

**The valuation-relevance of the foreign translation adjustment:
The effect of barriers to entry**

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December 2008

We gratefully acknowledge comments from Ashiq Ali, Eli Bartov, Qiang Cheng, Bill Cready, Ferdinand Gul, Bin Srinidhi and two anonymous reviewers. We are also grateful to participants at 2007 AAA annual meeting at Chicago, Illinois.

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Abstract

We examine the economic effects of barriers to entry on the association between foreign currency translation adjustments and stock returns of multinational firms operating in the manufacturing and service industries. Firms that are research and development leaders, i.e., innovation-intensive firms, and firms with high foreign asset intensity, i.e., asset-intensive firms are our proxy for firms likely to operate in environments of decreased competition, i.e., barriers to entry. We hypothesize and find that the foreign currency translation adjustments are positively associated with abnormal stock returns for firms subjected to barriers to entry effect in both manufacturing and service industries. This finding shows the importance of assessing the valuation-relevance of the foreign currency translation adjustments by considering the economic contexts of foreign currency movements. Overall, the evidence shows that the accounting rules governing foreign currency translations in general produce results consistent with the economic effects of foreign exchange rate changes.

I. INTRODUCTION

We examine the economic effects of barriers to entry on the association between foreign currency translation adjustments and stock returns of multinational firms. Louis (2003) considers the economic effect of rigidity of wages and shows that the foreign currency translation adjustments are negatively associated with multinational manufacturing firms' stock returns: foreign currency translation adjustments produce results opposite to the economic effects of exchange rate changes. The argument for rigidity of wages is based on the assumption of open markets, i.e., unhindered competition. The objective of this paper is to examine the economic effects of barriers to entry, i.e., relaxing the assumption of open markets for manufacturing and service industries.

Research in economics shows that foreign currency exchange rates are associated with a foreign country's economic growth relative to the U.S. economic growth, and vice versa (see Balasaa, 1964; Samuelson, 1964; Kravis and Lipsey, 1983; Bhagwati, 1984).¹ The foreign country's economic growth attracts increased competition because imports are cheaper: this exerts a downward pressure on output prices. However, the input factor prices (especially labor prices) are sticky resulting in a decrease in future profits (see White et al., 1998, page 861). There are two important assumptions in this argument: first, the foreign country's product market is open, and second, wages (labor prices) are sticky. In this paper, we relax the open-market assumption by considering firms operating in environments with barriers to entry, and examine the association of foreign translation adjustments and stock returns. We argue that the economic effect of sticky wages and barriers to entry affect firm value in opposite ways, i.e., foreign currency translation adjustments are positively associated with stock returns for firms operating in environments with barriers to entry. We also argue that firms operating in the service sector with barriers to entry are *also* likely to reap the benefits of the economic growth leading to an increase in the economic value of the firms.

¹ The Balasaa-Samuelson models do not assume purchasing power parity (PPP). Empirical evidence supports the view that productivity differentials are an important determinant of long-term exchange rates (see Mark, 1995; Chinn, 1999; Cheung et al., 2005; Lee and Chinn, 2006).

Firms with large R&D intensity and high asset intensity are considered as firms operating in environments with barriers to entry. We consider firms in the top (bottom) fifty percent of the industry-adjusted R&D capital intensity as R&D leaders (followers). Similarly, we classify firms in the top fifty percent of industry-adjusted foreign assets (number of foreign employees) to foreign sales ratio each year, as asset- (labor-) intensive firms. We consider labor intensity to control for the economic effect of sticky wages. Firms with high industry-adjusted foreign asset (labor) intensity are our proxy for firms that are more likely to be affected by barriers to entry (rigidity of wages) effect.² We hypothesize that the foreign currency translation adjustments are positively associated with stock returns for R&D leaders and high asset-intensive firms.

Consistent with our hypothesis, we find that the foreign currency translation adjustments are positively associated with stock returns for R&D leaders and asset-intensive multinational firms operating in both the manufacturing and service industries. Noting that exchange rates are relative to the U.S. dollar, we identify years when U.S. has experienced economic growth. In particular, we consider years earmarked by the National Bureau of Economic Research as recessionary and expansionary. We find that the positive association between stock returns and foreign currency translation adjustments for R&D leaders and asset-intensive firms occurs for U.S. expansionary periods. This is likely because the recessionary periods contain very few observations, and hence lack power.

We also consider both the domestic and foreign growth, because exchange rates depend on relative growth rates, and our hypothesis is based on the link between exchange rates and real economic growth. For this purpose we use the Major Currencies Index based on the level of trade provided by Federal Reserve. Conditioned on the U.S. economic growth (decline), a negative change in the index indicates growth (decline) in the foreign economy: we call this sub-sample as domestic growth (decline) and foreign growth (decline). However, a positive change in the annual

² For reason of brevity, we refer to firms with high industry-adjusted foreign asset (labor) intensity as asset-intensive (labor-intensive) firms. We use innovation-intensive and R&D intensive interchangeably for firms with high industry-adjusted R&D capital intensity.

index when the U.S. economy is growing does not indicate whether the foreign economy is growing or declining: we call this sub-sample as domestic growth and foreign growth indeterminate. We find that the positive association between foreign currency translation adjustments and stock price occurs in both the domestic and foreign growth sub-sample as well as domestic growth and foreign growth indeterminate sub-sample. Put together our evidence suggests that foreign currency translation adjustment provides information on the future growth prospects for R&D leaders and asset-intensive multinational firms operating in environments with barriers to entry. By implication, the economic effects of foreign exchange rate changes impact firms differently based on their strategies and characteristics (i.e., innovation, asset, and labor intensity). Our evidence shows the importance of considering the economic effects of foreign currency movements in assessing the valuation-relevance of the foreign currency translation accounting rules.

Studies on the valuation-relevance and usefulness of SFAS 52 that deal with foreign currency translation adjustments have provided mixed results.³ Griffin and Castanias (1987) show that the analysts' earnings forecast accuracy improved after SFAS 52, suggesting that earnings quality improved under SFAS 52. Collins and Salatka (1993) find that the perceived noise in earnings increase when the foreign currency translation adjustments are included in net earnings, suggesting that the earnings quality improved under SFAS 52. Gilbert (1989) finds that the foreign currency translation adjustments are not valuation-relevant after the adoption of SFAS 52. Similarly, Soo and Soo (1994) express a concern that the relevance of foreign exchange translations for stock returns may be hard to document due to the small size of foreign currency transactions relative to net income. Bartov (1997) examines the association between stock price changes and alternative foreign currency translation adjustments (the temporal and current rate methods) and finds that the foreign currency translation adjustments are valuation-relevant. Louis (2003) examines the valuation-relevance of foreign currency translation adjustments for manufacturing firms and finds

³ Under SFAS 52, translation gains and losses of foreign subsidiaries whose functional currency is the local currency are reported as cumulative translation adjustment in the stockholders' equity; the change in the cumulative translation adjustment is part of the comprehensive income. Prior to SFAS 52 under SFAS 8, total foreign exchange gains and losses were reported as part of the net income.

that the foreign currency translation adjustments are negatively associated with stock returns: this finding is consistent with the economic effects of the rigidity of wages. Sabac et al. (2005) provide an analytical insight that the negative association between foreign currency translation adjustments and stock returns depends on whether the firm's foreign subsidiary is a net producer or net seller. They consider a sample of Canadian firms and find a negative (positive) association between foreign translation adjustments and stock returns for foreign net producers (sellers).

We extend these studies by developing the economic context where the foreign currency translation adjustments are positively associated with stock returns. We find that the foreign currency translation adjustment contains differential information based on the economic contexts, i.e., the firm's strategy: innovation, asset, and labor intensity. The implication of our findings is that in assessing the valuation-relevance of foreign currency translation adjustments, the economic contexts are important: specifically, we provide an economic rationale and evidence for why a positive foreign currency translation adjustment can be deemed to be an increase in income.

The rest of the paper is organized as follows: Section II develops the hypothesis, Section III provides the empirical analysis, and Section IV contains some concluding remarks.

II. MOTIVATION AND HYPOTHESIS DEVELOPMENT

White et al. (1998) discuss contexts and settings where foreign currency translation adjustments distort economic reality. First, they consider the case of a manufacturing subsidiary where the output is sold entirely in the foreign country and costs are incurred in the foreign currency. If the value of the foreign currency increases, imports are likely to enter, resulting in lower sales, lower earnings and lower cash flows because output prices will need to be decreased to maintain market share. However, with the foreign currency as the functional currency, the foreign currency translation adjustment will be positive, even though the economic value of the foreign subsidiary has declined. Louis (2003) makes this argument precise through the economic effect of rigidity of wages: to remain competitive, the firm will decrease its selling prices but its labor costs are rigid for

an extended period. Thus, the economic effect of rigidity of wages when a foreign currency appreciates is to decrease the firm's future profitability. Putting these together, a foreign currency appreciation leads to a positive foreign currency translation adjustment (FTA) and an increase in the reported accounting/ comprehensive income, but a decrease in the firm's market value due to a decrease in the firm's future profitability. Louis (2003) shows that stock returns are negatively associated with foreign translation adjustments, i.e., on average a positive FTA is associated with a loss of value instead of an increase in value, and vice versa; and this negative association is more pronounced for more labor-intensive firms.

Second, consider the case where a U.S. company has a foreign manufacturing subsidiary that exports all goods to the U.S. for sale. If the foreign currency appreciates, the subsidiary's profit margins will be squeezed because the revenues will decline as a result of the increased production costs, if we assume that the U.S. dollar prices remain unchanged. If the foreign subsidiary maintains its revenues, the U.S. dollar prices will have to increase which will decrease the quantity of goods sold. Overall, the sales and earnings of the company will decrease leading to a decrease in the value of the company. Sabac et al. (2005) make this intuition precise and show that foreign currency translation adjustments are negatively associated with economic value when the foreign subsidiary is a net producer.⁴

Central to the arguments and findings in Louis (2003) and Sabac et al. (2005) is the assumption that the product markets are open. For instance, Louis (2003) argues that the entry of potentially cheaper imported goods exerts a downward pressure on output prices of the subsidiary. Similarly Sabac et al. (2005) assumes that the foreign exchange shocks cannot be passed-through to the product market. We thus consider the effects of relaxing the open-market assumption and call this the barriers to entry.

⁴ Sabac et al. (2005) also consider the differential stickiness of input and output prices and argue that stickiness of wages is not a likely reason for the negative association between stock prices and foreign currency translation adjustments. This is consistent with the empirical evidence in the economics literature which suggests that when exchange rates change, overall, wages are only marginally more rigid than output prices (see Giovanni, 1988; Froot and Rogoff, 1995; Haskel and Wolf, 2001).

Barriers to Entry, Foreign Currency Exchange Rates, and Stock Returns

White et al. (1998) consider a case where a foreign subsidiary operates in an environment with no export and import competition. In this case, the parent company data represents the performance of the subsidiary in the foreign currency. In other words, if the foreign currency appreciates, the net investment increases in the foreign currency and vice versa. As such, the net investment is a fair proxy for the value of investment to the parent. The main assumption that determines the positive association of the foreign currency translation adjustments and stock price as compared to the other two scenarios considered in Louis (2003) and Sabac et al. (2005) is the restriction on competition. More importantly, when competition is restricted the foreign currency translation adjustment (FTA) provides aggregate information on the changes in foreign currency exchange rate, and thus, FTA contains information on the foreign country's economic growth. Firms are able to pass through the increase in input prices to their consumers in both the Louis (2003) and Sabac et al. (2005) scenarios.

Stigler (1963), Mueller (1977), and Kamerschen (1968) suggest that higher barriers to entry decrease competition by limiting entry into the industry. Firms can strategically create barriers to entry by choosing product differentiation strategies. Product differentiation strategies ensure that the firms' products do not have direct substitutes. Caves and Porter (1977) develop a framework for intra-industry profit differentials based on pre-commitment to specialized resources such as R&D and capital-intensive technologies. Caves and Ghemawat (1992) show that differentiation-related strategies play an important role in sustaining profit differentials across firms: differentiation-related strategies include innovation activities such as introduction of new products/services and brands. In essence, barrier to entry restricts competition and hence, allows output prices to be passed through the increased costs without an adverse effect on earnings or profits.⁵

Eaton and Lipsey (1981) show a positive association between industry profitability and

⁵ A firm's labor intensity is not likely to lead to barriers to entry. Human capital in terms of management quality, innovation ability, etc. is likely to create barriers to entry. However, these superior abilities may not be reflected in the total number of employees. Consequently, labor intensity is more likely to be subject to the economic effect of rigidity of wages.

capital intensity suggesting that capital intensity is a potential source of barriers to entry. For foreign operations, especially in emerging markets where foreign direct investments are key drivers of economic growth, capital intensity would be an important barrier to entry. Evidence shows that foreign direct investments are an important determinant of economic growth (Froot and Stein, 1989; Borensztein et al., 1998; Griffin and Stulz, 2001). Firms invest in capital-intensive technologies in foreign countries to improve productivity and take advantage of economic growth in the foreign country.

Empirical evidence in the economics literature suggests that when foreign exchange rates change, wages are only marginally more rigid than output prices (see Giovanni, 1988; Froot and Rogoff, 1995; Haskel and Wolf, 2001). Firms choosing to strategically create barriers to entry by product differentiation either by being innovation leaders or adopting capital-intensive technologies are more likely to be able to pass through the increases in input prices to consumers (see Baginski et al., 1999). Thus, the effects of barriers to entry will apply equally to foreign production or marketing subsidiaries: if the foreign subsidiary is a production subsidiary then the parent will pass through the increased cost in the U.S.

Firms in the service industries will also be subject to foreign competitive pressures when the foreign economy grows. The effects of barriers to entry must exist for the service firms as well. As such, our hypothesis examines the firms in both the manufacturing and the service industries.

Hypothesis

Barrier to entry: *Foreign currency translation adjustments are positively associated with stock returns for firms with barriers to entry in the manufacturing and service industries.*

Foreign currency exchange rate is a relative concept. An appreciation in the foreign currency exchange rate could be associated with an economic growth in the foreign country or an economic downturn in the domestic market. If the appreciation of the foreign currency is concurrent with an economic downturn in the domestic market, then an appreciation of the foreign currency could be bad news for the firms. That is, in the arguments leading to the hypothesis, we have implicitly

assumed that the U.S. economy is not declining when foreign currency is appreciating. We address this by considering the relative growth of U.S. and foreign economy in the empirical tests.

We next turn to the empirical analysis.

III. EMPIRICAL ANALYSIS

Proxy and Variable Definitions

We use two proxies for barriers to entry: innovation strategy and foreign asset intensity.

Proxy for Innovation Strategy

We identify R&D leaders as a proxy for the firm's innovation strategy. We use the firm's capitalized R&D expense to identify R&D leaders in each industry. Capitalized R&D expense is computed by capitalizing and amortizing firm's R&D expenditure (Compustat data item 46) over five years (see Lev and Sougiannis, 1996). Firm's R&D capital intensity ($R\&D$) is defined as the capitalized R&D expense divided by sales (Compustat data item 12).⁶ We use industry-adjusted capitalized R&D intensity (also called R&D capital intensity) to classify firms as R&D leaders and followers. Industry-adjusted capitalized R&D intensity calibrates for competitive forces as well as innovation potential in the industry. For instance, even a R&D follower in the pharmaceutical industry could have a higher R&D capital intensity than that of an R&D leader in the food products industry. The benchmark R&D capital intensity for the industry (two-digit SIC) is the value-weighted capitalized R&D to sales ratio of all firms in the industry where the value-weights are sales. The industry-adjusted R&D capital intensity ($R\&D_ADJ$) is thus the difference between firm's R&D capital intensity and the value-weighted mean R&D capital intensity of the industry. A firm is classified as an R&D leader in year t , if its industry-adjusted R&D capital intensity in year $t-1$ is above median. Correspondingly, all other firms are classified as R&D followers.

We use the total R&D capital intensity as opposed to the foreign R&D capital intensity. The

⁶ R&D expenditures are considered to be zero for firms with missing R&D expenditures data. The accounting rule (SFAS 2) requires R&D expenditures to be reported. Consequently, firms with missing R&D data are assumed to have no R&D activity.

reasons for doing so are twofold. First, the knowledge/innovation from R&D activities is transferable. Thus, most of the R&D effort wherever it is exerted can be transferred to other geographic markets to reap the benefits of innovation. Second, is an important practical consideration: less than 30 firms in our sample have foreign R&D expenditures in the Compustat segment database. Thus, almost all firms even if they do conduct R&D activities in foreign countries do not voluntarily provide such information in their annual reports. Thus, we use the total R&D capital intensity as the measure of firm's innovation strategy.

Proxy for Foreign Capital Intensity

We use firm's industry-adjusted foreign asset intensity as the proxy for firm's foreign capital intensity: foreign capital intensity is computed as firm's foreign assets divided by its foreign sales. Thus, industry-adjusted foreign asset intensity (*ForAsset_ADJ*) is calculated as the difference between firm's foreign asset intensity and the mean foreign asset intensity of the industry based on two digits SIC codes. Data for foreign sales and assets are obtained from the Compustat segment database. Firms with industry-adjusted foreign assets to foreign sales ratio greater than (lower than or equal to) the median ratio in year $t-1$ are classified as asset-intensive firms in year t .⁷ Asset-intensive firms are considered to be operating in an environment with barriers to entry, in addition to R&D Leaders.

Research Design

To empirically examine the hypothesis, we augment Louis's (2003) model and estimate the following equation:⁸

$$SARET_{it} = \beta_0 + \beta_1 RDLeader + \beta_2 HighAsset + \beta_3 HighLabor + \beta_4 FTA_{it} + \beta_5 FTA_{it} * RDLeader + \beta_6 FTA_{it} * HighAsset + \beta_7 FTA_{it} * HighLabor + \beta_8 NIADJ_{it} + \beta_9 FTAX_{it} + \beta_{10} TADJ_{it} + error \quad (1)$$

⁷ We also use total assets to proxy for firm's asset intensity, i.e., gross total assets (Compustat data item 6 plus Compustat data item 196) scaled by net sales (Compustat data item 12) and obtain qualitatively similar results. In addition, we also conduct robustness test using different benchmark to classify high and low asset-intensive firms, i.e., a firm is classified as asset-intensive firm when its industry-adjusted foreign asset intensity is above zero rather than median, results are qualitatively similar. The Pearson (Spearman) correlation between foreign asset intensity measure and total asset intensity measure is 0.79 (0.89). These high correlations between foreign and total intensity measures suggest that firms use similar business models for foreign and domestic operations.

⁸ For robustness, we estimate equation (1) separately for each group without the interaction variables and obtain qualitatively similar results.

where *SARET* is the 12 months annual size-adjusted/abnormal return calculated over fiscal year t .⁹ The annual return is adjusted for delisting bias according to Shumway (1997). The size-adjusted returns are computed using the companion size portfolio approach. Market capitalization is the proxy for size, and the size-decile breakpoints used to identify the companion portfolio are based on NYSE/AMEX stocks. Thus, the size-adjusted/ abnormal return is the annual raw return minus the annual companion size-decile return. Data for computing the size-adjusted returns are obtained from CRSP.

R&DLeader and *HighAsset* are our proxies for barriers to entry. In particular, *R&DLeader* is a dummy variable that equals one if the industry-adjusted R&D intensity of a firm is greater than the industry's R&D intensity, and zero otherwise. *HighAsset* (*HighLabor*) is a dummy variable takes on a value of one if a firm is classified as asset-intensive (labor-intensive) firm. Asset-intensive (labor-intensive) firms are classified using industry-adjusted foreign asset (foreign employees) intensity.¹⁰ We include labor intensity to control for the rigidity of wages. *NIADJ* is the adjusted net income computed as net income (Compustat data item 18) minus foreign transaction gains or losses (Compustat data item 150).¹¹ *FTA* is the change in cumulative foreign translation adjustment (change of Compustat data item 230). *FTAX* is the foreign income tax (Compustat data item 64) and *TADJ* is the foreign transaction gains or losses (Compustat data item 150). *FTAX* and *TADJ* are control variables. All explanatory variables including the intercept are scaled by the beginning market value.

We estimate equation (1) for manufacturing and service firms separately.¹² Based on Louis (2003)'s rigidity of wages argument, we expect the coefficient on *FTA* (β_4) and interaction term *FTA*

⁹ We use fiscal year raw returns instead of the size-adjusted returns and obtain similar results.

¹⁰ Unlike foreign sales and foreign assets which are mandatory disclosure under the FASB Statement number 131 "Disclosures about Segments of an Enterprise and Related Information", the number of foreign employees is voluntary disclosure. In the case of missing data for the number of foreign employees, we use the firm level number of employee data multiplies the foreign over total assets ratio of the firm as a surrogate for the number of foreign employees. Similarly, the Pearson (Spearman) correlation between foreign labor intensity and total labor intensity is 0.78 (0.90).

¹¹ Including change in net income, $\Delta NIADJ$ in the model does not alter the results.

¹² Manufacturing (service) firms are firms operating in SIC codes 2000-3999 (7200-8799).

**HighLabor* (β_7) to be negative for both manufacturing firms and service firms. Based on the barrier to entry hypothesis, we expect the coefficient on the interaction terms *FTA*RDLeader* (β_5) and *FTA*HighAsset* (β_6) to be positive for both manufacturing and service firms. In addition, we expect the effects of barriers to entry on firm's abnormal stock returns to be positive as well, i.e., the sum of the coefficients β_5 , β_6 and β_4 is positive.

Sample

The sample selection procedure is similar to Louis (2003). The sample includes all multinational firms that report at least two consecutive non-zero cumulative foreign exchange adjustments (Compustat data item 230). These multinational firms are required to have the same fiscal-year end for all years, and have the relevant data available from both CRSP and Compustat databases to estimate equation (1). Furthermore, firms in the financial services sector, i.e., SIC codes 6000 to 6499, and extreme observations in the top and bottom one percent of the annual empirical distribution for all explanatory variables in equation (1) are deleted. We consider firms in both the manufacturing and service industries (SIC codes 7200-8799 and 2000-3999). The final sample contains 8,089 (2,506) firm-year observations, representing 1,607 (703) multinational firms in manufacturing (service) industries spanning from 1985 to 2006.

Panel A of Table 1 provides the sample distribution by two-digit SIC codes. For manufacturing firms, roughly 70 percent of the sample operates in four industries: SIC 35, Industrial Machinery and Equipment (18.54 percent), SIC 38, Instruments and Related Products (18.35 percent), SIC 36, Electronic and Other Electric Equipment (18.10 percent), and SIC 28, Chemical and Allied Products (14.49 percent). For service firms, more than 78 percent of the sample is for one industry: SIC 73, Business Services (78.41 percent). These industries are, in general, characterized by high innovations. Panel B of Table 1 provides the sample distribution by year. The sample distribution by year for both manufacturing and service firms exhibits similar pattern: the number of multinational manufacturing (service) firms is 271 (49) in 1985, 623 (207) in 1997, and 294 (131) in 2006 suggesting that over time more U.S. firms have a global presence,

while the decrease in the number of multinational firms from 1998 may be due to the trend of outsourcing. Overall, the trend emphasizes the increasing importance of foreign operations for U.S. multinational firms.

Table 2, Panel A (B) provides the descriptive statistics of the variables used in estimating equation (1) for manufacturing (service) firms, the unscaled explanatory variables used in equation (1), the variables used to measure firm's R&D capital, foreign asset and labor intensity (both industry-adjusted and the levels without adjusting for the industry average), and some variables describing firm characteristics. The mean (median) size-adjusted return is 0.025 (-0.002) and 0.018 (-0.007) for manufacturing and service firms, respectively which are all statistically insignificant showing that on average the size-adjusted return is zero. The mean unscaled FTA for manufacturing (service) firms is \$0.08 (\$-0.01) million with standard deviation of 16.73 (9.52). This shows that while the FTA is on average zero there is considerable variation. The median market value of equity is \$189.73 (\$204.80) million with Q1 \$50.62 (\$53.54) million and Q3 \$740.05 (\$735.25) million for manufacturing (service) firms showing that firms of varying sizes have foreign operations. The median market-to-book ratio of manufacturing (service) firms are 2.06 (2.84) with Q1 1.31 (1.59) and Q3 3.41 (4.94) showing that the sample contains firms with considerable variation in intangible intensity. The median sales growth for manufacturing (service) firms in year t , $t+1$, and $t+2$ are 9%, 21%, and 34% (13%, 31%, and 53%), respectively suggesting that the multinational firms in our sample on average have positive future sales growth. The market-to-book ratio and future sales growth profiles provide a certain degree of support for the importance of examining the economic effects of barriers to entry. In computing the future sales growth profiles, we include only observations of firms that survive in future years. Thus, the sales growth measures are likely to be biased upwards.

Our measure of firm's innovation strategy is industry-adjusted R&D capital intensity. The mean industry-adjusted R&D capital intensity for manufacturing (service) firms is -0.28 (-0.68) showing that only few firms use innovation as a strategy when benchmarked against the industry.

Firm's asset intensity measure, the industry-adjusted foreign assets to foreign sales ratio for manufacturing (service) firms ranges from -1.15 (-4.61) to 0.16 (1.14) for Q1 and Q3; and firm's labor intensity measure, the number of foreign employees to foreign sales ratio adjusted by industry ranges from -6.97 (-25.95) to 0.86 (0.63) for Q1 and Q3. Overall, the sample characteristics presented in Panels A and B show that the economic context of barriers to entry is well represented in the sample.

Results

Table 3 provides the estimate of equation (1) for both manufacturing and service firms. Equation (1) is estimated using OLS and since we have panel data, it is well known that while the estimates are consistent and efficient, the standard errors are biased downwards. We correct for the bias in standard errors using the Huberman, White, and Sandwich procedure (see Petersen, 2005 on the appropriateness of this procedure).¹³

Consistent with the rigidity of wages argument, the coefficient on the interaction term $FTA*HighLabor$ (β_7) is negative for manufacturing firms ($\beta_7 = -2.71$, $t = -2.40$) showing that foreign translation adjustments are negatively associated with abnormal stock returns for labor-intensive firms. Consistent with our hypothesis, the coefficient on the interaction term $FTA*RDLeader$ (β_5) is positive ($\beta_5 = 1.64$, $t = 2.58$) for manufacturing firms, indicating that firms in manufacturing sectors are affected by both rigidity of wages and barriers to entry effects. In addition, the estimated coefficient on $FTA*HighAsset$ (β_6) is also positive ($\beta_6 = 1.69$, $t = 2.12$) indicating support for the barriers to entry effect arising from firm's high asset intensity when foreign currency appreciates.¹⁴

The results for service firms are qualitatively similar to that of manufacturing firms. The estimated coefficient on $FTA*HighLabor$ (β_7) is negative ($\beta_7 = -1.77$, $t = -2.26$) while the estimated coefficients on $FTA*RDLeader$ (β_5) and $FTA*HighAsset$ (β_6) are significantly positive ($\beta_5 = 1.11$, $t = 2.67$; $\beta_6 = 1.81$, $t = 4.16$). In addition, the sum of the coefficients β_5 (β_6) and β_4 is also positive for

¹³ Alternatively, the Fama-MacBeth procedure is used for mitigating the bias in the standard errors. However, as Petersen (2005) points out the Fama-MacBeth procedure could lack power.

¹⁴ We re-estimate equation (1) for Louis's sample period. The estimated coefficient for FTA is $\beta_4 = -0.47$ ($t = -3.65$) for manufacturing firms which is consistent with Louis's (2003) result.

both manufacturing and service firms: for manufacturing firms, F-value =3.88 (7.02) and for service firms, F-value =6.59 (27.67). These results provide support to the argument that barriers to entry effect exists for firms in both manufacturing and service industries.

Conditioning on Domestic Economic Growth

As discussed earlier, foreign currency exchange rate is a relative concept. An appreciation in the foreign currency exchange rate could be associated with an economic growth in the foreign country or an economic downturn in the domestic market. The arguments in developing the hypothesis assume that the U.S. economy is not declining.¹⁵ To ensure that the effect of the interaction of barriers to entry and FTA is conditional on foreign economic growth rather than domestic economic downturn, we estimate equation (1) for sub-samples which only consists the years when the U.S. economy is growing or declining. We use the recession years indicated by the Business Cycle Dating Committee of the National Bureau of Economic Research (NBER). During our sample period, 1990, 1991 and 2001 are identified as recession years. To condition our analysis on U.S. economic growth, we estimate equation (1) separately for the expansionary and recessionary years.

The results are reported in Table 4, Panel A. For manufacturing (service) firms during the expansionary years, the coefficient estimate on FTA and R&D leader interaction term, $FTA*RDLeader$ is $\beta_5 = 2.64$, $t = 2.18$ ($\beta_5 = 1.13$, $t = 2.54$) and the estimated coefficient on FTA and high asset intensity interaction term, $FTA*HighAsset$ is $\beta_6 = 0.39$, $t = 1.74$ ($\beta_6 = 1.24$, $t = 2.70$) which are both statistically significant in ten percent level. This is consistent with the barriers to entry hypothesis for firms in both manufacturing and service industries. For the service industry, the rigidity of wages effect is not statistically significant at the ten percent level (but is significant at the twenty percent level). This suggests that service firms are more likely to pass through the increased input prices more than manufacturing firms.

¹⁵ When the U.S. economy is in decline, a number of macro economic factors are also likely to affect each of the business differently. U.S. economic growth is a steady state benchmark that is helpful to develop the arguments of foreign economic growth/decline.

Table 4, Panel B provides the results of estimating equation (1) for the recessionary years.

For manufacturing (service) firms, the coefficient estimate on FTA and R&D leader interaction term, $FTA*RDLeader$ is $\beta_5 = 3.68$, $t = 0.91$ ($\beta_5 = 1.91$, $t = 0.81$) and the estimated coefficient on FTA and high asset intensity interaction term, $FTA*HighAsset$ is $\beta_6 = 1.61$, $t = 0.56$ ($\beta_6 = 0.90$, $t = 0.24$) which are both not statistically significant in ten percent level. This is *not* consistent with the barriers to entry hypothesis for firms in both manufacturing and service industries. This is likely to occur because during recessionary periods, other macro economic effects in terms of the government's fiscal policy and monetary policies are likely to affect each firm differentially: foreign currency translation's affect on value may be a second-order effect.¹⁶

Conditioning on Domestic and Relative Growth

We next condition the analysis on both the domestic growth and the relative foreign economy growth. To do this, in addition to identifying the recession years, we also obtain a summary measure of foreign exchange value of the U.S. dollar based on the Major Currencies Index from the H.10 Federal Reserve Statistical Release.¹⁷ In particular, we use the monthly Major Currencies Index obtained from the Federal Reserve and compute the average index value for each calendar year. In using such an index, we assume that on average all the multinational firms in the sample have the same distribution of business across the countries, as indicated by the U.S. trade flows. While this assumption is not likely to hold for small firms that operate in only few foreign countries, this may be a good approximation for large multinational companies that operate in many foreign countries.

¹⁶ The Committee of National Bureau of Economic Research (NBER) uses five indicators including real gross domestic product, real income, employment, industrial production and wholesale-retail sales as factors to identify time-periods of economic recessions. A description of the procedure is available at <http://www.nber.org/cycles/recessions.html>. The identification of the recession years is available at <http://www.nber.org/cycles.html>. The recession periods are different from that identified by the Bureau of Economic Analysis (BEA). Recession periods are defined by the BEA as two adjacent quarters of economic decline. We use the BEA definition and obtain similar results.

¹⁷ Major currencies index is an index of the value of the U.S. dollar against a basket of major foreign currencies which is computed on a trade-weighted basis (see <http://www.federalreserve.gov/releases/H10/summary.html>). See Appendix for more details about the major currencies index obtained from Federal Reserve. Federal Reserve also provides a broad index taking all foreign currencies into consideration while constructing the index. Conditioned on the broad index rather than the major currencies index yields qualitatively similar results. Constructing a company specific index based on their foreign sales is not possible because data on each foreign country is not available.

We validate the summary index measure by examining the descriptive statistics of FTA for the years with negative and positive changes in index. If the negative changes in index indicate that the foreign currencies are strengthening, then FTA should be positive and vice versa. The descriptive statistics of FTA for the years with negative and positive changes in index are presented below.

FTA and the Changes of Major Currencies Index

	Mean	Median	Std. Dev.	Q1	Q3
Years with Negative Changes of Index	0.0022	0.0000	0.0139	-0.0003	0.0033
Years with Positive Changes of Index	-0.0023	-0.0001	0.0113	-0.0034	0.0000

The above table shows that in the years when the change in the index is negative (positive), FTA is on average positive (negative), i.e., mean FTA is 0.0022 (-0.0023). The Pearson (Spearman) correlation between FTA and the changes in index is -0.26 (-0.30) and is statistically significant. Thus, the assumption that on average all the multinational firms in the sample have the same distribution of business across the countries, as indicated by the U.S. trade flows is reasonable.

In the first sub-sample for conditioning on relative growth, we include years when the U.S. economy is growing and the change in the index is negative: that is, both the U.S. and foreign economy are growing and the foreign economy is growing at a faster rate on average. This sub-sample includes the following years: 1986, 1987, 1988, 1992, 1994, 1995, 1999, 2002, 2003, 2004, 2005 and 2006. We expect the hypothesis to be supported for this sub-sample, because the foreign country is growing at a faster rate than the U.S. economy: note that our hypothesis is developed conditioned on this assumption.

In the next and last sub-sample we include years when the U.S. economy is growing while foreign economic growth is indeterminate. This sub-sample includes all years with positive change in index and U.S. economy is growing: these sample years are 1985, 1989, 1993, 1996, 1997, 1998

and 2000.¹⁸ We expect the results to be consistent with this sub-sample, because FTA provides information on the growth potential in the foreign country in a more granular level.

Table 5, Panels A provides the estimates of equation (1) for the sub-sample when both the U.S. and foreign economy are growing and the foreign economy is growing at a faster rate on average. The estimated coefficient on $FTA*RDLeader$ is positive, $\beta_5 = 2.29$, $t = 1.87$ ($\beta_5 = 1.09$, $t = 2.37$) for manufacturing (service) firms. The estimated coefficient on $FTA*HighAsset$ is also positive, $\beta_6 = 0.54$, $t = 1.73$ ($\beta_6 = 1.77$, $t = 3.25$) for manufacturing (service) firms. These results are consistent with the hypothesis.

Table 5, Panel B provides the estimate of equation (1) when the U.S. economy is growing but the foreign economic growth is indeterminate. Here again, conditioned on the U.S. economy growth, our hypothesis is supported: for manufacturing (service) firms, the estimated coefficients on $FTA*RDLeader$ and $FTA*HighAsset$ are $\beta_5 = 5.08$, $t = 1.91$ and $\beta_6 = 1.22$, $t = 1.74$ ($\beta_5 = 4.15$, $t = 1.95$ and $\beta_6 = 2.97$, $t = 1.94$), respectively. This suggests that the FTA likely provides granular information on the foreign country's growth. Also note that, on average only 25 percent of the observations in this sub-sample have positive FTA comparing to the 48 percent in the former sub-sample when both the U.S. and foreign economy are growing and the foreign economy is growing at a faster rate: this is consistent with our prediction that, in this latter sub-sample the foreign economy, in general, is indeterminate and thus it may not be growing as fast as that of the U.S.

Robustness Tests

We perform three robustness tests. First, we examine the sample period from 1985 to 2001 to coincide with Louis's (2003) study. We do this because for our sample period the coefficient on FTA is positive, while Louis (2003) finds it to be negative. As such, we wish to examine whether

¹⁸ We do not consider the sub-sample with 1990 and 1991: these are the years when the U.S. economy is declining and the index is negative. That is, both the U.S. and foreign economy are declining but the foreign economy is declining at a slower rate. As reported in Table 4, Panel B the results for the U.S. recession years do not support the hypothesis, potentially because of the lack of power. Year 2001 has a positive change in index, but we also remove this year from the sub-sample as this year is also identified as U.S. recession year.

sample period differences could lead to this difference. Table 6, Panel A provides a summary of the result for this sample period. We find that consistent with Louis (2003), the coefficient on FTA is negative. This suggests that the sample period is likely contributed to Louis's (2003) result of a negative association between stock returns and FTA.

Second, we classify R&D leader, asset-intensive and labor-intensive firms using zero rather than median as benchmark: that is, firms with industry-adjusted R&D capital intensity which is above zero are classified as R&D leaders. Similarly, we classify asset-intensive and labor-intensive firms using zero as the benchmark. Table 6, Panel B provides a summary of the result for this alternative measure of barriers to entry and rigidity of wages. The results are largely qualitatively similar to the ones discussed above. However, the barrier to entry effect captured by asset intensity for service firms is not significant at the ten percent level, but is so at the twenty percent level. In this measure of barriers to entry, fewer firms are classified as high asset intensive firms, because there are some large firms and many small firms. Thus, it is likely that we do not classify some firms that have barriers to entry, as such, leading to the benchmark firms also include barrier to entry firms. This will decrease the power of the test. The magnitude of the coefficient estimates in Table 6, Panel B compared to that of Table 3 also indicates this potential measurement problem.

Third, we use the level of R&D intensity, asset intensity and labor intensity median to classify R&D leader, asset-intensive and labor-intensive firms. The results are summarized in Table 6, Panel C. In this case, we find that the coefficients on R&D leader and labor intensity are mostly higher than those discussed in Table 3. This suggests that R&D and labor expenses are likely to have less of industry effects: the barrier to entry is an absolute construct. However, the same argument does not hold for asset intensity. Overall, the results suggest that R&D is consistently a measure of barrier to entry, while the asset intensity measure may not be as powerful a measure.

IV. CONCLUDING REMARKS

We examined the association of the foreign currency translation adjustments and

multinational firms' stock returns by considering the economic effects of barriers to entry. We developed arguments hypothesizing changes in foreign currency exchange rate and stock returns based on economic theories. Specifically, an increase in the foreign currency exchange rate is associated with the foreign country's economic growth. This economic growth can spur competition for two reasons: first due to increased demand and second, due to cheaper imports. Firms that operate in environments with barriers to entry can stave-off the increased competition and thus reap the benefits of economic growth.

We consider firms that are research and development (R&D) leaders in their industries to be strategically positioned to take advantage of the economic growth in foreign countries. We also consider firms with high foreign asset intensity to be operating in an environment with barriers to entry. For both manufacturing and service firms, we find that foreign currency translation adjustments are positively associated with abnormal stock returns for R&D leaders and high foreign asset-intensive firms, while the foreign translation adjustments are negatively associated with abnormal stock returns for firms with high foreign labor intensity. Our results are robust after controlling for relative economic growth and over different specifications.

This finding shows the importance of considering the economic effects of foreign currency movements in assessing the valuation-relevance of foreign currency translation accounting rules. Louis's (2003) evidence raised concerns about a major component of accounting income, the foreign currency translation adjustment that is deemed to be an income even though the economic effect is opposite. Furthermore, the finding shows that while the economic argument provided in Louis (2003) is valid, the positive component of foreign currency translation adjustment in the accounting income is indeed an income in other economic contexts: barriers to entry proxied by innovation and asset intensity. Thus, the accounting rules governing foreign currency translations, in general produce results consistent with the economic effects of foreign exchange rate changes.

Appendix 1: Variables definition

<i>SARET</i> =	size-adjusted return, which is the fiscal year raw return adjusted for firm size using the companion portfolio approach
<i>NIADJ</i> =	net income before extraordinary items minus <i>TADJ</i> (Compustat item 18 minus Compustat item 150)
<i>FTA</i> =	foreign translation adjustment calculated as the change of the cumulative translation adjustment (change in Compustat item 230)
<i>FTAX</i> =	foreign income tax (Compustat item 64)
<i>TADJ</i> =	foreign transaction gains or losses (Compustat item 150)
<i>R&D</i> =	firm's research and development (R&D) capital intensity computed by capitalizing and amortizing firm's R&D expenses over five years (see Lev and Sougiannis, 1996) divided by net sales (Compustat item 12)
<i>R&D_ADJ</i> =	industry-adjusted R&D capital intensity which is the difference between firm's R&D capital intensity and the value-weighted mean R&D capital intensity of the industry; the industry's mean R&D capital intensity is the sum of all firms' R&D capital expenses for the two digits SIC code divided by the sum of all firms' net sales in that industry
<i>RDLeader</i> =	a dummy variable that equals one if the firm is classified as a R&D Leader, and zero otherwise; a firm is classified as a R&D leader in year t , if its industry-adjusted R&D capital intensity, i.e., <i>R&D_ADJ</i> in year $t-1$ is above median; correspondingly, all other firms are classified as R&D followers
<i>ForAsset</i> =	firm's foreign asset intensity which is calculated as foreign assets divided by foreign sales; firm's foreign asset and foreign sales data are obtained from Compustat segment database
<i>ForAsset_ADJ</i> =	industry-adjusted foreign asset intensity calculated as the difference between firm's foreign asset intensity and the mean foreign asset intensity of the industry based on two digits SIC code
<i>HighAsset</i> =	a dummy variable that equals one if the firm has high foreign asset intensity; a firm is classified as a high asset-intensive firm in year t if the firm's industry-adjusted foreign asset intensity, <i>ForAsset_ADJ</i> in year $t-1$ is above median, and zero otherwise
<i>ForLabor</i> =	firm's foreign labor intensity measure, calculated as the number of foreign employees divided by foreign sales obtained from Compustat segment data.
<i>ForLabor_ADJ</i> =	Industry-adjusted foreign labor intensity calculated as the difference between firm's foreign labor intensity and the mean foreign labor intensity of the industry based on two digits SIC code
<i>HighLabor</i> =	a dummy variable that equals one if the firm has high foreign labor intensity; a firm is classified as a high labor-intensive firm in year t if the firm's industry-adjusted foreign labor intensity, <i>ForLabor_ADJ</i> in year $t-1$ is above median, and zero otherwise
<i>Market Value of Equity</i> =	price per share (Compustat item 199) multiplied by total shares outstanding (Compustat item 25)
<i>Market/Book</i> =	the market value of equity divided by book value of common equity (Compustat item 60)
<i>Raw Return</i> =	fiscal year raw return
<i>Sales</i> =	net sales of the firm in millions (Compustat item 12)
<i>Sales Growth Year t</i> =	net sales (Compustat item 12) in year t minus net sales in year $t-1$ divided by net sales in year $t-1$; similarly, <i>Sales Growth $t+1$</i> and <i>Sales Growth $t+2$</i> are defined

Appendix 2: Foreign Currency Index

Year	Major Currencies Index	Increase of Index	Decrease of Index
1985	122.05	3.90	
1986	99.72		-22.33
1987	89.21		-10.50
1988	84.19		-5.03
1989	88.52	4.34	
1990	85.15		-3.37
1991	83.65		-1.50
1992	82.51		-1.14
1993	85.76	3.25	
1994	85.41		-0.35
1995	81.54		-3.88
1996	86.45	4.92	
1997	93.76	7.30	
1998	98.84	5.08	
1999	98.60		-0.24
2000	105.26	6.66	
2001	112.73	7.47	
2002	111.10		-1.62
2003	98.00		-13.10
2004	91.00		-7.00
2005	90.81		-0.19
2006	90.74		-0.07

The major currencies index is obtained from Federal Reserve (see <http://www.federalreserve.gov/releases/H10/Summary/>) which is a weighted average of the foreign exchange values of the U.S. dollar against a subset of major currencies that circulate widely outside the country of issue. These major currencies used to compute the index include the Euro, Canadian dollar, Japanese yen, British pound, Swiss franc, Australian dollar, and Swedish krona. Because these major currencies generally trade in liquid financial markets, the major currencies index is thus used by Federal Reserve to gauge financial market pressures on the U.S. dollar. The currency weights used to compute the summary measures are based on annual U.S. trade data, and are updated and revised annually by Federal Reserve. Adjustments to the weights will likely result in changes to past values of the nominal and real indexes. The currency index listed above is obtained from the latest release of Federal Reserve which was updated on January 2, 2007. Federal Reserve provides the daily and monthly currencies index. We thus aggregate the monthly currencies index data by years, and calculated the annual changes of the currencies index for our sample period.

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TABLE 1
Sample Distribution

Panel A: Distribution of sample by 2-digit SIC codes

Manufacturing Firms					
SIC Code	Industry Grouping	No. of Obs.	% of Obs.	No. of Firms	% of Firms
20	Food & Kindred Products	254	3.14	52	3.24
21	Tobacco Products	6	0.07	4	0.25
22	Textile Mill Products	92	1.14	15	0.93
23	Apparel & Other Textile Products	135	1.67	29	1.80
24	Lumber & Wood Products	33	0.41	6	0.37
25	Furniture & Fixtures	111	1.37	23	1.43
26	Paper & Allied Products	149	1.84	27	1.68
27	Printing & Publishing	188	2.32	35	2.18
28	Chemical & Allied Products	1,172	14.49	231	14.37
29	Petroleum & Coal Products	79	0.98	13	0.81
30	Rubber & Miscellaneous Plastics Products	252	3.12	46	2.86
31	Leather & Leather Products	39	0.48	8	0.50
32	Stone, Clay, & Glass Products	54	0.67	12	0.75
33	Primary Metal Industries	183	2.26	40	2.49
34	Fabricated Metal Products	294	3.63	47	2.92
35	Industrial Machinery & Equipment	1,500	18.54	304	18.92
36	Electronic & Other Electric Equipment	1,464	18.10	295	18.36
37	Transportation Equipment	424	5.24	80	4.98
38	Instruments & Related Products	1,484	18.35	300	18.67
39	Misc. Manufacturing Industries	176	2.18	40	2.49
Total		8,089	100.00	1,607	100.00

Service Firms					
SIC Code	Industry Grouping	No. of Obs.	% of Obs.	# of Firms	% of Firms
72	Personal Services	27	1.08	8	1.14
73	Business Services	1,965	78.41	554	78.81
75	Auto Repair, Services, & Parking	42	1.68	9	1.28
76	Miscellaneous Repair Services	2	0.08	1	0.14
78	Motion Pictures	58	2.31	18	2.56
79	Amusement & Recreation Services	56	2.23	15	2.13
80	Health Services	94	3.75	24	3.41
82	Educational Services	30	1.20	10	1.42
83	Social Services	12	0.48	3	0.43
87	Engineering & Management Services	220	8.78	61	8.68
Total		2,506	100.00	703	100.00

Table 1 continued

Panel B: Distribution of sample by year

Year	Manufacturing Firms		Service Firms	
	No. of Obs.	% of Obs.	No. of Obs.	% of Obs.
1985	271	3.35	49	1.96
1986	297	3.67	57	2.27
1987	333	4.12	65	2.59
1988	318	3.93	72	2.87
1989	332	4.10	69	2.75
1990	351	4.34	80	3.19
1991	357	4.41	83	3.31
1992	397	4.91	90	3.59
1993	432	5.34	102	4.07
1994	496	6.13	126	5.03
1995	516	6.38	134	5.35
1996	574	7.10	163	6.50
1997	623	7.70	207	8.26
1998	404	4.99	128	5.11
1999	305	3.77	104	4.15
2000	288	3.56	119	4.75
2001	297	3.67	149	5.95
2002	300	3.71	141	5.63
2003	304	3.76	138	5.51
2004	306	3.78	156	6.23
2005	294	3.63	143	5.71
2006	294	3.63	131	5.23
Total	8,089	100.00	2,506	100.00

Notes for Table 1

1. Manufacturing (service) firms are firms operating in SIC codes 2000-3999 (7200-8799).
2. The sample is from 1985 to 2006.

TABLE 2
Descriptive Statistics and Correlations

Panel A: Manufacturing Firms

	Mean	Standard Deviation	Q1	Median	Q3
Equation (1) variables					
<i>SARET</i>	0.025	0.583	-0.100	-0.002	0.070
<i>NIADJ</i>	0.004	0.181	-0.007	0.050	0.081
<i>FTA</i>	0.001	0.031	-0.004	0.000	0.004
<i>FTAX</i>	0.008	0.012	0.000	0.002	0.010
<i>TADJ</i>	-0.001	0.004	-0.002	0.000	0.001
Equation (1) explanatory variables unscaled					
<i>NIADJ</i>	56.96	208.88	0.15	7.41	63.20
<i>FTA</i>	0.08	16.73	-0.60	-0.01	0.54
<i>FTAX</i>	6.33	30.10	0.01	0.55	8.00
<i>TADJ</i>	-0.55	4.48	-0.50	-0.02	0.23
R&D capital, foreign asset and labor intensity					
<i>R&D</i>	0.31	1.14	0.01	0.07	0.19
<i>ForAsset</i>	1.28	1.76	0.69	0.89	1.21
<i>ForLabor</i>	7.87	5.77	4.42	6.64	9.51
<i>R&D_ADJ</i>	-0.28	0.48	-0.52	-0.13	0.01
<i>ForAsset_ADJ</i>	-0.75	1.11	-1.15	-0.59	0.16
<i>ForLabor_ADJ</i>	-3.63	5.44	-6.97	-3.84	0.86
Firm characteristics					
<i>Market Value of Equity (\$ Million)</i>	1,221.55	3,336.30	50.62	189.73	740.05
<i>Market/Book</i>	3.00	3.18	1.31	2.06	3.41
<i>Raw Return</i>	0.19	0.66	-0.20	0.08	0.39
<i>Sales (\$ Million)</i>	914.21	2,210.52	59.75	177.10	602.90
<i>Sales Growth t</i>	0.16	0.39	0.00	0.09	0.22
<i>Sales Growth t+1</i>	0.43	0.94	0.03	0.21	0.49
<i>Sales Growth t+2</i>	0.81	1.89	0.08	0.34	0.78

Table 2 continued

Panel B: Service Firms

	Mean	Standard Deviation	Q1	Median	Q3
Equation (1) variables					
<i>SARET</i>	0.018	0.668	-0.038	-0.007	0.026
<i>NIADJ</i>	-0.036	0.199	-0.061	0.025	0.059
<i>FTA</i>	-0.001	0.020	-0.002	0.000	0.003
<i>FTAX</i>	0.006	0.010	0.000	0.001	0.007
<i>TADJ</i>	0.000	0.003	-0.001	0.000	0.001
Equation (1) explanatory variables unscaled					
<i>NIADJ</i>	25.68	116.40	-4.00	4.10	26.00
<i>FTA</i>	-0.01	9.52	-0.30	-0.01	0.31
<i>FTAX</i>	5.81	20.26	0.00	0.36	8.40
<i>TADJ</i>	-0.38	2.34	-0.50	-0.03	0.19
R&D capital, foreign asset and labor intensity					
<i>R&D</i>	0.25	0.47	0.00	0.13	0.34
<i>ForAsset</i>	1.39	1.23	0.78	1.04	1.55
<i>ForLabor</i>	9.79	10.56	4.85	6.85	10.25
<i>R&D_ADJ</i>	-0.68	0.94	-0.89	-0.46	0.11
<i>ForAsset_ADJ</i>	-3.45	3.85	-4.61	-0.35	1.14
<i>ForLabor_ADJ</i>	-9.21	15.90	-25.95	-8.05	0.63
Firm characteristics					
<i>Market Value of Equity(\$ Million)</i>	1,168.43	3,637.86	53.54	204.80	735.25
<i>Market/Book</i>	4.36	4.94	1.59	2.84	4.94
<i>Raw Return</i>	0.17	0.78	-0.31	0.03	0.43
<i>Sales (\$ Million)</i>	571.11	1,390.16	45.60	123.00	455.00
<i>Sales Growth t</i>	0.23	0.47	0.01	0.13	0.32
<i>Sales Growth t+1</i>	0.74	1.58	0.05	0.31	0.81
<i>Sales Growth t+2</i>	1.77	4.91	0.10	0.53	1.43

Table 2 Continued

Panel C: Pearson (Spearman) correlations are reported above (below) the diagonal. Significant levels are shown in italics.

Variables	<i>SARET</i>	<i>NIADJ</i>	<i>FTA</i>	<i>FTAX</i>	<i>TADJ</i>	<i>RDLeader</i>	<i>HighAsset</i>	<i>HighLabor</i>
<i>SARET</i>		0.21	0.02	0.12	-0.01	0.00	-0.02	-0.02
		<i>0.00</i>	<i>0.02</i>	<i>0.00</i>	<i>0.25</i>	<i>0.74</i>	<i>0.05</i>	<i>0.05</i>
<i>NIADJ</i>	0.46		0.01	0.09	0.02	0.04	0.05	0.05
	<i>0.00</i>		<i>0.56</i>	<i>0.00</i>	<i>0.06</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>
<i>FTA</i>	0.01	0.01		-0.01	-0.02	0.01	0.00	-0.01
	<i>0.12</i>	<i>0.13</i>		<i>0.28</i>	<i>0.01</i>	<i>0.29</i>	<i>0.66</i>	<i>0.34</i>
<i>FTAX</i>	0.16	0.27	0.00		-0.10	0.03	0.03	0.05
	<i>0.00</i>	<i>0.00</i>	<i>0.85</i>		<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>
<i>TADJ</i>	0.00	-0.03	0.02	-0.05		0.01	0.02	0.00
	<i>0.79</i>	<i>0.00</i>	<i>0.02</i>	<i>0.00</i>		<i>0.13</i>	<i>0.01</i>	<i>0.68</i>
<i>RDLeader</i>	0.03	0.09	0.03	-0.02	0.03		0.48	0.42
	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.05</i>	<i>0.00</i>		<i>0.00</i>	<i>0.00</i>
<i>HighAsset</i>	0.01	0.11	0.07	0.01	0.03	0.48		0.57
	<i>0.17</i>	<i>0.00</i>	<i>0.00</i>	<i>0.21</i>	<i>0.00</i>	<i>0.00</i>		<i>0.00</i>
<i>HighLabor</i>	0.01	0.11	0.02	0.01	0.02	0.42	0.57	
	<i>0.16</i>	<i>0.00</i>	<i>0.06</i>	<i>0.26</i>	<i>0.07</i>	<i>0.00</i>	<i>0.00</i>	

Notes for Table 2

1. Manufacturing (service) firms are firms operating in SIC codes 2000-3999 (7200-8799).
2. Panel A (B) shows the descriptive statistics for manufacturing (service) firms.
3. All the descriptive statistics are computed after winsorizing the top and bottom one percentile of all the variables.
4. In Panel C, Pearson (Spearman) correlations are reported above (below) the diagonal. The p-value is shown in italics below the correlation coefficient estimate.
5. Variables definitions are contained in Appendix 1.

TABLE 3
R&D Leader, Foreign Asset Intensity, Foreign Labor Intensity and Foreign Translation Adjustment

	Expected Sign	Manufacturing Firms		Service Firms	
		Coef.	t-stat	Coef.	t-stat
FTA (β_4)	-	0.40*	2.61	0.02	0.96
FTA * <i>RDLeader</i> (β_5)	+	1.64*	2.58	1.11*	2.67
FTA * <i>HighAsset</i> (β_6)	+	1.69*	2.12	1.81*	4.16
FTA * <i>HighLabor</i> (β_7)	-	-2.71*	-2.40	-1.77*	-2.26
<i>RDLeader</i> (β_1)	?	0.01*	1.93	0.01	1.29
<i>HighAsset</i> (β_2)	?	-0.03	-0.68	0.04*	4.47
<i>HighLabor</i> (β_3)	?	-0.03*	-2.82	-0.02*	-1.70
NIADJ (β_8)	+	0.84*	41.65	0.63*	20.75
FTAX (β_9)	+	6.16*	15.52	7.41*	8.62
TADJ (β_{10})	?	-0.25	-0.94	1.06	0.29
Fixed Year Dummies			Yes		Yes
Fixed Industry Dummies			Yes		Yes
No. of Obs.			8,089		2,506
No. (%) of Obs. with Positive FTA			3,133 (38.73%)		983 (39.23%)
Adjusted R-Square (%)			21.25		18.38
Test of total effect		F-stat	p-value	F-stat	p-value
FTA + FTA * <i>RDLeader</i> = 0		F = 3.88	Pr = 0.05	F = 6.59	Pr = 0.00
FTA + FTA * <i>HighAsset</i> = 0		F = 7.02	Pr = 0.01	F = 27.67	Pr = 0.00

Notes for Table 3

- Equation (1): $SARET_{it} = \beta_0 + \beta_1 RDLeader + \beta_2 HighAsset + \beta_3 HighLabor + \beta_4 FTA_{it} + \beta_5 FTA_{it} * RDLeader + \beta_6 FTA_{it} * HighAsset + \beta_7 FTA_{it} * HighLabor + \beta_8 NIADJ_{it} + \beta_9 FTAX_{it} + \beta_{10} TADJ_{it} + error$
- All independent variables in the above model including the intercept are deflated by the firm's beginning market value of equity.
- The t-statistics are based on standard errors using the Huberman-White-Sandwich procedure (see Petersen, 2005).
- Manufacturing (service) firms are firms operating in SIC codes 2000-3999 (7200-8799). Manufacturing (service) firms sample contains 8,089 (2,506) firm-year observations spanning from 1985 to 2006.
- * indicates significance at the 10% level.
- Variable definitions are contained in Appendix 1.

TABLE 4
Domestic Growth and Foreign Translation Adjustment

Panel A: U.S. Expansionary Years				
	Manufacturing Firms		Service Firms	
	Coef.	t-stat	Coef.	t-stat
FTA (β_4)	0.93*	6.53	0.38	0.94
FTA * <i>RDLeader</i> (β_5)	2.64*	2.18	1.13*	2.54
FTA * <i>HighAsset</i> (β_6)	0.39*	1.74	1.24*	2.70
FTA * <i>HighLabor</i> (β_7)	-1.58*	-3.98	-1.05	-1.56
<i>RDLeader</i> (β_1)	0.03*	2.71	0.02	1.41
<i>HighAsset</i> (β_2)	-0.02	-1.24	0.05*	5.25
<i>HighLabor</i> (β_3)	-0.03*	-4.60	-0.01	-0.77
NIADJ (β_8)	0.91*	39.36	0.55*	16.09
FTAX (β_9)	6.14*	15.01	8.15*	7.18
TADJ (β_{10})	-0.38	-0.05	2.87	0.72
Fixed Year Dummies		Yes		Yes
Fixed Industry Dummies		Yes		Yes
No. of Obs.		7,084		2,279
No. (%) of Obs. with Positive FTA		2,660 (37.55%)		904 (39.67%)
Adjusted R-Square (%)		19.48		13.93

Panel B: U.S. Recession Years				
	Manufacturing Firms		Service Firms	
	Coef.	t-stat	Coef.	t-stat
FTA (β_4)	-3.41*	-3.60	-4.63*	-3.20
FTA * <i>RDLeader</i> (β_5)	3.68	0.91	1.91	0.81
FTA * <i>HighAsset</i> (β_6)	1.61	0.56	0.90	0.24
FTA * <i>HighLabor</i> (β_7)	-1.83	-0.70	-2.18	-0.72
<i>RDLeader</i> (β_1)	0.30*	3.68	0.03	0.83
<i>HighAsset</i> (β_2)	-0.06	-1.21	-0.17*	-2.60
<i>HighLabor</i> (β_3)	0.01	0.14	-0.05	-1.42
NIADJ (β_8)	0.52*	13.52	0.70*	5.08
FTAX (β_9)	4.56*	5.10	10.65*	2.73
TADJ (β_{10})	-3.41	-1.10	-4.65	-0.67
Fixed Year Dummies		Yes		Yes
Fixed Industry Dummies		Yes		Yes
No. of Obs.		1,005		312
No. (%) of Obs. with Positive FTA		493 (49.05%)		112 (35.90%)
Adjusted R-Square (%)		11.66		10.30

Notes to Table 4

1. Equation (1): $SARET_{it} = \beta_0 + \beta_1 RDLeader + \beta_2 HighAsset + \beta_3 HighLabor + \beta_4 FTA_{it} + \beta_5 FTA_{it} * RDLeader + \beta_6 FTA_{it} * HighAsset + \beta_7 FTA_{it} * HighLabor + \beta_8 NIADJ_{it} + \beta_9 FTAX_{it} + \beta_{10} TADJ_{it} + error$
2. Panel A contains the results of estimating equation (1) for the U.S. expansionary years, i.e., years excluding 1990, 1991 and 2001.
3. Panel B contains the results of estimating equation (1) for the U.S. recessionary years, i.e., years 1990, 1991 and 2001.
4. The U.S. expansionary and recessionary years are based on the recession years identified by the Business Cycle Dating Committee of the National Bureau of Economic Research (NBER).
5. All independent variables in the above model including the intercept are deflated by the firm's beginning market value of equity.
6. The t-statistics are based on standard errors using the Huberman-White-Sandwich procedure (see Petersen, 2005).
7. Manufacturing (service) firms are firms operating in SIC codes 2000-3999 (7200-8799).
8. * indicates significance at the 10% level.
9. Variable definitions are contained in Appendix 1.

TABLE 5

Relative Growth and Foreign Translation Adjustment

Panel A: Domestic Growth and Foreign Growth
(Negative Change in Foreign Currency Index)

	Manufacturing Firms		Service Firms	
	Coef.	t-stat	Coef.	t-stat
FTA (β_4)	0.85*	6.16	0.12	0.25
FTA * <i>RDLeader</i> (β_5)	2.29*	1.87	1.09*	2.37
FTA * <i>HighAsset</i> (β_6)	0.54*	1.73	1.77*	3.25
FTA * <i>HighLabor</i> (β_7)	-1.23*	-4.77	-0.76	-0.87
<i>RDLeader</i> (β_1)	0.03*	1.84	0.03*	1.86
<i>HighAsset</i> (β_2)	-0.03	-0.69	0.03*	2.56
<i>HighLabor</i> (β_3)	-0.04*	-4.14	-0.07*	-5.09
NIADJ (β_8)	0.82*	22.91	0.88*	10.29
FTAX (β_9)	5.90*	11.05	8.55*	5.68
TADJ (β_{10})	-0.73	-0.68	6.75	0.61
Fixed Year Dummies		Yes		Yes
Fixed Industry Dummies		Yes		Yes
No. of Obs.		4,160		1,357
No. (%) of Obs. with Positive FTA		2,012 (48.37%)		653 (48.12)
Adjusted R-Square (%)		16.78		15.64

Panel B: Domestic Growth and Foreign Growth Indeterminate
(Positive Change in Foreign Currency Index)

	Manufacturing Firms		Service Firms	
	Coef.	t-stat	Coef.	t-stat
FTA (β_4)	-0.07	-0.21	-0.88	-0.74
FTA * <i>RDLeader</i> (β_5)	5.08*	1.91	4.15*	1.95
FTA * <i>HighAsset</i> (β_6)	1.22*	1.74	2.97	1.94
FTA * <i>HighLabor</i> (β_7)	-0.38	-0.28	-0.56	-1.00
<i>RDLeader</i> (β_1)	0.07*	3.90	0.02	0.25
<i>HighAsset</i> (β_2)	-0.01	-0.60	0.07*	3.27
<i>HighLabor</i> (β_3)	-0.01	-0.18	-0.07*	-2.71
NIADJ (β_8)	0.93*	31.60	0.78*	14.66
FTAX (β_9)	5.19*	7.67	7.71*	4.15
TADJ (β_{10})	-0.38	-0.61	4.40	0.66
Fixed Year Dummies		Yes		Yes
Fixed Industry Dummies		Yes		Yes
No. of Obs.		2,924		837
No. (%) of Obs. with Positive FTA		736 (25.17%)		220 (26.28%)
Adjusted R-Square (%)		14.34		13.00

Notes for Table 5

1. Equation (1): $SARET_{it} = \beta_0 + \beta_1 RDLeader + \beta_2 HighAsset + \beta_3 HighLabor + \beta_4 FTA_{it} + \beta_5 FTA_{it} * RDLeader + \beta_6 FTA_{it} * HighAsset + \beta_7 FTA_{it} * HighLabor + \beta_8 NIADJ_{it} + \beta_9 FTAX_{it} + \beta_{10} TADJ_{it} + error$
2. Panel A contains the results of estimating equation (1) for the U.S. expansionary years with negative change in Foreign Currency Index, i.e., years 1986, 1987, 1988, 1992, 1994, 1995, 1999, 2002, 2003, 2004, 2005 and 2006.
3. Panel B contains the results of estimating equation (1) for the U.S. expansionary years with positive change in Foreign Currency Index, i.e., years 1985, 1989, 1993, 1996, 1997, 1998, and 2000.
4. The Foreign Currency Index obtained from the Federal Reserve is provided in Appendix 2.
5. All independent variables in the above model including the intercept are deflated by the firm's beginning market value of equity.
6. The t-statistics are based on standard errors using the Huberman-White-Sandwich procedure (see Petersen, 2005).
7. Manufacturing (service) firms are firms operating in SIC codes 2000-3999 (7200-8799).
8. * indicates significance at the 10% level.
9. Variable definitions are contained in Appendix 1.

TABLE 6

Robustness Tests

Panel A: Sample period 1985 to 2001; *RDLeader*, *HighAsset*, or *HighLabor* equals one if the industry adjusted measures are above annual median

	Manufacturing Firms		Service Firms	
	Coef.	t-stat	Coef.	t-stat
FTA	-0.47*	-3.65	-0.68	-1.23
FTA * <i>RDLeader</i>	0.97*	2.65	1.39*	2.65
FTA * <i>HighAsset</i>	2.23*	5.29	1.96*	3.38
FTA * <i>HighLabor</i>	-2.10*	-4.92	-2.06*	-1.78

Panel B: Sample period 1985-2006; *RDLeader*, *HighAsset* and *HighLabor* equals one if the industry adjusted measures greater than zero

	Manufacturing Firms		Service Firms	
	Coef.	t-stat	Coef.	t-stat
FTA	0.57*	4.27	0.15	0.45
FTA * <i>RDLeader</i>	1.38*	2.67	1.50*	2.82
FTA * <i>HighAsset</i>	1.07*	2.16	1.06	1.45
FTA * <i>HighLabor</i>	-1.80*	-3.36	-0.90*	-1.74

Panel C: Sample period 1985-2006; *RDLeader*, *HighAsset* and *HighLabor* equals one if intensity levels are above the annual median

	Manufacturing Firms		Service Firms	
	Coef.	t-stat	Coef.	t-stat
FTA	0.35*	2.46	1.02	1.38
FTA * <i>RDLeader</i>	2.86*	5.13	3.17*	1.93
FTA * <i>HighAsset</i>	0.80*	2.38	0.42	0.33
FTA * <i>HighLabor</i>	-1.14*	-2.60	-2.43*	-1.87

Notes for Table 6

- Equation (1): $SARET_{it} = \beta_0 + \beta_1 RDLeader + \beta_2 HighAsset + \beta_3 HighLabor + \beta_4 FTA_{it} + \beta_5 FTA_{it} * RDLeader + \beta_6 FTA_{it} * HighAsset + \beta_7 FTA_{it} * HighLabor + \beta_8 NIADJ_{it} + \beta_9 FTAX_{it} + \beta_{10} TADJ_{it} + error$
- Panel A contains the results of estimating equation (1) for the sample period from 1985 to 2001.
- Panel B contains the results of estimating equation (1) with *R&DLeaders*, *HighAsset* and *HighLabor* taking on a value of one, if the corresponding industry-adjusted intensity measures are non-negative.
- Panel C contains the results of estimating equation (1) with *R&DLeaders*, *HighAsset* and *HighLabor* taking on a value of one, if the corresponding un-industry-adjusted intensity measure is above the median of the annual empirical distribution.
- All independent variables in the above model including the intercept are deflated by the firm's beginning market value of equity.
- The t-statistics are based on standard errors using the Huberman-White-Sandwich procedure (see Petersen, 2005).
- Manufacturing (service) firms are firms operating in SIC codes 2000-3999 (7200-8799). Manufacturing (service) firms sample contains 8,089 (2,506) firm-year observations spanning from 1985 to 2006.
- * indicates significance at the 10% level.
- Variable definitions are contained in Appendix 1.