An Investigation of the Value-Relevance of Alternative Foreign Exchange Disclosures

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November 7, 2002
Abstract

This paper assesses which accounting disclosures are most useful in valuing firms with foreign operations in the presence of exchange rate movements. Our analytical model indicates that a valuation of these firms requires disaggregating cash flows into current unexpected cash flows in the parent currency, current unexpected cash flows in the foreign currency, the persistent component of previous unexpected foreign currency cash flows, and the permanent return on foreign currency operating capital. We next show that to value these firms using aggregate cash flows or earnings requires additionally, at a minimum, knowledge of permanent foreign currency operating cash flows. Intuitively, the sign on the latter measures whether the firm is a net producer or a net seller in the foreign currency, which explains whether the firm incurs an economic gain or loss as a result of foreign exchange moves. We then extend our analysis to explain why the value relevance of changes in the translation adjustment mandated under the current rate method is indeterminate, and demonstrate that, when we condition the translation adjustment on the sign of the permanent operating cash flows in the foreign currency, it becomes value relevant. However, once we know the permanent return on the operating capital in the foreign currency, changes in the translation adjustment add no new information to the valuation process, and are therefore redundant. We confirm all of the preceding analysis empirically, using proxies for the relative levels of sales versus costs (i.e., the net cash flow) in each foreign currency in which the firm operates. Net foreign cash flows are essential to the valuation of all foreign operations, regardless of how subsidiaries are classified under GAAP, and we therefore recommend that standard setters consider mandating disclosure of revenues and costs by currency for all firms with foreign operations.
1 Introduction

This paper assesses which accounting disclosures are most useful in valuing firms with foreign operations in the presence of exchange rate movements. Our analytical model indicates that a valuation of these firms requires disaggregating cash flows into current unexpected cash flows in the parent currency, current unexpected cash flows in the foreign currency, the persistent component of previous unexpected foreign currency cash flows, and the permanent return on foreign currency operating capital.

We next show that to value these firms using aggregate cash flows or earnings requires additionally, at a minimum, knowledge of permanent foreign currency operating cash flows. Intuitively, the sign on the latter measures whether the firm is a net producer or a net seller in the foreign currency, which explains whether the firm incurs an economic gain or loss as a result of foreign exchange moves. We then extend our analysis to explain why the value relevance of changes in the translation adjustment mandated under the current rate method is indeterminate, and demonstrate that, when we condition the translation adjustment on the sign of the permanent operating cash flows in the foreign currency, it becomes value relevant. However, once we know the permanent return on the operating capital in the foreign currency, changes in the translation adjustment add no new information to the valuation process, and are therefore redundant.

We confirm all of the preceding analysis empirically, using proxies for the relative levels of sales versus costs (i.e., the net cash flow) in each foreign currency in which the firm operates. Net foreign cash flows are essential to the valuation of all foreign operations, regardless of how subsidiaries are classified under GAAP, and we therefore recommend that standard setters consider mandating disclosure of revenues and costs by currency for all firms with foreign operations.

The current accounting treatment of foreign exchange translation came into being in
1981, when Statement of Financial Accounting Standards (SFAS) 52 replaced SFAS 8 in the United States. The Financial Accounting Standards Board (FASB) passed SFAS 52 by only a narrow four to three margin, and empirical evidence on its value relevance has been contradictory and ambiguous. The Canadian Institute of Chartered Accountants (CICA) followed with CICA Handbook Section 1650, which is similar to SFAS 52. In both countries, GAAP distinguishes between integrated and self-sustaining subsidiaries.\(^1\)

The accounting for integrated subsidiaries (the temporal method) is to recognize foreign exchange gains and losses on monetary assets and liabilities from integrated operations in income, while leaving non-monetary items at their historical exchange rates. Under the old SFAS 8, all firms with foreign subsidiaries were required to use the temporal method. SFAS 52 introduced a new accounting method for foreign self-sustaining subsidiaries.\(^2\) The accounting for self-sustaining subsidiaries (the current rate method) is to translate the operations of the foreign subsidiary at current rates; however, the accompanying gains and losses on net assets are not recognized in income but are entered directly to an equity account labelled the “translation adjustment”. The main argument for bypassing the income statement with these gains and losses is to avoid excess volatility in reported income.\(^3\) In this ongoing debate over translation of financial statement accounts and the classification of subsidiaries, the question of how the full impact of a foreign exchange movement should map into stock price is not adequately answered. Further, while GAAP requires that significant business segments be disclosed, including geographic segments, they do not require specific disclosures of the revenues and costs in specific currencies. Our analysis shows that such disclosures are necessary to valuing firms with foreign operations and to interpreting changes in the translation adjustment.\(^4\)

Intuitively, the model we develop demonstrates that foreign denominated operating cash flows are critical because they capture the relative levels of sales versus production (i.e., the net cash flow) in the foreign currency. Whether a subsidiary is a net seller or a net
producer in its own currency is crucial for valuation. For the former type of subsidiary, the parent loses when the foreign currency devalues relative to the parent’s currency because its revenue stream is reduced. For the latter type of subsidiary, the parent benefits when the foreign currency devalues relative to the parent’s currency because the cost of production is reduced. Formally, we show that the annual value change of a parent firm with foreign operations can be expressed as the value change resulting from the unexpected cash flows before consideration of changes in foreign exchange rates, plus the value change resulting from the effect of exchange rate changes to the expected cash flows in the foreign currency.

Our results flow from the fact that foreign subsidiaries are created for different purposes, and consequently, the effect on value of a foreign exchange movement will differ across firms. To simplify, we consider two types of foreign subsidiaries set up for distinctly different economic purposes: subsidiaries set up to avoid trade barriers (such as Japanese car manufacturing in North America), and subsidiaries set up to take advantage of lower cost of production than is available in the home country (such as the US assembly plants in Mexico). The former type, which we refer to as trade barrier subsidiaries, have disproportionately large revenues relative to costs in the subsidiary’s currency. The latter type, which we refer to as production subsidiaries have disproportionately large costs relative to revenues in the subsidiary’s currency.5

Trade barrier subsidiaries arise when countries put up tariff and non-tariff barriers to imports, and firms that wish to sell in these markets place a sufficient portion of production into these countries to be classified as domestic. They also arise if there are large transportation or storage costs attached to the final product that force production to occur close to the point or time of sale. These costs are economically derived barriers to trade. These subsidiaries import parts, expertise, or a brand name from the parent, but must produce their product partially in the subsidiary’s country. Thus, the costs of the product sold by the subsidiary comprise an imported portion that is in parent dollars and a local portion
in the subsidiary’s currency, but the subsidiary sells its entire product in the subsidiary’s currency. In these cases, an increase/decline in the value of the subsidiary currency has a positive/negative effect on the value of the firm.

Production subsidiaries arise when a subsidiary is created in a foreign country to take advantage of lower costs of production. The bulk of the subsidiary’s production is sold abroad in the parent’s currency (and other non-subsidiary currencies), but the costs and productive assets are denominated in the subsidiary’s currency. For these subsidiaries, the costs denominated in the subsidiary’s currency exceed the revenues denominated in the subsidiary’s currency. In these cases, the effect is opposite from that of a trade barrier subsidiary, an increase/decline in the value of the subsidiary currency has a negative/positive effect on the value of the firm. Clearly, when we value firms with a variety of subsidiaries we need to know the nature of the subsidiary currency cash flows.

Accordingly, our work makes the following contributions with respect to providing financial information for valuing a firm with foreign operations. We provide an analytical linear valuation model that shows that the best foreign exchange disclosure consists of disaggregated cash flows by currency. We then use this model to describe the information that can be added to either aggregate operating cash flows or earnings to explain unexpected returns. The model can also be used to explain why the value relevance of changes in the translation adjustment has been sample specific in prior research, and how to condition changes in the translation adjustment to better capture economic reality and become value relevant.

We use a sample of Canadian firms in this study because Canadian firms are relatively more reliant on international operations and trade than are firms in the United States, making the foreign currency movements more material for Canadian firms than for their American counterparts. Empirically, we demonstrate that including knowledge of cash flows in the foreign currency provides significant incremental valuation relevance relative to existing GAAP disclosures. We then empirically demonstrate how conditioning the change in the
translation adjustment on whether the subsidiaries are net sellers or net producers makes it value relevant.

The paper is organized as follows: Section 2 presents our model and primary hypothesis for foreign denominated cash flows. Section 3 reviews the research literature on the value relevance of the translation adjustment and then uses the model to provide implications and a secondary hypothesis for the translation adjustment. Section 4 describes the sample and presents descriptive statistics. Section 5 presents empirical results, and Section 6 concludes the paper.

2 Model and Primary Hypothesis

We now proceed to a formal model that provides us with a framework for valuing both trade barrier and production subsidiaries. We consider a firm with stochastic operating cash flows in two currencies at dates \( t \geq 0 \). At date \( t \), the firm receives \( cf^p_t \) in the parent’s currency and \( cf^s_t \) in foreign currency. In our model, we separate the cash flows and operating capital by currency. Both the parent and the subsidiary may generate revenues and incur costs in both currencies; however, for our purposes, we classify as the parent’s the cash and capital denominated in the parent currency, and as the subsidiary’s the cash and capital denominated in the subsidiary’s currency.

The cash flows in either currency, \( cf^{p,s}_t \), are a constant return on the operating capital in either currency, \( oc^{p,s}_t \), plus other cash flows, \( \nu^{p,s}_t \):

\[
\begin{align*}
    cf^{p}_t+1 &= \kappa^p oc^p_t + \nu^p_{t+1} \\
    cf^{s}_t+1 &= \kappa^s oc^s_t + \nu^s_{t+1}
\end{align*}
\]

The parameter \( \kappa^s \) is a measure of the return in the subsidiary’s currency on the operating capital of the subsidiary. For a trade barrier subsidiary, revenues exceed costs in the foreign
currency and $\kappa^s$ is positive and significantly larger than a normal rate of return for the firm’s line of business. For a production subsidiary, costs exceed revenues in the foreign currency and $\kappa^s$ is negative. The sign of $\kappa^s$ is independent of the profitability of the parent firm.

We assume the operating capital in either currency is constant,

$$oc_{t+s} = oc_t = oc_{s}.$$ 

The other cash flows $\nu^{p,s}_t$ are persistent, with persistence parameter $\omega \in [0,1]$,

$$\nu_{t+1}^{p,s} = \omega \nu_t^{p,s} + \varepsilon_{t+1}^{p,s}.$$ 

Throughout the paper, we also consider, as particular cases, the two polar settings in which the other cash flows are either transitory ($\omega = 0$), or permanent ($\omega = 1$).

This cash flow dynamic is similar to the one in Feltham and Ohlson (1996), except that we use two currencies and we assume that investments are exactly equal to the economic depreciation of operating capital and we do not need to model them separately. The unexpected cash flows $\varepsilon_{t}^{p,s}$ are mutually independent and $E_t[\varepsilon_{t+1}^{p,s}] = 0$, where $E_t[\cdot]$ represents the conditional expectation operator given information available at date $t$. We assume the exchange rate follows a random walk,

$$f_{t+1} = f_t + \delta_{t+1},$$

where one dollar of foreign currency equals $f_t$ dollars of the parent’s currency at date $t$, the unanticipated movements in the exchange rate $\delta_t$ and $\delta_{t+k}$ are mutually independent, and $E_t[\delta_{t+1}] = 0$. The terms $\delta_{t+k}$ and $\varepsilon_{t+t}^{p,s}$ are also mutually independent.

We assume, without loss of generality (see, e.g. Feltham and Ohlson, 1995, 1996), that
the firm pays out all time $t$ cash flows as dividends in the domestic currency:

$$d_t = cf_t.$$  

With this assumption, the firm’s (ex-dividend) value at time $t$ is given by

$$V_t = \sum_{\tau=1}^{\infty} \gamma^\tau \mathbb{E}_t[d_{t+\tau}] = \sum_{\tau=1}^{\infty} \gamma^\tau \mathbb{E}_t[cf_{t+\tau}],$$

where the discount factor is $\gamma = (1 + r)^{-1}$, and $r$ is the risk-free rate. The firm’s aggregate cash flows in the parent’s currency at date $t$ are given by

$$cf_t = cf^p_t + f_t cf^s_t = \kappa^p \omega c^p + f_t \kappa^s \omega c^s + \nu^p_t + f_t \nu^s_t.$$  

Since the conditional expectation of future cash flows is given by

$$\mathbb{E}_t[cf_{t+\tau}] = \mathbb{E}_t[cf^p_{t+\tau} + f_{t+\tau} cf^s_{t+\tau}] = \kappa^p \omega c^p + \omega \nu^p_t + f_t (\kappa^s \omega c^s + \omega \nu^s_t),$$

the value of the firm at date $t$ is given by

$$V_t = \frac{\gamma}{1 - \gamma} (\kappa^p \omega c^p + f_t \kappa^s \omega c^s) + \frac{\gamma \omega}{1 - \gamma \omega} (\nu^p_t + f_t \nu^s_t).$$

The realized return $R_{t+1}$ and the unexpected realized return $UR_{t+1}$ are calculated as follows.

$$R_{t+1} = \frac{V_{t+1} + d_{t+1}}{P_t} = \frac{V_{t+1} + cf_{t+1}}{V_t}$$

$$UR_{t+1} = R_{t+1} - \gamma^{-1}$$

Following Ohlson (1995), we have the following proposition.

**Proposition 1** Based on disaggregate cash flow information, the unexpected returns are
determined by

\[ UR_{t+1} = \frac{1}{1 - \gamma \omega} \frac{\varepsilon^p_{t+1} + f_{t+1}\varepsilon^s_{t+1} + \delta_{t+1}\omega \nu^s_t}{V_t} + \frac{1}{1 - \gamma} \frac{\delta_{t+1}\kappa^s \omega \nu^s_t}{V_t}. \]  

(1)

**Proof.** See Ohlson (1995). \( \Box \)

Thus, for unexpected returns, in addition to the current unexpected cash flows \( \varepsilon^p_{t+1} \), we need each of the following cash flow components for the foreign subsidiary: the permanent return on operating capital \( \kappa^s \omega \nu^s_t \) and the persistent component \( \omega \nu^s_t \) due to previous unexpected cash flows. If the other cash flows are transitory \( (\omega = 0) \) we only need the current unexpected cash flows and the permanent cash flow of the foreign subsidiary,

\[ UR_{t+1} = \frac{\varepsilon^p_{t+1} + f_{t+1}\varepsilon^s_{t+1} + \delta_{t+1}\kappa^s \omega \nu^s_t}{V_t}. \]  

(2)

Although the coefficients are different, we need the same information if the other cash flows are permanent \( (\omega = 1) \), since in this case

\[ UR_{t+1} = \frac{1}{1 - \gamma} \frac{\varepsilon^p_{t+1} + f_{t+1}\varepsilon^s_{t+1} + \delta_{t+1}\kappa^s \omega \nu^s_t}{V_t}. \]  

(3)

The impact in the above of a change in foreign exchange rates affects unexpected returns only through the permanent return on operating capital and the direction of this effect is conditional on the sign of \( \kappa^s \). Trade barrier subsidiaries, with a positive \( \kappa^s \), benefit/suffer from an appreciation/depreciation of the subsidiary currency, while production subsidiaries, with a negative \( \kappa^s \), will suffer/benefit from an appreciation/depreciation of the subsidiary currency. For the purpose of valuing firms with foreign operations, our model requires the disclosure of disaggregate foreign denominated cash flows by currency. Moreover, given the disclosures required by Proposition 1, there is no need to classify subsidiaries as integrated or self-sustaining.
Proposition 1 indicates that we need disaggregated cash flows to explain unexpected returns. Financial reporting and analysis often focus on aggregate cash flows or earnings. Accordingly, we now extend the preceding analysis to consider a formulation of returns in terms of aggregate cash flows or earnings plus necessary incremental information on the effect of exchange movements on foreign denominated cash flows. From this point on, we assume that the clean surplus relation holds (see Ohlson, 1995, and Feltham and Ohlson, 1995, 1996):

\[ bv_{t+1} = bv_t + x_t - d_{t+1} , \] (4)

where \( bv_t \) is book value and \( x_t \) are earnings at date \( t \). For any accounting treatment of foreign exchange, since dividends equal net cash flows, the earnings satisfy

\[ x_{t+1} = bv_{t+1} - bv_t + d_{t+1} = bv_{t+1} - bv_t + cf_{t+1} . \]

We then have the following proposition that employs aggregate cash flows or earnings plus incremental foreign denominated cash flow information.

**Proposition 2** Assume that no gain or loss on the foreign-denominated assets is recognized in earnings. Then, \( x_t = d_t = cf_t \) and, using aggregate cash flows or earnings, the unexpected returns are determined by

\[ UR_{t+1} = \frac{1}{1 - \gamma \omega} \frac{cf_{t+1} - E_t[cf_{t+1}]}{V_t} + \frac{\gamma(1 - \omega)}{(1 - \gamma \omega)(1 - \gamma)} \frac{\delta_{t+1} \kappa^s ocs}{V_t} \]

\[ = \frac{1}{1 - \gamma \omega} \frac{x_{t+1} - E_t[x_{t+1}]}{V_t} + \frac{\gamma(1 - \omega)}{(1 - \gamma \omega)(1 - \gamma)} \frac{\delta_{t+1} \kappa^s ocs}{V_t} . \] (5)

**Proof.** The unexpected aggregate cash flows at time \( t + 1 \) are

\[ cf_{t+1} - E_t[cf_{t+1}] = \varepsilon^p_{t+1} + f_{t+1} \varepsilon^s_{t+1} + \delta_{t+1} \omega \nu^s_t + \delta_{t+1} \kappa^s ocs . \]
Substituting $\varepsilon^p_{t+1} + f_{t+1} \varepsilon^s_{t+1} + \delta_{t+1} \omega \nu^s_t$ by $cf_{t+1} - E_t[cf_{t+1}] - \delta_{t+1} \kappa^s \omega^s$ in equation (1) for the unexpected returns gives the first part of equation (5)

$$UR_{t+1} = \frac{1}{1 - \gamma \omega} \frac{cf_{t+1} - E_t[cf_{t+1}] - \delta_{t+1} \kappa^s \omega^s}{V_t} + \frac{1}{1 - \gamma} \frac{\delta_{t+1} \kappa^s \omega^s}{V_t}.$$

For earnings, the clean surplus relation (4) implies $x_t = d_t = cf_t$ and $x_{t+1} - E_t[x_{t+1}] = cf_{t+1} - E_t[cf_{t+1}]$. Substituting back in the above equation gives the second line of (5). □

Thus, if we do not have the disaggregate information required by Proposition 1, unexpected returns are determined by unexpected aggregate cash flows or earnings and by the gain or loss on the permanent component of foreign cash flows $\delta_{t+1} \kappa^s \omega^s$.

The disadvantage of Proposition 2, equation (5) over Proposition 1, equation (1) is that, in a cross-sectional regression, the aggregate cash flows or earnings variable is correlated with the $\delta_{t+1} \kappa^s \omega^s$. In particular, for $\omega = 1$, they are perfectly collinear.

Accordingly, in empirical applications of equation (5), the coefficients on the first and second term will depend on the value of $\omega$. We will consider first the polar values of $\omega$ of zero and one. If $\omega = 0$, then the coefficient on $\delta_{t+1} \kappa^s \omega^s$ in equation (5) simplifies to $\gamma/(1 - \gamma) = 1/r$ and is therefore positive. On the other hand, since $\delta_{t+1} \kappa^s \omega^s$ occurs in both terms, its total impact on unexpected returns is given by equation (2) and is $(1 + r)/r$. If $\omega = 1$, then, in equation (5), the coefficient on the first term simplifies to $1/(1 - \gamma) = (1 + r)/r$ and the coefficient on the second term becomes zero. Note that the total impact of $\delta_{t+1} \kappa^s \omega^s$ is given by equation (3) and remains the same at $(1 + r)/r$; however, its impact is entirely captured within the first term in (5).

In general, for $\omega \in [0, 1]$, $\gamma \omega < 1$ and the coefficient of unexpected cash flows or earnings in equation (5) is always positive. The coefficient of $\delta_{t+1} \kappa^s \omega^s$ in equation (5) is positive if $\omega < 1$ and zero only for $\omega = 1$. 

12
The first hypothesis is based on Proposition 2, equation (5), which shows that in explaining returns, in addition to aggregate cash flows or earnings, it is necessary to include the foreign exchange gain or loss on the permanent net cash flow in the subsidiary currency.

**Hypothesis 1** In regressions of annual unexpected returns on annual unexpected earnings and the foreign exchange gain or loss on the permanent net cash flow in the subsidiary currency, the latter is value-relevant, and has a positive and significant sign.

Ideally, the model requires each firm’s revenues and costs in the foreign currency, since they determine whether an exchange rate movement leads to positive or negative unexpected returns. To empirically test Hypothesis 1, we need a proxy for $\delta_{t+1} + \kappa^{oc}$. We use the assets located in the subsidiary country as a proxy for the costs denominated in the subsidiary currency. If a firm has a physical plant in a foreign country, the direct costs of running this plant, such as labor and overhead, are incurred in that currency. Additionally, materials are likely purchased in this currency. Thus, most of the direct and indirect costs of production are incurred in the subsidiary currency. We use the revenue reported for the subsidiary as a proxy for revenue earned in the subsidiary currency.

For each subsidiary of each firm, we obtain prior year revenues and assets from the notes to the financial statements. Prior values are consistent with the model’s use of expected permanent operating cash flows and are available to the market early in the fiscal year, so that they can be linked to the foreign exchange movements during the year. Thus, the information that we test was available to market participants during the period in which we measure returns. We then multiply the subsidiary’s prior year revenues and assets by the appropriate change in exchange rate based on the nationality of the subsidiary. This provides a nominal exchange gain or loss measured in parent dollars for each subsidiary on both subsidiary revenues and assets. We denote the exchange gain or loss on subsidiary revenues by $REV_{G/L}$ and we denote the gain or loss on subsidiary assets by $ASSET_{G/L}$. 
We subtract the exchange gain/loss on the subsidiary net assets from the exchange gain/loss on the subsidiary revenues to get a net exchange-related gain/loss for that subsidiary, which we denote by $\text{NET}_G/L$. The exchange-related gains and losses for all of a firm’s subsidiaries are then summed to obtain a total net exchange-related gain or loss for the firm. The net exchange-related gains and losses, like the $\delta_{t+1} \kappa^* oc^*$ they are a proxy for, are a function of both the direction of the exchange rate movement and of the relative level of revenues and costs in the subsidiary’s currency.

The first model we use to test Hypothesis 1 is

$$UR_{it} = \alpha + \beta_1 \text{BASEARN}_{it} + \beta_2 \Delta \text{BASEARN}_{it} + \beta_3 \text{NET}_G/L_{it} + \varepsilon_{it}, \quad \text{(Model 1a)}$$

where $\text{BASEARN}$ and $\Delta \text{BASEARN}$ represent earnings and changes in earnings (see Table 1 for precise definitions). We explain fiscal year stock returns as a function of both earnings levels and changes consistent with the work of Easton and Harris (1991), Ali and Zarowin (1992), and Biddle, Seow, and Siegel (1995).

We also use the gain or loss on subsidiary revenues and the gain or loss on subsidiary assets as separate variables, so that they are not constrained to have the same coefficient. Our prediction is that the former will be positively associated with returns, and the latter negatively associated with returns. The corresponding empirical model is

$$UR_{it} = \alpha + \beta_1 \text{BASEARN}_{it} + \beta_2 \Delta \text{BASEARN}_{it} + \beta_3 \text{REV}_G/L_{it} + \beta_4 \text{ASSET}_G/L_{it} + \varepsilon_{it}. \quad \text{(Model 1b)}$$
3 Implications for the Translation Adjustment

Prior to considering the implications of our model in interpreting the translation adjustment, we review the related empirical literature. Several studies have tested the valuation relevance of the translation adjustment by examining whether it has incremental information content for returns over the information supplied by earnings and earnings changes. The evidence is inconclusive, with some studies reporting valuation relevance while others do not.⁹

These studies have used two kinds of tests. The first kind includes the change in the translation adjustment as an extra term in regressions of returns (or unexpected returns) on earnings or earnings changes, e.g., Soo and Soo (1994), Bartov (1997), Louis (2001), and Biddle and Choi (2002). The implicit hypothesis is that, if the translation adjustment is relevant, then incorporating the change in the translation adjustment as an incremental regressor should yield a better summary of stock performance.

Soo and Soo (1994) find both the foreign exchange gain/loss included in income under the temporal rate method, and the foreign exchange adjustment included in the translation adjustment under the current rate method are modestly and positively related to stock returns. Bartov (1997) finds modest evidence that the annual change in the translation adjustment is positively associated with returns and has more relevance for stock returns than does the foreign exchange gain/loss included in income under the temporal method. Louis (2001) focuses on the relation between the translation adjustment and stock returns for a sample of exclusively manufacturing firms. In contrast with prior work in the field, Louis finds a counterintuitive negative association between the change in the translation adjustment and stock returns. He attributes this to the fact that manufacturing firms’ subsidiaries are likely to be predominantly active in manufacturing for a world market, rather than the subsidiary’s domestic market. Hence, his sample appears to consist predominantly of production subsidiaries.
The second kind of test compares net income to comprehensive income, where the latter includes the change in the translation adjustment, plus some other items, e.g., Dhaliwal et al. (1999), Biddle and Choi (2002). The implicit hypothesis is that, if the translation adjustment is relevant, then incorporating the change in the translation adjustment by substituting comprehensive income for net income, should lead to a better summary of stock performance.

Dhaliwal, Subramanyam, and Trezevant (1999) find that the explanatory power of net income for contemporaneous returns is not improved by including the change in the translation adjustment. By contrast, Biddle and Choi (2002) find that comprehensive income dominates net income in explaining returns. Additionally, Biddle and Choi find that addition of the change in the translation adjustment as a separate variable in regressions of net income on returns enhances the earnings/return relation. Thus, the relevance and direction of the translation adjustment for returns appears to be sample specific across the literature.

We now provide the implications of our model for the value relevance of the translation adjustment. Within the assumptions of our model, the change in the translation adjustment is the gain/loss on the foreign-denominated operating capital at date \( t + 1 \) relative to time \( t \) expectations and is denoted by \( \Delta ta_{t+1} = \delta_{t+1}oc^s \). Thus, \( \delta_{t+1}\kappa^soc^s = \kappa^s\Delta ta_{t+1} \) and Proposition 2, equation (5) implies

\[
UR_{t+1} = \frac{1}{1 - \gamma \omega} \frac{x_{t+1} - E_t[x_{t+1}]}{V_t} + \frac{\gamma(1 - \omega)}{(1 - \gamma \omega)(1 - \gamma)} \frac{\kappa^s\Delta ta_{t+1}}{V_t}.
\]

(6)

The coefficient of unexpected earnings in equation (6) is positive for all firms and is increasing in the persistence parameter \( \omega \). The coefficient of the foreign translation adjustment in equation (6) depends on \( \kappa^s \) and \( \omega \) and its sign is determined by the sign of \( \kappa^s \). Thus, for the net income case, we cannot ignore \( \kappa^s \) and use only \( \delta_{t+1}oc^s \), the change in the translation adjustment, in explaining unexpected returns. In particular, the latter approach would have
value implications in the wrong direction in the case of production subsidiaries because \( \kappa^s \) is negative for these entities. In testing only manufacturing subsidiaries, Louis (2001) appears to have a sample with a relatively homogenous and negative \( \kappa^s \) across the sample firms, which makes his findings consistent with the predictions of our model.

Although we do not test models based on comprehensive income, we present the corresponding analysis. The clean surplus relation (4) gives comprehensive income as \( x^c_t = cf_t + \Delta ta_t \) and the unexpected comprehensive income as \( x^c_{t+1} - E_t[x^c_{t+1}] = cf_{t+1} - E_t[cf_{t+1}] + \Delta ta_{t+1} \). Substituting back in equation (6) gives the unexpected returns as

\[
UR_{t+1} = \frac{1}{1 - \gamma \omega} \frac{x^c_{t+1} - E_t[x^c_{t+1}]}{V_t} + \frac{1}{1 - \gamma \omega} \left( \frac{\gamma (1 - \omega)}{1 - \gamma \kappa^s - 1} \right) \frac{\Delta ta_{t+1}}{V_t} .
\] (7)

Thus, in the comprehensive income case, as in the net income case, ignoring \( \kappa^s \) gives the wrong signal about valuation in the case of a production subsidiary, where \( \kappa^s \) is negative. The coefficient of unexpected comprehensive earnings in equation (7) is the same as for unexpected earnings in equation (6) above. The coefficient of the foreign translation adjustment, however, is different in equation (7), and its sign is determined by the sign of \( \kappa^s \) and the magnitudes of \( \kappa^s \) and \( \omega \). More precisely, the coefficient of the change in the translation adjustment is positive if, and only if, \( \kappa^s > r (1 - \omega)^{-1} \). Thus, equation (7) shows that regressions of unexpected returns on the unexpected comprehensive income alone are misspecified. In addition, even after including the change in the translation adjustment as an incremental term, its coefficient is likely indeterminate or sample-specific.

Returning to the net income case, there are two important empirical implications from equation (6). First, failing to control for the variability of \( \kappa^s \) introduces a severe misspecification into regressions of returns on earnings and changes in the translation adjustment, such that the sign on the translation adjustment is indeterminate or sample-specific. Second, if the change in the translation adjustment is properly conditioned on \( \kappa^s \), that is, if we can
identify trade barrier and production subsidiaries, then it should be relevant and significant. Accordingly, we test the following two-part hypothesis.

**Hypothesis 2** Tests that include the change in the translation adjustment as a separate variable:

a. In regressions of annual unexpected returns on annual unexpected earnings and the change in the translation adjustment, the coefficient of the change in the translation adjustment is indeterminate or sample-specific.

b. In regressions of annual unexpected returns on annual unexpected cash flows or earnings, interacting a variable that identifies subsidiary type with the change in the translation adjustment results in a positive and significant association between the change in the translation adjustment and returns for trade barrier subsidiaries, and a negative and significant association between the change in the translation adjustment and returns for production subsidiaries.

To test the first part of Hypothesis 2, we use the following model:

\[ UR_{it} = \alpha + \beta_1 BASEARN_{it} + \beta_2 \Delta BASEARN_{it} + \beta_3 \Delta TA_{it} + \varepsilon_{it}, \]  

(Model 2a)

where \( \Delta TA \) represents the change in the translation adjustment.

To condition our translation adjustment empirically, we use the net of subsidiary revenues less subsidiary assets. As explained earlier, when subsidiary revenues are high relative to subsidiary assets, the subsidiary is likely a trade barrier subsidiary, for which \( \kappa^s \) will be positive, while when subsidiary assets are high relative to subsidiary revenues, the subsidiary is likely a production subsidiary, for which \( \kappa^s \) will be negative. We leave out the firms for the middle 20% of this measure, as the likelihood of classifying these firms accurately is low. We create a 0/1 dummy, denoted TYPE, which we multiply with the translation adjustment.
TYPE = 1 indicates a trade barrier subsidiary (that is, large revenues relative to assets), and TYPE = 0 indicates a production subsidiary (that is, large assets relative to revenues). This specification implies that the main effect on the translation adjustment measures its valuation relevance for a production subsidiary, while the sum of the main effect and the interaction of the dummy with the translation adjustment measures its valuation relevance for a trade barrier subsidiary.

To test the second part of Hypothesis 2 we use the following model:

\[
UR_{it} = \alpha + \beta_1 BASEARN_{it} + \beta_2 \Delta BASEARN_{it} + \beta_3 \Delta TA_{it} + \beta_4 TYPE \times \Delta TA_{it} + \varepsilon_{it}. \quad \text{(Model 2b)}
\]

In Model 2b, the change in the translation adjustment is only conditioned on a coarse proxy for \( \kappa^s \), TYPE, that can take only two values corresponding to positive/negative values of \( \kappa^s \). However, as equation (6) shows, we can condition the change in the translation adjustment using a finer measure of \( \kappa^s \). If we precisely condition the change in the translation adjustment over the full range of \( \kappa^s \), we are effectively replacing the change in the translation adjustment \( \Delta ta_{t+1} \) by \( \delta_{t+1} \kappa^s \delta_{oc} \), which returns us to Model 1a.

Finally, to confirm that \( \Delta TA \) has value relevance only if conveys information about \( NET,G/L \), we test the following model:

\[
UR_{it} = \alpha + \beta_1 BASEARN_{it} + \beta_2 \Delta BASEARN_{it} + \beta_3 NET,G/L_{it} + \beta_4 \Delta TA_{it} + \varepsilon_{it}. \quad \text{(Model 3)}
\]

Since \( \Delta ta_{t+1} \) is only relevant as part of the full term \( \kappa^s \Delta ta_{t+1} \), we expect the proxy for the latter will remain strongly significant, while \( \Delta TA \) should be insignificant.
4 Sample and Descriptive Statistics

As described previously, foreign operations and foreign exchange issues are relatively more important for Canadian than American firms. We begin our sample selection by identifying all cross-listed firms for the period from 1983 (the year when Section 1650 of the CICA Handbook became effective) through 1998 using the TSE Monthly Review and the Report on Business database. Canadian cross-listed firms are larger, more likely to have international operations, and provide better disclosure than their purely domestic counterparts. Constructing the proxy for net foreign currency operating cash flows requires both foreign operations and significantly detailed segment disclosures. We then reduce this list to firms having the necessary return data from the Toronto Stock Exchange (TSE) data tape, and examine the annual reports for firms on this list that have a cumulative translation adjustment in the equity section of the balance sheet.

We use the translation adjustment to identify firms with significant foreign operations. This sample allows meaningful tests of the primary hypothesis. It also allows us to test the implications derived from our analysis for the translation adjustment, and to link our results with the prior literature. We keep all firms providing sufficient segment disclosure to enable the determination of each subsidiary’s sales and net assets in both dollars and the subsidiary’s currency, leaving us with a sample of 87 firms and 435 firm-years from 1983 through 1998. We obtain foreign exchange rates from International Financial Statistics, produced by the International Monetary Fund.

Table 1 Panel A presents descriptive statistics for the sample firms. A comparison of the mean and median values in Panel A reveals that many of the variables are skewed, so for Panel B and the subsequent tests we winsorize all variables at 1% and 99%. Subsequently, we discuss the sensitivity of the results to the use of rank regressions.

INSERT TABLE 1 ABOUT HERE
The mean (median) absolute value of the change in the cumulative translation adjustment is over 70% (60%) as large as the mean (median) change in base earnings. The mean absolute exchange gains and losses on subsidiary revenues and assets are even larger. Both exceed the mean and median change in base earnings. The importance of exchange rate movements arising from foreign denominated borrowings and foreign operations for Canadian firms provides an opportunity to test for market reactions to exchange rate movements that materially affect firms' financial statements.\textsuperscript{12}

5 Empirical results

We assess empirically how well stock returns are explained by our proxies for the economic gain or loss sustained by firms as a result of foreign exchange movements, as well as by the change in the translation adjustment mandated by current GAAP. All test statistics presented in the paper are two-tailed. We begin with the univariate results presented in Table 1, Panel B. These results show that the change in the translation adjustment, $\Delta TA$, is positively associated with market-adjusted returns, though not significantly so. Consistent with Bartov (1997), this relation is stronger in the ranks. The difference between the gain or the loss on subsidiary revenues and the gain or loss on subsidiary assets, $NET.G/L$, is strongly positively associated with returns ($p$-value = 0.0006) in the Pearson correlations, although the strength of the association is weakened somewhat in the ranks ($p$-value = 0.105). The gain or loss on subsidiary assets, $REV.G/L$, and the gain or loss on subsidiary assets, $ASSET.G/L$, are strongly correlated with each other. The former is strongly associated with market-adjusted returns in the predicted direction, while the latter is not. Our hypothesis stated that $REV.G/L$ ($ASSET.G/L$) should be significantly positively (negatively) associated with market-adjusted returns in a multivariate regression because the latter should capture subsidiary costs. The construct validity of the empirical proxies is important, so prior to
the full multivariate test, we confirm these variables’ construct validity by examining partial Pearson correlations of each of \( \text{REV}_G/L \) and \( \text{ASSET}_G/L \) with market adjusted returns, after controlling for the other. The partial (untabulated) correlation of \( \text{REV}_G/L \) with market-adjusted returns after controlling for \( \text{ASSET}_G/L \) retains its positive sign and significance \((p\text{-value} = 0.011)\), and the partial correlation of \( \text{ASSET}_G/L \) with market-adjusted returns after controlling for \( \text{REV}_G/L \) reverses sign and becomes negative and significant \((p\text{-value} = 0.018)\). The partial correlations are consistent with and support our contention that assets owned by the subsidiary, after controlling for subsidiary revenues, capture costs denominated in the subsidiary’s currency.

Multivariate results are presented in Table 2. As a benchmark, we begin with a regression (Base Model) that excludes the translation of the balance sheet of foreign operations. The explanatory power of earnings and earnings changes alone for annual unexpected stock returns compares favourably with their explanatory power documented in the literature.

INSERT TABLE 2 ABOUT HERE

Our primary hypothesis concerns how well stock returns are explained by \( \text{NET}_G/L \), the net exchange gain or loss on subsidiary operations (\( \text{REV}_G/L \) less \( \text{ASSET}_G/L \)). The results in models 1a and 1b confirm this hypothesis. Model 1a demonstrates that \( \text{NET}_G/L \) is a significant explanatory of returns. Results are significant \((p\text{-value} = 0.003)\) and in the predicted direction. The adjusted \( R^2 \) increases 14% from .113 to .129 with the addition of \( \text{NET}_G/L \). Model 1b, includes \( \text{REV}_G/L \) and \( \text{ASSET}_G/L \) as separate explanatory variables, which allows their coefficients to differ. The earlier results are confirmed, \( \text{REV}_G/L \) is significantly and positively associated with unexpected returns, while \( \text{ASSET}_G/L \) is significantly and negatively associated with unexpected returns.\(^{14}\)

The second hypothesis explores how well the translation adjustment \((\Delta \text{TA})\) alone explains stock returns (Model 2a), and whether conditioning it on subsidiary type improves its explanatory power (Model 2b). Consistent with our earlier exposition, in Model 2a, \( \Delta \text{TA} \)
fails to add explanatory power to the earnings/return relation. In fact, its inclusion is not even sufficient to make up for the additional degree of freedom, and the adjusted $R^2$ drops slightly from the base model.

The test of Model 2b, provides significant results and in the predicted direction: $\Delta TA$ corresponds to production subsidiaries and is negatively associated with stock returns ($p$-value = 0.09), while $TYPE \times \Delta TA$ corresponds to the difference between trade barrier and production subsidiaries and is positive and significant ($p$-value = 0.02).\textsuperscript{15} Thus, trade-barrier subsidiaries, which generate net revenues in the subsidiary’s currency, exhibit a positive relation between $\Delta TA$ and stock returns, while production subsidiaries, which generate net costs in the subsidiary’s currency, exhibit a negative relation.

We test the robustness of these results through rank regressions as recommended by Cheng, Hopwood, and McKeown (1992). This is an important robustness check since Bartov (1997) found the change in the translation adjustment to be more positively significant in a rank specification and $\Delta TA$ was significant in the simple Spearman rank correlation with market-adjusted returns. In the ranked multivariate analysis, $\Delta TA$ is not significant in either of the ranked versions of Models 4 or 5, whereas $REV.G/L$, $ASSET.G/L$, and $NET.G/L$ are all significant in the predicted directions in the ranked versions of all specifications in which they appear.\textsuperscript{16} Thus, the rank regressions corroborate the earlier analysis.

Finally, for completeness Model 3 adds $\Delta TA$ to $NET.G/L$. As expected, $NET.G/L$ remains strongly positively associated with returns ($p$-value = 0.003), while $\Delta TA$ fails to attain statistical significance.

These results support our arguments that the market response to exchange rate movements is sensitive to the relative magnitudes of revenues and costs denominated in the subsidiary’s currency. Accordingly, disclosure of these subsidiary currency cash flows should be beneficial to investors attempting to value firms with foreign operations. $\Delta TA$ alone, the change in the translation adjustment, is not useful in explaining stock returns, while
NET\_G/L, our proxy for the exchange gain or loss on permanent subsidiary cash flows, is significantly and positively related to returns. By conditioning $\Delta TA$ on whether the operating cash flows in the subsidiary currency are positive or negative and thus acknowledging the underlying economics of the subsidiary activities, $\Delta TA$ becomes significant in the predicted direction.

6 Conclusion

In an increasingly global business environment, the need for informative financial reporting of transactions in a foreign currency is crucial for evaluating the performance of firms with foreign operations. This paper contributes to our knowledge of how accounting information for foreign operations maps into firm value. We demonstrate analytically that valuing a firm with foreign operations in the presence of exchange rate uncertainty requires disaggregated information on the operating foreign currency cash flows. Ideally, investors require the current unexpected cash flows in the parent’s currency, the current unexpected foreign currency cash flows, the persistent component of previous unexpected foreign currency cash flows, and the permanent return on operating capital in the foreign currency.

When valuing firms using aggregate earnings data from the income statement, investors also require, at a minimum, knowledge of the effect of exchange movements on permanent foreign operating cash flows. We use proxies for the relative level of sales versus costs (i.e., the net cash flow) in every foreign currency in which the parent firm operates, and demonstrate empirically that the effect of exchange movements on net foreign currency cash flow has significant explanatory power for returns.

We also show that including only the change in the translation adjustment, along with earnings, is insufficient for valuation purposes because this measure ignores whether the firm is a net producer or seller in the foreign currency. This provides an explanation for
why the results from prior empirical work in the area are sample-specific. There is no association between stock returns and the change in the translation adjustment in our sample, a modest positive association in some samples of American firms (Soo and Soo 1994, Bartov 1997), a negative association in a sample of American manufacturing firms (Louis 2001), and conflicting findings on the value relevance of comprehensive income in Dhaliwal et al. (1999) and Biddle and Choi (2002).

We demonstrate that changes in the translation adjustment become value relevant when conditioned on the sign of permanent foreign currency operating cash flows. Conditioning distinguishes whether the subsidiary is a net seller or producer in its own currency. However, since the foreign operating cash flows can be used directly to value firms, the change in the translation adjustment is unnecessary in the presence of the cash flow variables.

Most importantly, our analysis and empirical results suggest additional disclosures that will help investors assess the value of foreign operations to the firm. Further, these disclosures, if implemented, would be beneficial regardless of whether firms classify their subsidiaries as integrated or self-sustaining. Standard setters can improve the value relevance of financial disclosures by mandating that firms disclose the specific revenues and costs that are transacted in each currency in which the firm operates.
Notes

1The Canadian and American standards are comparable on defining self-sustaining versus integrated subsidiaries; however, they use different terminology. SFAS 52 focuses on the functional currency, either the parent’s or the subsidiary’s currency. To reconcile the terminologies, a self-sustaining subsidiary is one that has as its functional currency the subsidiary’s currency, while an integrated subsidiary is one that has as its functional currency the parent currency, the Canadian dollar.

2Collins and Salatka (1993) found that firms with self-sustaining subsidiaries exhibited higher ERCs on unexpected earnings around earnings announcements following the change from SFAS 8 to SFAS 52. The inference is that the exchange gains or losses on monetary items included in earnings under SFAS 8 added noise to the earnings announcements.

3This was an important factor in the FASB replacing SFAS 8 with SFAS 52. Research undertaken at the time indicated that some managers were engaging in costly hedging activities to neutralize this accounting effect (Evans, Folks, and Jilling, 1978).

4Our model will present implications for disclosures related to foreign exchange that are relevant for the purpose of valuation. It would be necessary to consider other purposes and issues related to financial reporting to make a more comprehensive statement concerning income measurement or balance sheet presentation. Thus, we limit ourselves to a recommendation for disclosure in this paper.

5Conceptually, each type can be contrasted with a purely stand alone subsidiary with all revenues and costs in the subsidiary currency and whose only link with the parent is through dividends.

6Our cash flow dynamic is *mathematically* a particular version of the one in Feltham and
Ohlson (1996) if we restrict ourselves to a single currency; our cash flows in either currency satisfy their (CFD) on p.212 with \( \gamma = 1 \) and \( \kappa = \omega - 1 \). Economically, however, we cannot interpret our setting within their framework because of the different interpretations we give different terms, which results in different parameter restrictions.

\(^7\)In any tests of these variables we employ collinearity diagnostics.

\(^8\)Wong (2000) makes related disclosure recommendations in his study of the association between accounting derivatives disclosures and foreign exchange risk exposures. Wong is unable to find consistent results in the predicted direction, in part because disclosures are too aggregated to determine firms underlying currency exposures. Among other disclosures, Wong recommends that financial statement notes provide disaggregated information, by major currency, on notional amounts in foreign currencies by long and short position.

\(^9\)All of these studies employing US data express concern that the relevance of foreign exchange transactions for returns may be hard to document due to the small size of foreign currency transactions relative to net income. The greater materiality of foreign exchange issues for the Canadian firms examined here mitigates this empirical problem.

\(^{10}\)These other items include changes in unrealized gains and losses on marketable securities and changes in the additional minimum pension liability.

\(^{11}\)A problem with this second approach is that it does not allow the components of income to vary with respect to their persistence, since all the elements included in comprehensive income are constrained to have the same coefficient. This is particularly problematic for comprehensive income because it includes gains and losses related to price movements in competitive markets that should follow a random walk. Such gains and losses are by definition transitory, and should be segregated from more permanent income components in understanding price movements.
12 For example, in Dhaliwal et al. (1999), comparable magnitudes are observed only in the top decile of the absolute change in the foreign currency translation adjustment.

13 The partial Spearman correlations behave similarly, with \( \text{REV}_G/L \) and market-adjusted returns positive and significant \((p\text{-value} = 0.021)\), while \( \text{ASSET}_G/L \) and market-adjusted returns are negative and significant \((p\text{-value} = 0.066)\).

14 Clearly, \( \text{REV}_G/L \) and \( \text{ASSET}_G/L \) are strongly correlated. We ran collinearity diagnostics (Jobson, 1991 and Belsley, Kuh, and Welsch, 1990) and no eigenvector has a condition index in excess of 10, the level at which collinearity begins to become a problem.

15 For purposes of comparison we rerun Model 1a in this smaller sample, \( \text{NET}_G/L \) is again significant \((p\text{-value} = 0.003)\), in the predicted direction with an the adjusted \( R^2 \) of 0.137.

16 Bartov (1997) finds that the change in the translation adjustment is significant over the twelve-month period ending with the first quarter of the subsequent year. He also finds it is significant in the 60 days following the end of the first quarter of the subsequent year. In our sample of Canadian firms, the change in the translation adjustment remains insignificant when we use these two windows, regardless of whether we use rank or regular regressions. This difference in results for the change in the translation adjustment is consistent with our argument that the sign and significance of this variable will be sample specific.
References


Panel A: Distributional characteristics of independent variables. All variables are scaled by the beginning market value of equity. For variables that will be positive or negative depending on the exchange rate movement, the mean and median of the absolute values of the exchange gain or loss is provided in parentheses.

<table>
<thead>
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<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
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<tr>
<td>BASEARN</td>
<td>0.131</td>
<td>0.093</td>
<td>0.200</td>
</tr>
<tr>
<td>ΔBASEARN</td>
<td>0.021</td>
<td>0.010</td>
<td>0.130</td>
</tr>
<tr>
<td>ΔTA</td>
<td>0.003</td>
<td>0.0005</td>
<td>0.019</td>
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<td>NET_G/L</td>
<td>0.002</td>
<td>0</td>
<td>0.043</td>
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<td>(0.015)</td>
<td>(0.006)</td>
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<td>0.0003</td>
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<td>(0.013)</td>
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</tr>
<tr>
<td>ASSET_G/L</td>
<td>0.017</td>
<td>0.00001</td>
<td>0.071</td>
</tr>
<tr>
<td>(0.035)</td>
<td>(0.014)</td>
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</table>

BASEARN is the pre-tax operating income. ΔBASEARN is the annual change in BASEARN. ΔTA is the annual change in the cumulative translation adjustment arising from exchange rate movements applied to the net assets of self-sustaining subsidiaries. NET_G/L is the net of REV_G/L and ASSET_G/L. REV_G/L is the gain or loss calculated by applying exchange rate movements to the revenues of subsidiaries. ASSET_G/L is the gain or loss calculated by applying exchange rate movements to the assets of subsidiaries. UR_it is the market adjusted return on the firm's stock during the fiscal year (Panel B only).
**TABLE 1 (continued)**

**Panel B:** Correlation coefficients among variables used in the analysis of the effect of exchange rate movements on the relationship between accounting numbers and returns. Two-tailed p-values are in parentheses. Pearson correlations are above the diagonal, and Spearman correlations are below the diagonal. Variables are described in panel A.

<table>
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<th>UR_{it}</th>
<th>BASEARN</th>
<th>ΔBASEARN</th>
<th>ΔTA</th>
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<th>REV_G/L</th>
<th>ASSET_G/L</th>
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<td>(0.0001)</td>
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<td>(0.0001)</td>
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<td>(0.0001)</td>
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<td>(0.041)</td>
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Table 2 The relation between returns, changes in the cumulative translation adjustment, and exchange gains and losses on subsidiary revenues and assets.

Base Model:
\[ UR_{it} = \alpha + \beta_1 BASEARN_{it} + \beta_2 \Delta BASEARN_{it} + \epsilon_{it} \]

Model 1a:
\[ UR_{it} = \alpha + \beta_1 BASEARN_{it} + \beta_2 \Delta BASEARN_{it} + \beta_3 NET_G/L_{it} + \epsilon_{it} \]

Model 1b:
\[ UR_{it} = \alpha + \beta_1 BASEARN_{it} + \beta_2 \Delta BASEARN_{it} + \beta_3 REV_G/L_{it} + \beta_4 ASSET_G/L_{it} + \epsilon_{it} \]

Model 2a:
\[ UR_{it} = \alpha + \beta_1 BASEARN_{it} + \beta_2 \Delta BASEARN_{it} + \beta_3 \Delta TA_{it} + \epsilon_{it} \]

Model 2b:
\[ UR_{it} = \alpha + \beta_1 BASEARN_{it} + \beta_2 \Delta BASEARN_{it} + \beta_3 \Delta TA_{it} + \beta_4 TYPE*\Delta TA_{it} + \epsilon_{it} \]

Model 3:
\[ UR_{it} = \alpha + \beta_1 BASEARN_{it} + \beta_2 \Delta BASEARN_{it} + \beta_3 NET_G/L_{it} + \beta_4 \Delta TA_{it} + \epsilon_{it} \]

<table>
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<th>Base Model</th>
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<th>Model 1b</th>
<th>Model 2a</th>
<th>Model 2b</th>
<th>Model 3</th>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>(0.951)</td>
<td>(0.638)</td>
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<tr>
<td>(TYPE*\Delta TA)</td>
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<td></td>
<td>5.144</td>
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<td>(0.020)</td>
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<tr>
<td>n</td>
<td>435</td>
<td>435</td>
<td>435</td>
<td>435</td>
<td>349</td>
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</tr>
<tr>
<td>Adjusted R²</td>
<td>0.113</td>
<td>0.129</td>
<td>0.127</td>
<td>0.111</td>
<td>0.127</td>
<td>0.127</td>
</tr>
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</table>
Table 2 continued

UR\textsubscript{a} is the market adjusted return on the firm's stock during the fiscal year (Panel B only).
BASEARN is the pre-tax operating income
\(\Delta\)BASEARN is the annual change in BASEARN.
NET\_G/L is the net of REV\_G/L and ASSET\_G/L.
REV\_G/L is the gain or loss calculated by applying exchange rate movements to the revenues of subsidiaries.
ASSET\_G/L is the gain or loss calculated by applying exchange rate movements to the assets of subsidiaries.
\(\Delta\)TA is the annual change in the cumulative translation adjustment arising from exchange rate movements applied to the net assets of self-sustaining subsidiaries.
TYPE is a 0/1 dummy variables, where 1 (0) indicates that the firm is a net seller (producer) in the subsidiary’s currency.

Two-tail significance levels are in parentheses.