

Comparative Information Content of Return on Assets Based Alternative Translation Methods

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Abstract

There is a massive foreign currency translation literature, but virtually no empirical research exists that describes differences in information content of translated financial statements when different translation methodologies are applied. This study examines return on total assets across translation methodologies with the assumption that differences in information content are reflected in differences in rank orderings of companies. The greatest differences in rank orderings were observed between the methodologies of SFAS #8 and SFAS #52 whereas the current-noncurrent and the current rate methods rank companies similarly. Differences in information signals across translation methodologies are often enormous and are highly firm specific.

Introduction and Purpose

It is clear that there is nothing close to a worldwide consensus as to which exchange rates ought to be used to translate various accounts from a foreign subsidiary's currency to U.S. dollars prior to consolidation. An examination of the accounting practices of fifty countries a decade ago reveals that seven countries used the current-noncurrent method (CNM), ten used the monetary-nonmonetary method (MNM), eleven used the temporal rate method (TRM), and twenty-two a current rate method (CRM), (Choi and Mueller 1992). Three other countries (U.S., U.K., and Canada) used CRM or TRM, depending on the circumstances. In more recent years, translation practice in a number of countries has been influenced by the International Accounting Standards Board pronouncements and U.S. GAAP. Many multinational companies, domiciled in various countries, use TRM for non-integrated companies and CRM for companies more closely integrated with the parent company, (Holt, 2003).

This study examines a single financial ratio, return on total assets, and suggests that differences in information content between translation methodologies are reflected in differences in rank orderings of companies based on return on assets numbers. The purpose of this paper is to determine (1) if different translation methodologies materially affect the comparative rankings, and hence comparative information content, of companies in terms of return on total assets, and (2) if some methodologies appear to be informationally similar in terms of return on total assets.

The lack of understanding of the effects of alternative translation methods is not surprising once surrounding circumstances are considered. Companies use one translation method at a time, some methods have not been used for many years, some feasible methods have never been used, and except for the translation gain or loss, the effects of translation are buried in the consolidated accounts. Untangling these effects for a reasonable number of firms presents a discouraging task. Moreover, obtaining the further temporally referenced item-by-item data required to construct comparable results under alternative methods for research purposes would task the patience of the most cooperative of firms. For these reasons, no broadly comparative and temporally sustained study, involving reasonably large samples of real firm data, appears to be available. This study seeks to begin to fill this vacuum of empirical insight into the reporting consequences of alternative translation methods to the extent that these obstacles can be overcome. The present study overcomes these difficulties with a unique methodology described below.

Literature Review

There exists a massive foreign currency translation literature, spanning several decades, which consists largely of theory and opinions about how translation should or should not be done. Yet, little empirical research has been done to describe differences in information content of translated financial statements when different translation methodologies are applied. The translation policy choices for GAAP, in the U.S. as well as in other countries, have always been made with virtually no empirical knowledge of just what happens to consolidated financial statements when foreign accounts are translated by different methodologies.

The foreign currency translation literature can be divided into four general categories: (1) studies which are surveys of management perceptions and studies of changes in management behavior, (2) studies of the impact of alternative translation methods on financial statements, (3) market studies, and (4) studies which reveal preferences for translation methods by studying events such as early adoption of SFAS #52 and lobbying.

Among the category (1) studies, Rodriguez (1980) surveyed 70 U.S. MNCs and found that managements were non-speculative, defensive with respect to exchange rate variations, and reluctant to report translation losses. As a result, they were willing to pay a hedging cost higher than the average exchange depreciation. Houston (1986) found that managements decreased their financial exposure hedging when adopting SFAS #52. A number of studies reflect managements' displeasure with currency translation rules. Examples are Choi et al.'s (1979) survey, Stanley and Block (1979a and 1979b) and Cooper et al. (1978).

Among the category (2) studies are Aggarwal (1978), Biel (1976), Teck (1976), Porter (1983), and Selling and Sorter (1983), all of which criticize accounting rules for currency translation. Aggarwal (1978) and Reckers (1978) expressed the opinion that SFAS #8 resulted in financial statements that, in one way or another, did not reflect economic reality. In a simulation study, Rupp (1982) concluded that the temporal method of SFAS #8 was extremely sensitive to the proportion of debt in the capital structure.

Among the category (3) studies, Griffin and Castanias (1987) observed that managers were motivated to enter the currency futures markets to reduce the fluctuations in reported translation gains and losses. This behavior, while functional for managers, can be dysfunctional to the company since currency futures trading is costly. Bryant and Shank (1977) expected that such dysfunctional behavior would result in significant adverse market reaction. Shank et al. (1980) and Ziebart and Kim (1987) did observe various market reactions to currency translation methods. A conclusion to be drawn from category (3) studies is that accounting method does often result in an adverse market effect, although such effects are partially the result of managers' changes in behavior based on changes in accounting method.

Collins and Salatka (1993) concluded that including the foreign currency adjustment in reported earnings, as required by SFAS #8 (TRM), produced noise which reduces the quality of earnings, but Soo and Soo (1994) found that the market reflected no difference between including the adjustment in earnings as required by SFAS #8 and excluding it from earnings as required by SFAS #52 (CRM). Bartov (1997) found that the SFAS #52 requirements caused reported earnings to be more relevant for market valuation than SFAS #8.

Among the category (4) studies, Griffin (1983), Ayres (1986), Berg (1987), Kelly (1985), and others indicate that large companies with low management ownership are more likely to lobby for or against a proposed change in currency translation rules than smaller companies with higher management ownership. Furthermore, managements do change their behavior based on managements' perceptions of how different currency translation rules may affect financial statements.

During the period that the massive literature was being written, standard-setting bodies in the United States have required, at different times, four different translation methodologies. First, the current-noncurrent method (CNC) was required; then the monetary-nonmonetary (MNM) method advocated by Hepworth (1956) and required by APB Opinion No. 6 in 1965; then the temporal rate method (TRM) developed by Lorensen (1972) and required in 1975 by SFAS #8; and most recently the current rate method of SFAS #52 (1981). But even this newest standard is criticized widely (for example, Beaver and Wolfson, 1982). Clearly there is no closure on the foreign currency translation and consolidation problem in the United States, let alone worldwide.

Methodology

The purposes of this study were achieved by taking the following steps:

Fifty U.S. companies were selected at random to build a data base of pre-translation financial statements. To be eligible for inclusion in the sample, a company must have had annual financial statements available for twenty consecutive years ending in 2000.

Before translating financial statements, it was necessary to determine the temporal characteristics of the pre-translation reported accounting numbers. Obtaining this information directly from the companies selected for the sample, for all the years studied, was impractical. This data problem has always been a major barrier to empirical research in foreign currency translation. This study overcame this barrier by estimating the temporal characteristics with a specially developed and tested estimation method.

Three studies, relevant to the estimation of temporal characteristics, were Petersen (1971), Davidson et al (1976), and Parker (1977). The purpose of these models was to generate estimated general price level data. Ketz (1977) provided detailed explanations of these three models, and Ketz (1978) tested their validity. He concluded that each of the three models is sufficiently accurate for research purposes.

But the three models tested by Ketz are limited in that they estimate only the average ages of assets and liabilities. For the purposes of the present study, an estimation method that results in a distribution of ages for such accounts rather than merely an average age was needed. This estimation was most critical for fixed assets because of the relative size of fixed assets numbers. Fixed assets are translated at historical exchange rates under some methodologies, for example the TRM of SFAS #8, and at the current exchange rate under others, for example the CRM of SFAS #52. A sophisticated method of estimation was developed based on the assumption that asset retirements occur in FIFO fashion and using published purchase and retirement data. The method was tested against 1,200 theoretical companies with the following results: 18 percent of the estimates resulted in a translation error of less than 1 percent, 79 percent in errors of less than 5 percent, 99 percent in errors of less than 10 percent, and none of the estimates results in translation errors of more than 11.37 percent (Holt, 1991).

The financial statements of each of the fifty companies were translated annually for a ten-year period, 1991-2000, representative of various relative exchange rate and price level conditions.

This study examined three methodologies which encompass the history of GAAP in the United States as well as price parity methodology. Including the deferral or non-deferral of translation gains and losses factor resulted in eight methodologies as follows:

M1 = CNM/NDF	M5 = CNM/DEF
M2 = TRM/NDF (SFAS #8)	M6 = TRM/DEF
M3 = CRM/NDF	M7 = CRM/DEF (SFAS #52)
M4 = PPM/NDF ^c	M8 = PPM/DEF

Where	CNM = current-noncurrent method
	TRM = temporal rate method,
	CRM = current rate method,
	PPM = price parity method,
	NDF = non deferral of translation gains and losses,
	DEF = deferral of translation gains and losses

The monetary-nonmonetary method, once required by GAAP in the United States, was excluded, because there is little practical difference between the monetary-nonmonetary method and the temporal rate method, and because the pre-translation data needed to make the distinction was not readily available.

The translations were made from U.S. dollars to British pounds to generate the post-translation earnings and total assets numbers needed to calculate post-translation return on total assets. Although other currencies could have been chosen, the time series data of exchange rates between the U.S. and the U.K. were used because they were easily obtainable, and the U.K. is a major direct investor and investee of the U.S.

Two questions were posed concerning the information content, represented by rank ordering of companies, of the return on total assets numbers generated from different translation methodologies: (1) Do different translation methodologies materially affect the comparative rankings of firms in terms of profitability as measured by return on total assets across firms and across periods? And (2) Do some methodologies rank firms similarly in terms of return on total assets?

In this study, a significant difference in rank orderings, and hence information content, is assumed to exist when a “quintile change” is observed. If a company is ranked fifteenth under one translation methodology and sixteenth under another, there is a difference in information signals between the two methodologies, but the difference may be of little if any importance in most decisions. However, a change from fifteenth position to twenty-fifth (a quintile change) is defined, for the purpose of this study, as a significant difference in information signals between two translation methodologies. The use of quintiles instead of quartiles or sextiles is arbitrary and is based on the number of companies in the sample (fifty).

Results

Table 1 shows the Spearman rank correlation coefficients for each of the nine years and the nine-year average for all methodology pairs. The highest correlation of rank orderings based on return on assets occurs between M5 (CNM/DEF) and M7 (CRM/DEF), and this very high correlation is maintained consistently during each of the nine years. Deferral or non-deferral of translation gains and losses generally has a minor effect on relative rank orderings. For example, the rank orderings of M4 and M6 produce an average Spearman R of .83. But when M4 is compared with M2 (M2 is the same methodology as M6, except for non deferral of translation gains and losses), the average Spearman R is similar at .81.

It is especially interesting that two methodologies which result in a comparatively low average Spearman R as well as little consistency over the nine years are the methodologies required by SFAS #8 (M2) and SFAS #52 (M7). When FASB made the change in GAAP from SFAS #8 to SFAS #52, it made a major change in information content based on the rank ordering of companies by return on assets. The M2-M3 pair and the M2-M5 pair had similarly low average Spearman R's and consistency over the study period.

Table 2 shows the quintile changes across firms for return on asset for 1994 and 2000, two representative years. In both years, all methodology pairs (with the exception of M5 and M7 in 1994) result in at least one quintile change. The majority of such changes are of one quintile only. But since a single quintile change represents significantly different information signals resulting from the use of different translation methodologies, a small number of quintile changes cannot be dismissed as trivial. For example, the M5 (CM/DEF) vs. M7 (CRM/DEF) pair results in only three quintile changes in 2000, but such a difference could be significant to an investor who rank orders companies by return on assets as a part of the investment decision. The three quintile changes could lead the investor to significantly different investment decisions.

In 1994, the largest number of quintile changes was seventeen for the M2 (TRM/NDF) vs M6 (TRM/NDF) pair and twenty for the M2 (TRM/NDF) vs. M7 (CRM/DEF) pair. In 1994, the methodology that is the least compatible with the other seven methodologies in terms of information content based on return on assets orderings is M2 (TRM/NDF) which resulted in a total of ninety-three quintile changes in the seven pairings. The most compatible methodologies were M5 (CNM/DEF) and M7 (CRM/DEF) which had no quintile changes in 1994 and three in 2000.

There are differences in the number of quintile changes based on return on assets in 2000 compared with 1994, but the general patterns remain the same. M2 (TRM/NDF) appears to be the methodology which is the least compatible with the others, and M5 (CNM/DEF) and M7 (CRM/DEF) the two methodologies most compatible with one another.

Conclusion

By way of conclusion, an attempt is made to provide answers to the two questions posed above. First, do different methodologies materially affect the comparative rankings of companies in terms of

profitability as measured by return on assets, across firms and across periods? Companies are clearly ranked differently by return on total assets depending on the translation methodologies used. It is especially interesting that M2 (TRM/NDF) and M7 (CRM/DEF), the methodologies of SFAS #8 and SFAD #52 respectively, rank order companies with less consistency than most other pairs, and that a relatively high number of quintile changes result, twenty in 1994 and eleven in 2000.

For all methodology pairs, the Spearman R's indicate differences in rank orderings for the sample firms taken together, and a perusal of the rank orderings of individual companies and the resulting quintile changes indicates that there are often significant differences in rank orderings at the firm level. Rank orderings and quintile changes for individual firms are highly firm specific, and differences in rank orderings are not consistent across periods.

Second, do some methodologies rank firms similarly in terms of return on total assets? The two methodologies which rank order companies with the highest correlation as well as with the highest consistency over the study period are M5 (CNM/DEF) and M7 (CRM/DEF), although at the firm level there are sometimes significant differences as evidenced by quintile changes.

It is clear from Tables 1 and 2 and from the answers to the above two questions that there are often very substantial differences in rank orderings of companies by return on total assets depending on the translation methodologies used. Therefore, the translation methodology policy choice is certainly not trivial in reference to return on total assets. It is particularly striking that, in most of the nine years of the study period, most methodology pairs result in at least one company being rank ordered at least thirty lower by one methodology than by the other (three quintile changes). Such differences in information signals are enormous and, depending on the specific decision being made, are of potentially substantial significance.

Limitations and Suggestions for Future Research

This study did not determine which translation methodology is best by any normative criterion. But it is clear that translation methodology policy choice for GAAP does matter, often very substantially, for rank orderings of companies based on return on total assets. Future research should describe differences in rank orderings for other important ratios. Ultimately, the translation methodology policy choice must be based on normative criteria. Empirical studies which test translation methodologies against various normative criteria are needed as well as additional, descriptive studies such as the present study.

Table 1
Spearman R's Based on Returns on Total Assets
1991 – 2000

Methodology Pairs	<u>1992</u>	<u>93</u>	<u>94</u>	<u>95</u>	<u>96</u>	<u>97</u>	<u>98</u>	<u>99</u>	<u>00</u>	<u>Average</u>
M1 vs M2	.76	.77	.75	.71	.93	.74	.81	.91	.76	.76
M1 vs M3	.83	.82	.80	.66	.90	.87	.88	.81	.83	.82
M1 vs M4	.79	.78	.83	.83	.96	.81	.82	.85	.82	.83
M1 vs M5	.88	.85	.84	.73	.93	.88	.90	.75	.87	.85
M1 vs M6	.85	.71	.74	.60	.89	.70	.75	.76	.73	.75
M1 vs M7	.95	.81	.86	.72	.85	.83	.94	.87	.84	.85
M1 vs M8	.81	.57	.76	.66	.88	.73	.79	.78	.78	.75
M2 vs M3	.53	.57	.73	.41	.86	.71	.74	.80	.81	.68
M2 vs M4	.59	.83	.82	.87	.90	.90	.82	.84	.69	.81
M2 vs M5	.49	.58	.70	.40	.81	.63	.80	.79	.74	.66
M2 vs M6	.61	.63	.85	.77	.87	.86	.87	.79	.84	.79
M2 vs M7	.47	.58	.69	.39	.84	.55	.81	.84	.77	.66
M2 vs M8	.63	.68	.80	.65	.92	.83	.78	.65	.69	.74
M3 vs M4	.74	.68	.84	.62	.89	.83	.74	.76	.79	.77
M3 vs M5	.87	.88	.91	.83	.98	.82	.96	.87	.84	.88
M3 vs M6	.76	.81	.75	.63	.86	.84	.80	.90	.84	.80
M3 vs M7	.87	.94	.92	.84	.93	.85	.84	.93	.77	.88
M3 vs M8	.78	.73	.89	.71	.96	.91	.84	.92	.84	.84
M4 vs M5	.83	.66	.80	.66	.89	.63	.85	.79	.86	.77
M4 vs M6	.93	.79	.79	.81	.91	.74	.87	.76	.85	.83
M4 vs M7	.83	.72	.86	.65	.88	.65	.87	.84	.88	.80
M4 vs M8	.99	.83	.97	.81	.99	.86	.90	.83	.90	.90
M5 vs M6	.88	.85	.86	.76	.91	.71	.91	.99	.89	.86
M5 vs M7	.97	.97	.98	.97	.97	.96	.96	.98	.95	.97
M5 vs M8	.87	.84	.90	.80	.93	.76	.93	.93	.93	.88
M6 vs M7	.90	.91	.87	.71	.90	.69	.88	.91	.83	.84
M6 vs M8	.95	.96	.92	.95	.96	.90	.91	.91	.91	.93
M7 vs M8	.91	.81	.87	.85	.89	.75	.87	.89	.89	.86

Table 2
Quintile Changes Across Firms Based on Return on Total Assets
1994 and 2000

Methodology Pairs	Quintile Changes									
	1994					2000				
	0	1	2	3	4	0	1	2	3	4
M1 vs M2	39	8	0	3	0	44	5	0	1	0
M1 vs M3	36	9	3	2	0	44	5	1	0	0
M1 vs M4	37	6	3	3	1	39	7	3	1	0
M1 vs M5	43	3	2	2	0	42	6	2	0	0
M1 vs M6	41	5	4	0	0	38	8	2	2	0
M1 vs M7	42	3	4	1	0	39	9	1	1	0
M1 vs M8	35	7	3	5	0	37	12	0	1	0
M2 vs M3	39	6	5	0	0	36	12	1	1	0
M2 vs M4	40	7	1	1	1	37	9	1	2	1
M2 vs M5	37	4	3	6	0	31	15	3	1	0
M2 vs M6	33	12	3	1	1	37	12	1	0	0
M2 vs M7	30	11	4	4	1	39	8	2	1	0
M2 vs M8	39	7	2	1	1	35	10	3	2	0
M3 vs M4	40	3	6	0	1	40	8	1	1	0
M3 vs M5	41	8	0	1	0	40	7	1	2	0
M3 vs M6	37	9	2	2	0	38	11	1	0	0
M3 vs M7	43	7	0	0	0	39	11	0	0	0
M3 vs M8	36	9	3	1	1	39	10	1	0	0
M4 vs M5	34	6	9	1	0	42	7	1	0	0
M4 vs M6	42	6	2	0	0	44	3	2	1	0
M4 vs M7	39	4	0	0	0	40	9	1	0	0
M4 vs M8	43	2	3	2	0	47	3	0	0	0
M5 vs M6	44	3	2	1	0	47	3	0	0	0
M5 vs M7	50	0	0	0	0	47	3	0	0	0
M5 vs M8	41	6	3	0	0	44	6	0	0	0
M6 vs M7	45	1	3	1	0	42	4	4	0	0
M6 vs M8	45	5	0	0	0	45	4	1	0	0
M7 vs M8	42	7	1	0	0	39	10	0	1	0

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