

The Variability of Earnings in Chinese Subsidiaries Across Foreign Currency Translation Methodologies: An Empirical Comparison with UK Subsidiaries

Paul E. Holt

University of Central Oklahoma

Huiying Chen

University of Central Oklahoma

Abstract

Previous studies empirically tested the use of several foreign currency translation methodologies, including purchasing power parity (PPP) construct methods against the normative criterion of variability of earnings, and found that the use of PPP resulted in lower variability of translated earnings when translations were made between the US dollar and the UK pound. In the current study, the temporal characteristics of fifty sample companies were determined and used to translate accounts between the US dollar and the Chinese renminbi (RMB) and between the US dollar and the UK pound. Several translation methodologies were used, include PPP construct methodologies. In the current study, the US/UK translations using PPP translation methodologies resulted in lower variabilities of reported earnings of the subsidiaries than when using market-generated exchange rate translation methodologies, thereby replicating and expanding previous empirical results. But the US/Chinese translations produced a nearly opposite effect from the US/UK translations, reflecting the “managed floating” exchange rate system currently used in China.

KEYWORDS: International Accounting, Price Parity, Foreign Currency Translation, China, United Kingdom, Quality of earnings

1. Introduction

International Accounting Problem

In accordance with US generally accepted accounting principles (GAAP), parent companies usually must prepare consolidated statements with their foreign subsidiaries. To achieve this, the foreign subsidiary’s accounts must first be recast in accordance with the parent country’s GAAP. Second, the foreign accounts must be restated into the reporting currency of the parent. This second step, foreign currency translation, has been the topic of numerous studies over several decades.

Aside from the methodologies officially required in specific countries, there are a number of theoretically possible methodologies for foreign currency translation. Despite a massive literature, comparatively little is known empirically regarding how and in what ways the official choice of translation methodology matters. There is no theoretical closure on the issue, and only during the past decade have any empirical studies been performed to begin to determine which translation methodology, if any, is superior to others in accordance with any normative criterion.

In the United States, accounting policy makers have made major changes in GAAP for currency translation three times, each change more contentious than the previous one. The first

official methodology in the US was the current-noncurrent method discussed in AICPA Bulletin No. 92 (1931), AICPA Bulletin No. 117 (1934) and Accounting Research Bulletin 43 (1953). The first change was required in 1965 by Accounting Principles Board Opinion No. 6 which required the monetary-nonmonetary method. The second change was made shortly after the organization of the Financial Accounting Standards Board (FASB) with the issuance of SFAS #8 (1975) which required the temporal rate method. The third change was SFAS #52 (1981) in which the current rate method was required under some conditions and the temporal rate method under others. It may well be that weariness with the issue, rather than widespread agreement, best characterizes the present situation.

Singh (2014) points out that "...only the Current Value Method (Purchasing Power Parity)(PPP) Method correctly reports the effects of the inflation of both countries" and that "the Current Rate Method fails to correctly report the effect of the subsidiary country's inflation and the temporal method does not correctly report the parent country's inflation." Further, it argues that exchange rate risk is related to violations of purchasing power parity.

Each of these four exchange rate methodologies, required by GAAP at one time or another, has its advantages and disadvantages, but none has been empirically or theoretically demonstrated to be superior to the others under all normative criteria. In fact, exchange rates are not related in any certain way to accounting measures, and there is therefore no definitive defense for the use of exchange rates for currency translation, Patz (1978).

Variability of Earnings

Managers are expected to be risk averse, to prefer ever-increasing reported earnings per share, with low variability, to major swings and greater variability. Investors in the United States see higher variability of earnings as a signal for a speculative investment. Managers of companies with significant foreign operations could therefore be expected to prefer translation methodologies that result in lower variability of translated subsidiary earnings. For these and other reasons, the variability of earnings can be viewed as a normative criterion. There is a substantial literature (see literature review) that reflects this normative criterion, specifically with respect to foreign currency translation.

It does not necessarily follow, however, that any currency translation methodology that produces a lower variability of translated earnings is superior in information content to any other methodology that results in greater variability. The preferences of managers and investors are not adequate support for lower variability as a normative criterion against which translation methodologies should be tested.

But to the extent that greater variability in reported earnings is caused by noise rather than additional, useful information, lower variability of reported earnings is superior and should be pursued when selecting from among currency translation methodologies. The following section provides some theoretical support for lower variability of earnings as a normative criterion.

Purchasing Power Parity (PPP) and the Variability of Earnings Issue

The PPP concept of exchange rates is summarized in Officer (1982) 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 determinant of, and tends to be approached by, the former, and (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. Tyers and Zhang (2014) noted that "...real exchange rates are seen to be influenced in the long run by forces that return economies to purchasing power parity and by differences in productivity growth across sectors and across regions.

The equilibrium exchange rate between two currencies is the rate at which the demand for a currency and supply of the same currency are equal. At the equilibrium exchange rate, the price for exchanging two currencies will remain stable (The Free Financial Dictionary, 1/18/2020). It is intuitive that a time series of equilibrium exchange rates, which eliminates the temporary, market-generated noise, between any two currencies, is likely to be characterized by a lower variability than the time series of market-generated exchange rates.

The Committee on International Accounting suggested, in 1974, that purchasing power parity (PPP) constructs might be appropriate for foreign currency translation, indeed that such constructed time series might be superior to exchange rates. In effect, the committee was calling for research in this direction, and part of the spirit of the call was that the use of PPP, based on the equilibrium exchange rates, would result in lower variability of translated earnings and better information content in consolidated statements.

In more recent years, some empirical studies, based on translations between the US dollar and the UK pound, have found that the use of PPP does indeed result in lower variability of earnings and is superior to exchange rates when tested against a few other normative criteria (see the literature review). But, to date, no similar empirical studies are known to exist which describe what happens when a PPP time series is used instead of exchange rates for currency translation between the US dollar and various currencies other than the UK pound.

China's Foreign Exchange System

China's exchange rate regime evolves from a dual exchange rate system to a fixed exchange rate policy. Since 2005, The People's Bank of China adopted a "managed float" exchange rate of the RMB during the transition to a higher float degree regime. This is done to maintain a stable exchange rate as opposed to a more volatile exchange rate that would result from greater exposure to unexpected international market forces.

For the purposes of foreign currency translation for consolidation, it is not known whether the time series of managed float exchange rates or the time series of purchasing power parity constructs results in lower variability of reported earnings. See the Variability of Earnings as a Normative Criterion section below.

Prasad (2008) proposed a change from the managed float system to free float.

2. Purpose of the Study

Accordingly, the purpose of the present study is to compute the variability of translated earnings of subsidiaries, between the US dollar and the Chinese RMB, across different translation methodologies, including PPP methodologies, and to compare these results with those generated by translations between the US dollar and the UK pound.

The UK pound is used in this study for two reasons: (1) it is a floating exchange rate in contrast to the "managed float" of the RMB, and (2) studies exist which show PPP superior to

the UK floating exchange rate based on several normative criteria.

China's business environment is substantially different from that of the UK. Thus, if PPP methodologies test well against exchange rate methodologies translating between the US dollar and the Chinese RMB, the proposition that PPP should be used for currency translation worldwide is enhanced. It is anticipated that the effects noted in previous studies, translating between the US dollar and the UK pound, would be repeated in translation between the US dollar and the Chinese RMB, but to a lesser degree.

3. Literature Review

Variability of Earnings as a Normative Criterion

Several early studies suggest that lower variability of translated earnings is more desirable than higher. Some of these studies were inspired by SFAS #8 which required that the resulting translation adjustment be shown in current reported earnings.

Allan (1976), Biel (1976), Herschman (1976), Mattlin (1976), Merjos (1977), Aggarwal (1978), Porter (1983), and Selling and Sorter (1983) indicated that the requirements of SFAS #8 were perceived by many financial statement users to result in greater variability of reported earnings than other possible translation methodologies.

Aggarwal (1978) and Reckers (1978) proposed that SFAS #8 resulted in financial statements that, in one way or another, did not reflect economic reality because of the increased variability of reported earnings.

Collins and Salatka (1993) concluded that including the translation adjustment in net income as required by SFAS #8 generated noisier earnings signals. When SFAS #52 was implemented, those companies whose currency translation gains or losses were most affected by the change from SFAS #8 to SFAS #52 showed significant increases in the earnings response coefficient. Markets perceived reported earnings under SFAS #52 to be of higher quality, that is, with less noise, than reported earnings under SFAS #8.

Relevant 21st Century Literature

The degree to which currency translation gains and losses under SFAS #52 affect equity security prices was explored in Bazaz and Senteney (2001) by applying an equity valuation model.

Louis (2003) considered the relationship between change in firm value and the translation adjustment and noted that accounting rules for currency translation typically result in financial statement numbers opposite to the economic effects of variations in exchange rates.

Holt (2004) was a descriptive study in which a complex method of estimating the temporal characteristics of accounts was used to compare the information content of return on assets across translation methodologies, including PPP. It was observed that the greatest difference in rank orderings of companies by return on assets was between the methodologies of SFAS #8 and SFAS #52 whereas the current-noncurrent and the current rate methodologies ranked companies similarly. Further, differences in information signals across translation methodologies were often enormous and were highly firm specific.

According to Kwon (2005), foreign investors commonly price exchange risk differently from local investors and the sources and magnitudes of differences in exchange risk pricing vary

considerably from country to country.

Pinto (2005) used an earnings and book value model to observe that translation adjustments are significantly value relevant.

Liu (2006) examined the forecasting and valuation properties of foreign currency translation gains and losses with an accounting-based equity valuation model for multinational firms. The study observed that translation gains and losses could be subdivided into a core component and a transitory component, and that translation gains and losses were more transitory than transitory earnings.

Wang et. al. (2006) suggested that currency-translation differences are at times incrementally relevant to returns. The study found consistent evidence that both reported income and clean surplus income are relevant in explaining stock returns, although asset revaluations and currency-translation differences are at times incrementally relevant to returns.

Chambers et. al. (2007) provided evidence in the post-SFAS #130 (1997) period that other comprehensive income is priced by investors on a dollar-for-dollar basis. The foreign currency translation adjustment component of other comprehensive income was found to be priced by investors.

Holt (2011 and 2012a) made normative evaluations of translation methodologies based on firm valuation and found that PPP performed well against this criterion compared to exchange rates when translations were made from the US dollar to the UK pound. The use of PPP was found to be superior over exchange rates for variability of reported earnings, and an analysis of meaningfully-paired observations indicated markedly different current ratio and inventory turnover numbers across translation methodologies.

4. Methodology

Overview

As indicated in the literature review, previous studies have indicated that the use of PPP is superior to the use of exchange rates for currency translation between the US dollar and the UK pound when tested against various normative criteria, including variability of earnings. The present study somewhat replicates the testing for variability of earnings when translated between the US dollar and UK pound, but updates the previous work with more recent pre-translation financial statements and expands the number of translation methodologies tested. Further, the same pre-translation financial statements are translated between the US dollar and the Chinese RMB, using the same translation methodologies, for the purpose of comparing the results.

Sample Firms and Study Period

Fifty US companies were selected at random to build a data base of pre-translation financial statements, under the inclusion criterion that financial statement data had to be available for fifteen consecutive years ending in 2018. This criterion insured the availability of the considerable information needed for this study that was not readily available from other sources, such as the cost of fixed assets acquired and retired, and when. Although the study period was the ten years ending in 2018, financial data for fifteen years were needed to estimate the temporal characteristics of various accounts accurately for the ten study period. The resulting sample was representative of a wide range of firms in terms of industry, size, capital structure,

profitability, etc.

The estimation of the temporal characteristics of various accounts, prior to translation, was achieved by the application of the methods described in detail in Holt (2012b). Month-end exchange rates between the US and the UK and China were obtained from January 2004 through December 2018. To construct the PPP monthly time series for the same period, the United States monthly consumer price indexes (CPI) and the corresponding CPIs for the UK and China were obtained.

Translations of the fifty companies were made between the US dollar and UK pound and between the US dollar and the Chinese RMB for each of the years in the study period, using each of the following eight translation methodologies:

E C D
E C N
E T D
E T N
P C D
P C N
P T D
P T N

Where:

E = exchange rates where used for translation

P = PPP constructed numbers were used for translation

C = the current rate method

T = the temporal rate method

D = deferral of translation gains and losses (not included in net income)

N = non deferral of translation gains and losses (included in net income)

For each of the years in the study period and for each of the translation methodologies, the variability of reported net income per share was calculated for each company, and the average variability of net income for each methodology determined.

Construction of the Purchasing Power Parity (PPP) Time Series

The PPP method of currency translation is described in detail in Patz (1981), and an analysis of the state of the art of currency translation theory and the lack of definitive research of the PPP is available in Patz (2006).

As discussed in the Patz articles, there is no clear way in which exchange rates are related to accounting measures, and there is no rigorous defense for the use of exchanges rates in translation. Further, no existing research shows any of the exchange-rate based translation methodologies to be theoretically or empirically superior to the others under all circumstances. Patz (1978) suggests that the problem lies with the use of exchange rates themselves. In the price parity methodology proposed by Patz, subsidiary accounts are translated using a temporal method approach, but using a constructed time series of price parity relative purchasing power indices.

In the present study, an additional PPP methodology, using the current rate approach, is also included. The purpose of a PPP methodology 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, Churchman (1961), but rather for the maximization of economic power which can be defined as the size of assets held.

The calculation of the price parity indices needed for translation under the PPP method was achieved 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 in the foreign environment 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.

This method is called the “constructed rate” approach for generating a price parity index time series. It is the method suggested by Patz (1981) as the simplest and most practical for accounting application.

Research Questions

The study addresses two research questions:

- (1) Is the variability of earnings resulting from foreign currency translation using purchase power parity greater or less than the variability using China’s managed float exchange rate time series?
- (2) Are the PPP translation methodologies as viable, based on variability of earnings per share, between the US dollar and Chinese RMB as between the US dollar and the UK pound?

5. Results and Conclusions

Research question 1

Is the variability of earnings resulting from foreign currency translation using purchase power parity greater or less than the variability using China’s managed float exchange rate time series?

Table 1 shows the average variability of reported earnings per share, using each of the eight translation methodologies, of the fifty companies selected for the pre-translation sample over the ten-year study period ending in 2018, translated between the US dollar and the UK pound.

Table 1: Rank Ordering of Translation Methodologies Based on Lowest Average Variability of Earnings, Translations between the US Dollar and the UK Pound

Rank	Translation Methodology	Average Variability
1	P C N	.819
2	P T N	.853
3	P C D	.955
4	E C N	.956
5	E C D	.957
6	P T D	.959
7	E T N	1.108
8	E T D	1.457

Three of the price parity methodologies have lower average variability of earnings than all the exchange rate methodologies. P T D is in the 6th position, although there is little difference between position 3 and position 6.

Table 2 shows the average variability of reported earnings per share, using each of the eight translation methodologies, of the fifty companies selected for the pre-translation sample over the ten-year study period ending in 2018, translated between the US dollar and the Chinese RMB.

Table 2: Rank Ordering of Translation Methodologies Based on Lowest Average Variability of Earnings, Translations between the US Dollar and the Chinese RMB

Rank	Translation Methodology	Average Variability
1	E C D	7.46
2	E C N	7.57
3	E T D	8.04
4	E T N	8.18
5	P T D	22.77
6	P T N	23.80
7	P C D	23.81
8	P C N	24.10

The results shown in Table 2 are in striking contrast to those of Table 1. All of the price parity translation methodologies result in higher variability of earnings than the managed float exchange rate methodologies.

Table 3 recasts Table 1 to demonstrate the head-to-head comparisons between PPP methodologies and exchange rate methodologies, translated from the US dollar to the UK pound.

Table 3: Head-to-Head Comparisons of PPP and Exchange Rate Methodologies Based on Average Variability of Earnings per Share as Translated Between the US Dollar to the UK Pound

PPP Methodology	Average Variability	Exchange Rate Methodology	Average Variability
P C N	.819	E C N	.956
P T N	.853	E T N	1.108
P C D	.955	E C D	.957
P T D	.959	E T D	1.457

In each of the four head-to-head comparisons, the PPP methodology results in lower average variability of earnings than the exchange rate methodology, although little difference is observed between P C D and E C D.

A striking difference is displayed in Table 4. The head-to-head comparisons, when translating between the US dollar and the Chinese RMB, show the opposite result; the price parity methodologies are consistently higher in variability than the managed float exchange rate methodologies.

Table 4: Head-to-Head Comparisons of PPP and Exchange Rate Methodologies Based on Average Variability of Earnings per Share as Translated Between the US Dollar to the Chinese RMB

PPP Methodology	Average Variability	Exchange Rate Methodology	Average Variability
P C N	24.10	E C N	7.57
P T N	23.80	E T N	8.18
P C D	23.81	E C D	7.46
P T D	22.77	E T D	8.04

Research Question 2

Are the PPP translation methodologies as viable, based on variability of earnings per share, between the US dollar and the Chinese RMB, as between the US dollar and the UK pound?

Based solely on the normative criterion of variability of reported earnings, the answer to research question 2 is a clear no.

The argument that PPP translation methodologies should result in reported earnings less variable than exchange rate methodologies in the UK companies, is based on the theory that the time series of price parity constructs was closer to the equilibrium exchange rate than the market-driven time series. Previous research, summarized in Tables 1 and 3, strongly support that argument.

But China's managed float exchange rate time series is partly market driven. During the transition from fixed exchange rate framework to the free float regime, the exchange rates are intervened to reduce the negative impacts of unexpected international market forces and result in a more stable exchange rate series. As noted earlier in this study, at the equilibrium exchange

rate, the price for exchanging two currencies will remain stable (The Free Financial Dictionary, 1/18/2020). The results of this study are consistent with the notion that the managed float exchange rate system in China produces a time series closer to the equilibrium exchange rate than the PPP system.

This answer may reduce the argument for a change in accounting principle related to foreign currency translation from exchange rates to price parity constructs, at least in China. But it was precisely because of major differences in the business environment and general culture between the UK and China that China was chosen for the present study.

6. Future Research

Foreign currency translation methodologies can be tested against a number of normative criteria other than variability of reported earnings.

One classification of criteria is value of the firm. For example, Ohlson (2001) studied the relationship between earnings, book values, and dividends in equity valuation. Ohlson (2005) examined accounting-based valuation formulae, and Ohlson and Juettner-Nauroth (2005) studied the relationship between earnings per share and firm value. These studies were not oriented specifically to foreign currency translation, but similar research methodologies could be developed to do so.

Other normative criteria for testing translation methodologies include the Fischer Black method of accounting method selection and the present values of future cash flows to investors.

Although the present study does not clearly support PPP over exchange rate methodologies for China, the authors feel that future normative research should include PPP translations among numerous other national currencies.

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