC; and exchange gains.

(6) Roman Law/Central and South American Model (C9 — G6)

This group consists primarily of Roman law countries located in Central or South America. The group can be characterized by the fact that the freedom of land ownership is almost invariably limited in its constituent countries and that accounting conservatism there is relatively weak in that they use non-conservative accounting practices with respect to carrying bases of investments in marketable securities; DAEPNM; and exchange gains on unsettled transactions ("EGUST"), on one hand, while they employ conservative practices only with respect to MVI; carrying bases of inventories ("CBI"); and MINV on the other.

(7) Roman Law Model (C9 — G7)

This group consists of a part of Roman law countries. The group can be characterized by the fact that its constituent states maintain a moderate degree of accounting conservatism and that they use conservative accounting practices with respect to elements of cost of construction of fixed assets ("ECCFA"); and ECI, on one hand, while they employ non-conservative practices with respect to ULFA; CBI; and exchange losses on unsettled transactions ("ELUST") on the other.

(8) Islamic Law/African Model (C9 — G8)

This group consists of Islamic law countries and African states. They are typical developing countries. They maintain relatively weak accounting conservatism. The group can be characterized by the fact that its constituent countries use non-conservative accounting practices with respect to CBI and RWDII on one hand, while they employ conservative practices with respect to ECCFA, ECI and GDFA on the other.

(9) Common Law/Far East Model (C9 — G9)

This group consists partly of common law countries and partly of Far East law countries. They are relatively blessed with natural environments. Their accounting conservatism is rather weak. The group can be characterized by the fact that its constituent countries

use non-conservative accounting practices with respect to MVI, CBI and PELUPC on one hand, while they employ conservative practices with respect to MDEP and ULFA.

As shown in Fig. 3—2, when we applied Maharanobis' Distance as accounting practice similarity, we classified the 55 countries into 7 groups, taking into consideration the way in which the distance between one group and another increased. Here we are going to make some discussions with respect to the characteristics of each of the 7 country groups in terms of environmental variables and prevailing accounting practices.

(1) Small Population Country Model (M9 — G1)

This model consists of countries with small population and few cities. The degree of their accounting conservatism is moderate. The group has no particular characteristics worthwhile mentioning except that its constituent countries use nonconservative accounting practices with respect to DAEPNM.

(2) Developed Nation Leader Model (M9 — (G2 + G6))

This model consists of the United Kingdom, the United States and France, and those countries which are under the influence of those three countries or any of them.

The degree of accounting conservatism among its constituent countries ranges between slightly weak and moderate. The group can be characterized by the fact that its constituent countries use non-conservative accounting practices with respect to PLCC and EGUST.

(3) Mixture Model (M9 — G3)

German law countries and developing countries are mixed in this group. They maintain the highest degree of accounting conservatism of all. The group can be characterized by the fact that its constituent countries invariably use conservative accounting practices with respect to CBIMSC and GDFA.

(4) Central and South American Model (M9 — (G4 + G7))

This group consists primarily of small Latin American countries where capitalism is still under a development stage and business environments are generally unfavorable. They maintain the lowest degree of accounting conservatism of all. The group can be characterized by the fact that its constituent countries invariably use non-conservative accounting practices with respect to DRESC.

(5) Brazil/Venezuela Model (M9 — G5)

This group consists of Brazil and Venezuela. They maintain a moderate degree of accounting conservatism. The group can be characterized by the fact that the freedom of land ownership is invariably limited to a certain degree or another in these countries and that they use conservative accounting practices with respect to fixed assets and inventories on one hand, while they employ non-conservative practices with respect to deferment of advertising, research and development costs on the other.

(6) Indian Model (M9 — G8)

This group consists solely of India, the unique Hindu law country. It has very large population and territorial area. But its economy, information and social environments are still under a development stage.

It maintains a moderate degree of accounting conservatism. It can be characterized by the fact that it uses conservative accounting practices with respect to MDEP, ECI,

PELLC, PELUPC and exchange gains on one hand, while it uses non-conservative practices with respect to WDFA, ULFA, RWDII and ELUST on the other.

(7) Japanese Model (M9 — G9)

This model consists solely of Japan, where capitalism has been highly developed and the levels of both information environments and education are very high.

It maintains a moderate degree of accounting conservatism. It can be characterized by the fact that non-conservative accounting practices are generally used there with respect to ECCFA, ECI, CBI, DIVI and provisions for expected losses on contracts of certain specific types on one hand, while conservative practices are generally employed with respect to fixed assets and inventories, CBIMSC, PLCC, DDEVC and ELUST on the other.

IV. Concluding Remarks

The degree of influence of accounting conservatism upon accounting practices varies from one country to another. In our study, we succeeded, we believe, in explaining such variance to a certain extent by natural, economic, information, political, social and legal environmental variables, and also in classifying the 55 sample countries into several groups based on their respective accounting conservatism ranking scores and identifying the characteristics by which they can be distinguished from each other.

As a natural consequence of the fact that we fully relied on the research work conducted and published by Price Waterhouse International in conducting our study, the reliability of the results of our study depends very much on that of Price Waterhouse's work. The reliability of the results of our study is also somewhat limited by that fact that there may be a number of other accounting alternatives which can be used as factors to determine the degree of accounting conservatism than those used in our study and that in our study the number of environmental variables are limited to 28 because of the limited availability of useful and reliable data and information.

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