A Normative Evaluation of Translation Methodologies Based On Present Values of Future Cash Flows to Investors

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Abstract

Virtually no empirical foreign currency translation research exists that tests alternative translation methodologies against normative criteria. This study evaluates alternate translation methodologies in terms of the quality of earnings criterion of prediction of future cash flows. Eight translation methodologies are compared, using a modification of the Ohlson firm valuation model, in which the discounted future cash flows to investors is the dependent variable. The translation methodology that performed best in this normative assessment was a price parity method, a method that has never been required or allowed under U.S. GAAP.

Keywords: Currency translation, earnings quality, firm valuation, investor returns, normative criteria, Ohlson valuation model, price parity.

Introduction and Background

An Unsolved Problem

United States standard-setting bodies have required, at different times, four different translation methodologies. First, the current-noncurrent method (CN) was required; then the monetary-nonmonetary (MN) method required by APB Opinion No. 6 in 1965; then the temporal rate method (TR), required in 1975 by SFAS #8; and most recently the current rate method (CR) of SFAS #52 (1981). But even this newer standard was criticized widely (for example, Beaver and Wolfson, 1982). The translation policy choices for Generally Accepted Accounting Principles (GAAP) in the United States have always been made with essentially no empirical knowledge of just what happens to consolidated financial statements when foreign accounts are translated by diverse methodologies and without empirical evaluations of normative criteria.

An investigation of the accounting practices of fifty countries more than two decades ago revealed that seven countries used the current-noncurrent method (CN), ten used the monetary-nonmonetary method (MN), eleven used the temporal rate method (TR), and twenty-two a current rate method (CR), (Choi and Mueller, 1992). Many multinational companies, domiciled in different countries, use TR for non-integrated companies and CR for companies more closely integrated with the parent company (Holt, 2003).

Houston (1986) observed that no translation methodology has been validated to be superior to other methodologies in any theoretical way. Clearly there is no closure on the foreign currency translation and consolidation problem in the United States, let alone worldwide.

Obstacles to Empirical Research

The absence of understanding of the consequences of using various translation methods is not unexpected once circumstances are considered. Multinational companies use one translation method at a time, based on the requirements of standard-setting bodies, 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 meaningful number of companies presents an impractical chore. Furthermore, obtaining the temporally referenced item-by-item data required to construct comparable results under alternative translation methods for research purposes would task the patience of the most obliging of firms.

Consequently, no broadly comparative and temporally sustained studies, involving reasonably large samples of real firm data, and evaluating alternative translation methodologies by any normative criterion, have been achieved.

However, the present study overcomes these difficulties with a unique methodology, described below.

Purpose of the Study

The issue of which foreign currency translation methodology is superior to others is a normative question. Although there are a number of possible accounting-related normative criteria, this study focuses on the value of the firm from the viewpoint of investors, and suggests that accounting numbers resulting from the application of any viable translation methodology should relate to investor-perceived firm value.

Previous studies do not consider methodologies that have never been used, but which may be viable, even superior. Therefore, the price parity method, a feasible method which has never been permitted by standard setting bodies in any country is included in the study.

Literature Review

The relevant literature can be divided into two categories: (1) studies of the impact of alternative translation methods on financial statements, and (2) market studies.

Studies of the Impact on Financial Statements

A number of early studies criticize accounting rules for currency translation. Among these are Aggarwal (1978), Biel (1976), Porter (1983), and Selling and Sorter (1983). 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. Holt (2006) empirically compared the variability of reported earnings resulting from eight foreign currency translation methodologies. The current rate method with non-deferral of translation gains and losses resulted in the highest average variability of earnings, and price parity methodologies resulted in lower variability than exchange rate methodologies as reflected by the average coefficients of variation of the study companies. However, results were highly firm specific.

Liu (2006) used an accounting-based equity valuation model for multinational firms to examine the forecasting and valuation properties of foreign currency translation gains and losses. It found that translation gains and losses could be subdivided into a core component and a transitory component. The combined effect was that translation gains and losses were more transitory than transitory earnings.

Holt(2012a) focused on two short-term liquidity ratios, the current ratio and inventory turnover and attempted to identify, in terms of empirical properties, if and in what ways foreign currency translation methodologies generate different results. Analysis of meaningfully-paired observations indicated substantially different current ratio and inventory turnover numbers across translation methodologies. But the results were not consistent from year to year and the results of all the fifty sample companies, taken together, did not hold for all the individual companies. At the firm level, the results were highly firm specific.

Market Studies

Bryant and Shank (1977) expected that dysfunctional management behavior would result in significant adverse market reaction. Ziebart and Kim (1987) indicated an overall negative market reaction to SFAS No. 8, with a positive reaction to SFAS No. 52. In addition, the pre-SFAS No. 8 methods of accounting for foreign currency translation were found to be related to the market reactions to SFAS No. 8 and SFAS No. 52 in various ways.

Collins and Salatka (1993) concluded that including the foreign currency adjustment in reported earnings, as required by SFAS #8 (TR), produced noise which reduces the quality of earnings. Soo and Soo (1994) found that the market incorporated foreign translation gain and loss information reported in stockholders' equity under SFAS 52 when valuing equity securities, but the effect of this information on stock prices was smaller than the effect of other earnings factors. Bartov (1997) found that the SFAS #52 requirements caused reported earnings to be more relevant for market valuation than SFAS #8. Wang et al (2006) suggested that currency-translation differences are at times incrementally relevant to returns.

Kwon (2005) showed that foreign investors generally price exchange risk differently from local investors, and that the source and magnitude of differences in exchange risk pricing vary significantly across countries.

Louis (2003) empirically examined the association between change in firm value and the foreign translation adjustment for manufacturing firms. For firms in the manufacturing sector, accounting rules for currency translation usually result in financial statement numbers opposite to the economic effects of exchange rate variations. Thus, the translation adjustment was found to be associated with a loss of value instead of an increase in value. In another empirical study, Pinto (2005) tested the value relevance of foreign currency translation adjustments in an earnings and book value model and observed that foreign currency translation adjustments are significantly value relevant when their parameter estimates are allowed to vary in the cross-section.

Bazaz and Senteney (2001) used an equity valuation model to investigate the extent to which SFAS No. 52 unrealized foreign currency translation gains and losses are reflected in levels of equity security prices. The results indicated that, generally, translation gains and losses are valued, but losses have a greater impact than gains and the value seems to change over time in setting the levels of equity share price.

Chambers et al (2007) provided evidence in the post-SFAS #130 periods that other comprehensive income is priced by investors on a dollar-for-dollar basis. Two components of other comprehensive income, foreign currency translation adjustment and unrealized gains and losses on available-for-sale securities, were found to be priced by investors. But the study suggests that investors pay greater attention to other comprehensive information reported in the statement of changes in equity, rather than in a statement of financial performance.

A conclusion to be drawn from category (3) studies is that accounting methodology changes do 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.

Methodology

Determination of Temporal Characteristics

One hundred 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 nineteen consecutive years ending in 2012, and to have paid dividends on common stock for each of the years 2005-2012.

Before translating these companies' 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 TR of SFAS #8, and at the current exchange rate under others, for example the CR of SFAS #52.

A sophisticated method of estimation was developed for this study 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, 2012a).

The financial statements of each of one hundred U.S. companies, selected at random, were translated from U.S. dollars to U.K. pounds, using each of the eight

translation methodologies described below, for each of the six years 1999-2004. Although the study year was 2005, translated data for the year 2004 was necessary to generate the change in book value numbers. Further, pre-translation accounting numbers were needed for ten years (1994-2003) in order to generate the temporal characteristics of certain accounts, such as fixed assets.

Translation Methodologies

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

	CN/NDF	CN/DEF
	TR/NDF (SFAS #8)	TR/DEF
	CR/NDF	CR/DEF (SFAS #52)
	PP/NDF	PP/DEF

Where CN = current-noncurrent method
TR = temporal rate method,
CR = current rate method,
PP = price parity method,
and NDF = non deferral of translation gains and losses,
DEF = deferral of translation gains and losses

FASB introduced the concept of a functional currency in SFAS #52. The functional currency of a subsidiary is the currency of the primary economic environment in which the subsidiary operates. Normally, it is the currency of the environment in which the subsidiary primarily generates and expends cash. If the currency of the books and records of a subsidiary is different from the functional currency, the temporal method of translation is used, and the resulting translation adjustment is reported in net income. If the currency of the books are records of a subsidiary is the same as the functional currency, the current rate method of translation is used, and the resulting translation adjustment is reported in other comprehensive income.

Non deferral (NDF), in the context of the present study, reflects net income plus the effect of translation gains and losses. Deferral (DEF) reflects net income only, without the effect of translation gains and losses. The study does not infer that a higher r^2 implies that the translation adjustment alone is value relevant or that the adjustment is a better predictor of cash flows.

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 numbers needed to calculate earnings per share and changes in book value per share, under each of the eight methodologies studied. 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.

The Current-noncurrent Method (CN). In this method, current assets and liabilities are translated at the exchange rate at the balance sheet date. Noncurrent assets

and liabilities and the elements of owners' equity are translated at the exchange rate in effect when those assets were acquired, the liabilities were incurred, or the owners' equity elements recorded. Depreciation and amortization expense are translated at historical rates applicable to the related assets. All other income statement items are translated at an average exchange rate for the accounting period. The objective of this method is to reflect the liquidity of the foreign entity by showing the working capital components in dollar equivalents.

The rationale of the current-noncurrent method is that noncurrent items are not affected by fluctuations in exchange rates. If the goal is to measure remittable currency, only the current items should be translated at the current exchange rate, and exchange gains and losses should depend on the working capital position of the company (Benjamin and Grossman, 1981). As a result, the parent company will experience a translation loss when the foreign currency is devalued and a gain when it is revalued, as long as the subsidiary maintains a positive working capital position. The results of applying the current-noncurrent method are not affected by the debt to equity ratio since both long-term debt and equity are translated at the historical rate.

The Temporal Rate Method (TR). TR was required by SFAS #8 (1975). Cash, accounts receivable, inventories and investments carried at market, accounts payable and long-term debt are translated at the closing rate, whereas inventories and investments carried at cost, fixed and other assets, common and preferred stock are translated at the historical rate. Expenses, such as depreciation, which are recognized as a result of shifting amounts reported for an asset to an expense are translated at the rate that is used to translate the related asset. Revenues recognized by shifting deferred income to a revenue classification are translated at the rate that is used to translate the deferred income. Other revenues and expense are translated at the average exchange rate.

The objective of the method is to preserve the underlying accounting principles of historical cost so that consolidation is possible on a consistent basis (Demirag, 1987). The FASB selected the temporal method on the premise that it best preserved the qualitative characteristics of individual assets and liabilities.

The most common complaint concerning the temporal rate method as required by SFAS #8 is that it allegedly results in greater variability of earnings than other methodologies (Benjamin and Grossman, 1981). Those who opposed SFAS #8 argued that including translation gains and losses in current earnings results in earnings fluctuations that do not reflect economic reality, and that significant translation gains or losses reported in one accounting period are likely to substantially reverse in subsequent periods. Those who defend SFAS #8 argue that these fluctuations do reflect international market realities, given the fact that exchange rates change.

The Current Rate Method (CR). CR is required by SFAS #52 (1981). In this method, all balance sheet items, with the exception of owners' equity, are translated at the closing rate (current rate). Owners' equity is translated at historical rates. Income statement items are translated at an average exchange rate for the accounting period. According to FASB #52, the objective of this method is to generate translated accounting numbers which reflect the economic conditions and perspective of the local country and to provide information that is generally compatible with the expected economic effects of an exchange rate change on the enterprise's cash flow and equity.

A significant feature of the current rate method, in contrast to the CN and TR, is that numerous financial ratios are the same before and after translation. Another significant feature is that the full translation gain or loss arises in the accounting period that an exchange rate change occurs, since all assets and liabilities are translated at the

current rate. Translations gains and losses are thus related to the net asset position. Because this number is potentially large, translation gains and losses under the current rate method may have a significant impact on current income in CR methodologies which require that such gains and losses not be deferred (CR/NDF).

Price Parity. There is no rigorous defense for the use of exchanges rates in translation, and exchange rates are not related in any clear way to accounting measures. Indeed, in 1974, the Committee on International Accounting called for an investigation of a purchasing power parity theory based approach as a possible alternative to exchange rate methods.

None of the exchange-rate based translation methodologies has been shown theoretically or empirically to be superior to the others under all circumstances. Patz (1978) suggests this may result from the use of exchange rates themselves. The Price Parity Method of translation is described in full in Patz (1981).

Using the price parity methodology, foreign accounts are translated into dollars using a temporal method approach, but using a time series of price parity relative purchasing power indices. The purpose is to reflect the command over goods and services in the economy in which the subsidiary operates. It is assumed that foreign subsidiaries do not exist solely for the purpose of generating dollar cash flows to the parent, but rather for the maximization of economic power which can be defined as the size of assets held (Churchman, 1961).

Officer (1982) summarized the PPP theory of exchange rates in three propositions: (1) PPP is the principal determinant of the long-run equilibrium exchange rate, (2) the short-run equilibrium exchange rate in any current period is a function of the long-run equilibrium exchange rate in the sense that the latter variable is the principal determinate of, and tends to be approached by, the former, (3) the short-run equilibrium exchange rate in any current period is determined principally by the PPP, with the former variable tending to equal the latter.

The price parity indices needed for translation under the price parity method were calculated as follows:

$$PP_t = PP_b(CPI_{tk}/CPI_{ts})$$

Where

PP_t *= the price parity index for point in time t,*

PP_b *= an exchange rate assumed to approximate purchase power parity at the point in time b (b = December 31, 1993, a base point.)*

CPI_{tk} *= consumer price index for the U.K. at time t, standardized to base period b = 100, and*

CPI_{ts} *= consumer price index for the U.S. at time t, standardized to base period b = 100.*

The foregoing is called the "constructed rate" approach for obtaining a price parity index time series. It is the method suggested by Patz (1981) as the simplest and most practical.

Use of a Modified Ohlson Firm Valuation Model

This study tests each of the translation methodologies against the normative criterion of market value using the Ohlson Model (Ohlson 2001, 2005a, and 2005b).In this model,

$MVS = a_o + a_1 (eps) + a_2 (BVC) – a_3 (BVP)$

Where

MVS is the firm's value per share at the end of 2005, based on the present value of investors' future cash flow,

EPS is the firm's earnings per share for 2005,

BVC is the book value per share of the firm at the end of the

2005, and

BVP is the book value per share of the firm at the end of the previous year, 2004.

In the present study, the value of the firm, MVS, is represented by the sum of two translated factors, the present value of future dividend cash flows to investors over a specified period (see research question below) and the present value of the market price of common stock at the end of the specified period. The discount rate used was the weighted average of U.S. treasury securities for 2005, 4.67%. (Treasury Direct, 2005).

The four non-deferral methodologies differ from the deferral methodologies in one way only: for non-deferral, earnings per share are modified by the current year's translation gain or loss. Both deferral and non-deferral result in the same stockholders' equity. Thus, the only difference is in the earnings per share.

Research Question

For each translation methodology, the 2005 earnings per share and the change in book value per share from 2004 to 2005 were regressed against the MVS. The research question was: which translation methodology scores best in this regression? The question was resolved by comparison of the eight r^2 numbers resulting from the application of the eight translation methodologies used in the study. The regression based on this modified Ohlson model was performed for future cash flows to investors over three years, five years and seven years, periods which may be thought of as holding periods.

High r^2 numbers were not expected, as there are many factors besides earnings per share and changes in book value which affect the market price per share of common stock and dividends. The value of the r^2 numbers to the present study was not their high significance, but their relative values, allowing a rank-ordering of the eight translation methodologies according to the earnings quality criterion of predictability of future cash flows to investors.

Results and Conclusions

The tables below show the results of the regressions that were performed, based on the modified Ohlson model. The translation methodologies are rank-ordered based on the resulting r^2 numbers.

Table 1*

Translation Method	Three Years	Five Years	Seven Years
PP/DEF	.269	.242	.181
PP/NDF	.265	.224	.171
MN/DEF	.227	.208	.162
MN/NDF	.201	.186	.154
CR/DEF	.219	.180	.148
CR/NDF	.189	.158	.111
CN/DEF	.195	.163	.124
CN/NDF	.179	.146	.109

r^2*s are *based on discounted future cash flows to investors as the dependent variable and the modified Ohlson model accounting variables as the independent variables.

Table 2*

Translation Method	Three Years Rank Order	Five Years Rank Order	Seven Years Rank Order
PP/DEF	1	1	1
PP/NDF	2	2	2
MN/DEF	3	3	3
MN/NDF	5	4	4
CR/DEF	4	5	5
CR/NDF	7	7	7
CN/DEF	6	6	6
CN/NDF	8	8	8

Rank orderings of translation methodologies are based on r^2s from table 1

There are two striking observations to be made from the table data.

First, for the given years of the study, taken together, for each of the translation methods (PP, TR, CR, and CNC), deferral of translation gains and losses (non-inclusion in the earnings per share) resulted in a better relationship between accounting numbers and firm value based on discounted cash flows to investors. This result suggests noise in the translation gains and losses numbers, a result that is consistent with Collins and Salatka (1993). Apparently including translation gains and losses in the earnings number does not increase earnings quality under the normative criterion tested in the present study.

Second, use of the price parity methodology (a methodology never required or allowed under U.S. GAAP) resulted in the best overall r^2 scores, superior to three methods which have been required, at different times, by U.S. GAAP, whether translations gains and losses were deferred or not.

These observations are strongly consistent for each holding period of the study, although the greatest difference among translation methodologies is observed for the five-year holding period.

Consistently, the longer the holding period, the less effective are the quality of earnings and changes in book value in predicting the present value of future cash flows to investors.

Limitations and Suggestions for Future Research

This study tested the earnings quality of translated earnings per share for the year 2005 only along with the changes in book values between 2004 and 2005 only. This restriction was the result of needing financial statements for each company in the sample over nineteen years, seven of which were dedicated to future cash flows, ten of which were required to generate the temporal characteristics of certain accounts for translation and one of which (2004) was needed for comparison of book value with 2005. The extent to which results might have been different if it had been realistic to include several years, instead of 2005 only, is not known.

This study compared eight translation methodologies against only one normative criterion. Future studies should identify additional normative criteria and test translation methodologies against those criteria. Eventually, it will be possible to determine if one translation methodology consistently out-performs other methodologies when compared with a number of normative criteria, or if different translation methodologies are superior for different normative criteria.

Further, because of the results of the present study, price parity methodologies should be included in future studies.

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