The pricing of corporate foreign trade risk

Yakov Amihud*#, Eli Bartov* and Baolian Wang+

Abstract

This paper shows that across firms, expected returns increase in the risk of exposure to foreign sales, measured by the ratio of a firm's foreign sales to total sales (*FSratio*). This is a more comprehensive measure of exposure than exposure to exchange rate shocks for firms engaged in foreign sales. In a cross-section regression, *FSratio* has a significant effect on stock returns. A zero-investment return factor of high-minus-low-*FSratio* stocks generates a positive and significant risk-adjusted return (*alpha*). This factor's systematic risk (β) is significantly priced in an augmented CAPM model across stock portfolios and across individual stocks.

Keywords: *exchange rate exposure*; *risk*; *asset pricing*; *export, foreign sales*.
JEL Classification: *M4*; *G12*; *G14*.

November 18, 2013

* NYU Stern School of Business
+ Hong Kong University of Science and Technology
# Ira Rennert Professor of Finance
We thank Yaniv Konchitchki for helping with earlier work on this paper.

Electronic copy available at: http://ssrn.com/abstract=2356748

I. Introduction

Firms with significant foreign sales are naturally exposed to shocks in both exchange rates and in foreign demand and supply for their products, which affect the quantity sold and its price. These shocks affect the firms' revenue in U.S. dollar and consequently affect their profitability, their risk, and their value. For exporting firms, foreign sales risk is a more comprehensive measure of exposure to foreign trade than exchange rate risk alone because it includes shocks to foreign demand and supply and terms of trade. Suppose that exchange rates were fixed or perfectly hedged by firms engaged in foreign trade. Even then, foreign sales risk would still exist due to shocks to foreign demand and supply and foreign prices.

Somewhat surprisingly, empirical research finds very weak and often insignificant effect of exchange rate changes on stock prices of exporting firms.[1] Bartram and Bodnar (2007), who review this exchange rate exposure puzzle, suggest that the low correlation between stock return and exchange rate changes result from "the endogeneity of operative and financial hedging at the firm level" (p. 642). For example, firms utilize financial means – such as foreign debt and derivatives – to hedge exchange rate risks or utilize operational means to do that.[2] However, it is hard or even infeasible to hedge against a fall in the price of a product sold abroad or against a decline in the quantity demanded there due to fall in demand or due to change in supply by other suppliers. In this paper, we introduce a new return factor that captures corporate foreign sales exposure risk and show that the systematic risk with respect to this factor is priced.

---

[1] The early studies include Jorion (1990), Amihud (1994), Bodnar and Gentry (1993) and Bartov and Bodnar (1994). Bartram and Bodnar (2007) provide a review of the many studies on the subject.
[2] See Geczy, Minton, and Schrand (1997), Allayannis and Ofek (2001), Allayannis, Ihrig and Weston (2001), Bartram, Brown and Minton (2010).

Electronic copy available at: http://ssrn.com/abstract=2356748

Our measure of a firm's foreign sales exposure is the ratio of the firm's non-domestic sales to its total sales, which we call Foreign Sales ratio or *FSratio*. We test the effect of foreign sales risk in three ways.

First, we show that across firms, stock returns are significantly higher for firms with higher *FSratio* after controlling for common stock characteristics (size, book-to-market, lagged return, β and idiosyncratic risk).

Second, we construct a factor which longs stocks of firms with high *FSratio* and shorts stocks of firms with low *FSratio*, giving rise to a *high-minus-low foreign sales (HMLFS) factor*. We find that *HMLFS* has a significant risk-adjusted annual excess return (*alpha*) of more than 3%. Consistent with Doidge, Griffin and Williamson (2006), *HMLFS* is sensitive to the exchange rate shocks although the explanatory power of these shocks is quite low, consistent with the findings of Amihud (1994) and Bartov and Bodnar (1994).

Third, we test whether the systematic risk of *HMLFS*, or the sensitivity of stock returns to this factor, is priced. We add *HMLFS* to the Fama-French (1993) and Carhart (1997) four-factor model that is augmented by the excess global market (MSCI) excess return (orthogonalized to the U.S. market excess return). The test employs the Fama-MacBeth (1973) procedure and three sets of testing assets: (i) the Fama-French 100 portfolios of stocks sorted on size and book-to-market ratio; (ii) 43 industry portfolios which are the 48 Fama-French portfolios excluding financials and utilities; and (iii) all stocks on CRSP that satisfy our data requirements. Estimating cross-section Fama-MacBeth regressions of portfolio or stock returns on the factors' βs, we find that the mean coefficient of β_{HMLFS}, the systematic risk coefficient of *HMLFS*, is positive and statistically significant. The results are qualitatively similar for all three sets of testing assets. This suggests that the systematic risk of foreign sales exposure is priced.

We conduct a number of "horse-races" between the cross-sectional effect of β_{HMLFS} and the effects of related measures. We add to the cross-section model the stock characteristic *FSratio*. The coefficient of β_{HMLFS} remains positive and significant while that of *FSratio* is insignificant for data sets (i) and (ii) (portfolios sorted on size and book-to-market or grouped by industries), but significant for individual stocks. This implies that the systematic risk of the *HMLFS* factor is priced in addition to the pricing of the stock characteristic *FSratio*. Also, we add to the cross-section model the (conditional) β of exchange rate changes of the U.S. dollar. The effect of this β is insignificant while that of β_{HMLFS} remains positive and significant. Our results also remain significant when estimating the model using the Fama-French 25 (5x5) portfolios sorted on size and book-to-market ratio and portfolios grouped by 2-sigit SIC code.

Our foreign sales exposure measure is a coarse measure of firms' exposure to the risk of foreign trade in general.[3] Importing firms' stock returns would react to our factor *HMLFS*, which is based on foreign sales, with an opposite sign to that of exporting firms. If, for example, global prices in U.S. dollars rise because of stronger demand abroad or because of the dollar's depreciation, *HMLFS* will rise while importing firms will hurt, implying a negative β_{HMLFS}. Given that *HMLFS* is a systematic risk factor, investors will be able to construct a portfolio that combines stocks with positive and negative β_{HMLFS} which is immune to this risk.

[3] Ideally, we would have liked to use *net* foreign sales, i.e., foreign sales minus foreign purchases, since foreign purchases can partially hedge foreign sales exposure. However, data are unavailable on firms' foreign purchases. Foreign income, for which data exist, can be manipulated for tax and other purposes and there is an unresolved problem of transfer pricing.

The sensitivity of stock returns to our *HMLFS* factor also enables to capture an *indirect exposure* to foreign trade. Consider, for example, domestic firms that are suppliers to exporting firms. While their sales are domestic, their stock returns should be sensitive to the foreign sales risk of their client firms. The same applies to domestic firms with only domestic purchases and sales whose value depends on that of importing firms that are subject to similar risks as exporting forms, though their return sensitivity (β_{HMLFS}) has the opposite sign as that of exporting forms. In summary, the stock return sensitivity to our foreign sales exposure factor of firms which depend on exporting and importing firms captures the foreign trade exposure risk of these firms.

Our study is the first to show in the context of an augmented capital asset pricing model that the risk of foreign sales exposure is significantly priced in the stock market. Whereas prior studies provide mixed evidence on the effect of exchange rate exposure on expected stock returns, we propose to examine a broader type of exposure to foreign trade: the foreign sales exposure, of which exposure to foreign exchange fluctuations constitutes only a small part. As explained above, while our exposure index is based on foreign sales, it applies to both direct and indirect exposure to foreign trade in general.

Our exposure variable, *FSratio*, is related to the analysis of Doidge, Griffin and Williamson (2006). They study firms in 18 countries, find that international sales are the most reliable measure related to exchange rate exposure.[4] While we too find that *HMLFS* is related to exchange rate changes, the correlation between them is very low, 10%, consistent with the findings of Doidge, Griffin and Williamson (2006) and of Griffin and

[4] Doidge, Griffin and Williamson (2006) do not study the pricing of exposure to international sales.

Stulz (2001). The latter finds a very small (largely insignificant) effect of foreign exchange rate shocks on industry returns across countries.[5]

The paper proceeds as follows. In Section II we present our measure of foreign sales exposure and document its frequency and its relation to firm characteristics. In Section III we test whether this exposure is priced, employing three different methods. Section IV offers concluding remarks.

II. Data, Variables Definition and Descriptive Statistics

We measure foreign sales exposure by $FSratio_{j,t}$, the Foreign Sales ratio of firm *j* in year *t*,

$$FSratio_{j,t} = ForeignSales_{j,t} \, / \, (ForeignSales_{j,t} + DomesticSales_{j,t}) \,. \qquad (1)$$

ForeignSales is the sum of sales from the nondomestic segments of the firm and export sales (the SALEXG variable) from its domestic segments, and *DomesticSales* is sales from the domestic segments minus export sales. Compustat Segment database contains information on sales for geographic segments, both domestic segments and nondomestic segments.[6] For domestic segments, Compustat Segment also reports the information on export sales. Our analysis is for the years 1977-2011 (returns data are up to 2012), the starting year being determined by the availability of accounting data on non-domestic sales. Financial Accounting Standard (SFAS) No. 14, *Financial Reporting for Segments*

---

[5] In recent research on the cross-sectional pricing of exchange rate exposure, Kolari, Moorman, and Sorescu (2008, p. 1074; our emphasis) find that "stocks most sensitive to foreign exchange risk (in *absolute* value) have *lower* returns than others. This implies a non-linear, *negative premium for foreign exchange risk*." Apergis, Artikis, and Sorros (2011) find a non-monotonic inverse U-shaped relation of returns to foreign exchange sensitivity for German stocks. We find a *positive* relation between stocks' excess return and exposure to foreign sales risk, of which foreign exchange risk is only a small part.

[6] We classify a geographic segment into domestic or nondomestic based on the GEOTP variable. GEOTP has three possible values: 1 indicating Total Foreign, 2 indicating Domestic and 3 indicating NonDomestic. We drop the 31 observations that are classified into 1.

of a Business Enterprise, was issued in December 1976 and became effective for financial statements for fiscal years beginning after December 15, 1976.[7] Among other things, it required information on sales to be reported on a geographic basis for those companies having foreign operations and export sales.

Data on stock returns and market capitalization are obtained from the CRSP database. We exclude the finance industry (SIC codes 6000-6999), the utility industry (SIC codes 4900-4999), and firm-years where the market value of equity is below $10 million or the stock price is below $1. We also delete firm-years where domestic or foreign sales are negative (19 firm-years or 125 firm-months). The final sample contains 102,519 firm-years and 1,105,432 firm-months. From Kenneth French's database we obtain data on the Fama-French (1993) and the Carhart (1997) factors, the returns on 100 (10x10) portfolios classified by size and by book-to-market ratio, and the returns on the Fama-French 48 industry portfolios, from which we exclude financial industries (Banking, Insurance, Real Estate, and Trading) and the Utility industry.

INSERT TABLE 1

Table 1 reports the summary statistics for *FSratio*. The fraction of firms with positive *FSratio* decreases from 51.2% in 1977 to below 40% in the mid-1980s and then increases to 67.3% in 2011. The mean (median) of *FSratio* for firms engaged in foreign sales decreases from 30.0% (22.1%) in 1977 to around 20% (17%) in the mid-1980s, and then rises to 41.3% (38.2%) in 2011. This increase is consistent with the expansion of foreign trade in the recent decades and the upward trend in global diversification of U.S. industrial firms observed by Denis, Denis, and Yost (2002).

[7] SFAS No. 14 was superseded in June 1997 by SFAS No. 131. SFAS No. 131 is FASB Statement No. 131, *Disclosure about Segments of an Enterprise and Related Information*. Berger and Hann (2003) find that the new standard increased the number of reported segments and provided more disaggregate information.

We relate $FSratio_{j,t}$ to characteristics of stock *j* in each month *t*: $\beta_{j,t}$ (systematic risk), $Size_{j,t}$, $BM_{j,t}$, $R11_{j,t}$ and $IVOL_{j,t}$ (idiosyncratic risk). β is the slope coefficient from a regression of a stock's monthly excess return on the market's excess return, *RMrf*, estimated over a rolling window of 60 months (minimum of 24 observations) up to month *t*. *Size* is the market capitalization, the product of stock price and number of shares outstanding. *BM* is the book-to-market ratio, calculated as in Fama and French (1992) as the ratio of the firm's book value of equity at the end of the fiscal year to its market capitalization at the end of December.[8] *Size* and *BM* are in natural logarithm. *R11* is the buy-and-hold eleven-month compounded return from month *t-12* up to month *t-2*. $IVOL_{j,t}$ is calculated, following Ang, Hodrick, Xing, and Zhang (2006), as the standard deviation of the residuals from a regression in each month *t* of the stock excess daily returns on the daily returns of the Fama and French (1993) factors $RMrf_t$, SMB_t and HML_t. We follow the convention of Fama and French (1992) and apply accounting data reported in calendar year *t* to return data over the twelve months beginning in July of year *t+1* to June of year *t+2*. We begin our analysis of stock returns from July 1978, using the year-end accounting statement for 1977, and end on December 2012 using year-end accounting data for 2011. In general, variables for each month *t* are their values known as of the end of month *t-1*.

INSERT TABLE 2

Table 2 presents the pairwise cross-stock correlation coefficients between seven variables that include $NoFS_{j,t}$, a dummy variable that equals 1 if $FSratio_{j,t}$ = 0. The

[8] Book equity is calculated following Fama and French (2008). It is equal to total assets (Compustat data item 6), minus liabilities (181), plus balance sheet deferred taxes and investment tax credit (35) if available, minus preferred stock liquidating value (10) if available, or redemption value (56) if available, or carrying value (130). Negative *BM* observations are deleted.

numbers presented are the time series means of the month-by-month cross-stock correlations between these variables. There are altogether 414 months in our sample. *FSratio* and *NoFS* have their highest correlation (in absolute value), with *Size*, 0.247 and -0.212, respectively, indicating that larger firms have higher ratio of foreign sales. (We therefore control for firm size below when constructing our *FSratio*-based return factor.) The other pairwise correlations are generally small in absolute value.

III. Effect of foreign sales exposure on expected return

A. Cross-section test using individual firm characteristics

We test whether stock returns are higher for stocks with greater *FSratio*, our measure of exposure to foreign sales risk. The test employs cross-section Fama-MacBeth regressions of individual stock monthly excess returns $R_{j,t}$ (in excess of the risk-free rate) on $FSratio_{j,t-1}$, controlling for $\beta_{j,t-1}$, $Size_{j,t-1}$ (in logarithm), $BM_{j,t-1}$ (in logarithm), $R11_{j,t-1}$ and $IVOL_{j,t-1}$ (the values of the right-hand-side variables are known at the end of month *t-1*. Stock returns are adjusted for delisting.[9]

INSERT TABLE 3

Columns (1) and (2) of Table 3 present the results for the entire sample period 7/1978-12/2010 (414 months), and columns (3) and (4) present the results for two subperiods: 7/1978-12/1995 and 1996-2010. For each series of estimated coefficients, we calculate the mean and the *t*-statistic. For the coefficients of *FSratio*, which is the

[9] In case of delisting, if the delisting reason is code is 500, 520, 551-573, 580, 574 or 584, we set the delisting return to be -30%, as in Shumway (1997). Otherwise, if monthly return on CRSP is available, we aggregate monthly return and delisting return as the last return. If monthly return on CRSP is not available, we use the delisting return as the last return of a stock. Results are similar without the delisting return adjustment.

focus of our study, we add the following:

(i) The median and a test of whether it is significantly different from zero, using Wilcoxon signed-rank test;

(ii) *NW t*-statistic, calculated by the Newey-West (1987) procedure with one lag. This is because the time series of the monthly coefficients of *FSratio* is 0.20 with *t* =4.12. (Higher-order correlations are insignificant.)

(iii) *Pos:Neg*, the number of positive and negative coefficients.

(iv) The weighted mean; the weights are the reciprocal of the estimated standard errors, meaning that coefficients that are less-precisely estimated receive lower weight. This procedure follows Ferson and Harvey (1999, Appendix A) who propose it to correct for potential heteroskedasticity in the Fama-MacBeth estimations.

The results in Table 3, column (1) show that the *FSratio* risk is positively and significantly priced for the entire period and for both subperiods. The mean coefficient of *FSratio* for the entire period is 0.554 with *t* = 2.89, or *t* = 2.64 by *NW*. The median coefficient of *FSratio* is 0.526%, quite close to the mean. The economic significance of the estimated coefficient is illustrated as follows. In 2011, the inter-quartile range of *FSratio* among firms with positive such ratio was 0.428 (= 0.606-0.178). A mean coefficient of 0.554 implies a difference in expected return of 0.237% per month (= 0.554*0.428) or 2.84% per year, after controlling for other stock characteristics. This is meaningful when compared with the market excess return *RMrf* which was 7.0% during the same period. In Column (2) we include the dummy variable *NoFS* to account for a possible pricing effect of having no foreign sales. Its coefficient is negative but statistically insignificant (*t* = -1.70), while the coefficient of *FSratio* remains statistically significant. This variable also has an insignificant effect in the two subperiods.

We observe that the return-*FSratio* relation is stable over time: the means and medians of the coefficients are close in magnitude over the two subperiods; see columns (3) and (4) of Table 3. The coefficient of *NoFS* (which we estimate but do not tabulate) in each of the subperiods is statistically insignificant: In subperiod I and II it is, respectyively, -0.105 (*t* = -1.63), and -0.066 (*t* = -0.85). As we show below, the excess return on the portfolio of *NoFS* stocks is not distinguishably different from that on the portfolio with the lowest *FSratio*, i.e., there is no significant shift in the valuation of *NoFS* stocks compared with stocks with the lowest *FSratio*.

The coefficients of the control variables have their well-known signs and they are generally significant except for the coefficient of β which, while being positive as expected, is statistically insignificant. *Size* (in log) has negative and significant coefficients, the coefficients of *BM* (in log) are positive and significant, the coefficients of *R11* (which captures the momentum effect) are generally positive and significant (insignificant in the second subperiod), and the coefficients of *IVOL* are negative and significant as in Ang, Hodrick, Xing, and Zhang (2006).

Overall, the results support the hypothesis that corporate foreign sales exposure is priced in the U.S. capital market.

B. HMLFS: High-Minus-Low Foreign Sales factor and its risk-adjusted return

We now test whether foreign sales exposure is priced by comparing the risk-adjusted excess returns on portfolios of stocks sorted on their *FSratio*. We Rank stocks by their *FSratio* and divide them into quintile portfolios, plus one portfolio for *NoFS* stocks, i.e., stocks with zero *FSratio*. We then regress the monthly excess return $R_{p,t} - rf_{,t}$ of portfolio p ($p = 0, 1, \ldots 5$ and 5-1) on the following five-factor model:

$$R_{p,t} - rf_{,t} = alpha_p + \beta_{MRM,p} RMrf_t + \beta_{SMB,p} SMB_t + \beta_{HML,p} HML_t + \beta_{UMD,p} UMD_t + \beta_{MSCIr,p} MSCIr_t + \varepsilon_{p,t} \qquad (2)$$

Model (2) is the factor model of Fama and French (1993) and Carhart (1997), augmented by a global excess return factor *MSCIr*, orthogonalized: we use the residuals (plus intercept) from a regression on $RMrf_t$ of the U.S. dollar denominated return on the MSCI index in excess of the U.S. risk-free rate. (The slope coefficient is 0.830, $R^2 = 0.752$.) We call model (2) the FFCM model.

We expect $alpha_p$, the risk-adjusted excess return, to be larger for portfolios of stocks with higher *FSratio*.

Stock portfolios are formed following Fama and French (1993) in their construction of the *HML* factor (high-minus-low book-to-market stocks). To control for the effect of firm size, which is correlated with *FSratio* (see Table 2), we first divide our sample stocks into three size groups. The size breakpoints are based on NYSE listed companies only, and size (market capitalization) is as of the end of June of each year. Within each size tercile, we sort stocks by their *FSratio* as of the preceding year into six portfolios: one containing stocks with *FSratio* = 0 and five quintile portfolios, where quintile 1 (5) is of stocks with the lowest (highest) *FSratio*.[10] For each of the three size portfolios, the quintile portfolios have the same number of stocks. We then calculate the average returns within each portfolio.[11] Finally, we average the portfolio returns across the three different size groups. For example, the return of portfolio 5 is the average of the three portfolio returns of the fifth *FSratio* quintile across the three size groups. As in Fama and French (1993), construction of stock portfolios begins in July of each year and lasts for 12 months with rebalancing in July of the following year. The average return of each portfolio is either value weighted (VW), using the stock market capitalization as of the end of the previous month, or return-weighted (RW). The latter is equally-weighted stock returns corrected for bias due to market microstructure noise, calculated by weighting returns by (1 + the stock's lagged monthly return); see Asparouhova, Bessembinder and Kalcheva (2010, 2013).

We construct the *HMLFS* factor – "*High-Minus-Low Foreign Sales*" exposure portfolio – as a zero-investment portfolio, $HMLFS_t = R_{5,t} – R_{1,t}$ (portfolio 5-1). It consists of buying the stocks of the highest *FSratio* quintile and selling the stocks of the lowest *FSratio* quintile. We also present results for portfolio 5-0 with excess return $R_{5,t} – R_{0,t}$.

INSERT TABLE 4

Table 4 presents the estimation results of the FFCM model (2). Panel A presents the estimated $alpha_p$ (the regression intercept), the risk-adjusted excess returns. The *HMLFS alpha*, $alpha_{5\text{-}1}$, is positive and statistically significant for the entire period and for each of the two subperiods for both the VW and the RW portfolio returns. *HMLFS*

[10] We follow Fama and French (1993) who, when constructing stock quintile portfolios by the earnings/price ratio or dividend/price ratio have one portfolio of all stocks for which these ratios are zero (or negative for earnings), and then five quintile portfolios of stocks ranked by these ratios.

[11] Returns are, again, adjusted for delisting.

alpha is 0.256% (0.273%) for VW (RW) monthly returns, implying an annual excess return of 3.1% (3.3%, respectively). This is economically significant when compared with the Fama-French *HML* mean return of 3.7% for this period. For portfolio 5-0, its $alpha_{5\text{-}0}$ is also positive and statistically significant. Notably, $alpha_0$ is practically zero for nearly all estimations and it is not significantly different from $alpha_1$.

The $alpha_p$ intercepts generally rise in *p*, and while $alpha_5$ is slightly lower than $alpha_4$ it is still significantly higher than $alpha_1$. In the second subperiod, 1996-2012, $alpha_p$ rises monotonically in *p*. We will see below in other estimates that the recent subperiod shows a stronger effect of foreign sales exposure on expected return.

Panel B of Table 4 presents the slope coefficients of the four FFCM factors from a regression with *HMLFS* as the dependent variable. The coefficient of the global factor *MSCIr* is positive and significant for the entire period and it is particularly large in the second subperiod, reflecting perhaps the growing global corporate activity of U.S. firms in recent decades. This would make returns on high-*FSratio* firms more strongly related to global market conditions. In contrast, the coefficients of *RMrf* are generally insignificant suggesting that exposure to foreign sales has little sensitivity to domestic market conditions.

As for the other factors, β_{SMB} is negative because high-*FSratio* firms are typically larger, as observed in Table 2 (big firms enter with a negative sign in the *SMB* factor). However, β_{SMB} is statistically insignificant because we control for size when constructing the portfolios. Both β_{HML} and β_{UMD} are positive and significant, though the latter coefficient is unstable, being negative and insignificant in the first subperiod.

In Panel C we test whether *alpha* of *HMLFS* remains significantly positive after adding to the FFCM model *HMLfx*, a return factor of currencies sorted by interest rates. It is constructed by Lustig, Roussanov and Verdelhan (2011) as the returns on high-minus-low interest rate currencies.[12] The sample period is 11/1983-5/2010 (319 months, shorter than ours). To save space, we present only the intercepts $alpha_{5\text{-}1}$ and the coefficients of *HMLfx*. We obtain that $alpha_{5\text{-}1}$ remains positive and significant for the entire period after controlling for *HMLfx* whose coefficient is also significant. In the first subperiod, $alpha_{5\text{-}1}$ is significant, while the coefficient of *HMLfx* is small and quite insignificant, while in the second subperiod $alpha_{5\text{-}1}$ is significant for the RW returns and more weakly for VW returns (t = 1.71), though the point estimate of $alpha_{5\text{-}1}$ remains close to that in the first subperiod. The coefficients of *HMLfx* for the second subperiod are higher than those in the first subperiod and are statistically significant, as is the case with the coefficients of *MSCIr*, demonstrating the greater effect of global factors on returns of firms that engage in foreign trade.

Finally, we test whether *HMLFS* is affected by changers in the U.S. dollar's foreign exchange rate which, together with shocks to foreign demand and foreign prices, affects the risk of foreign sales exposure. We add to the FFCM model (2) the variable dFX_t, the monthly percent change in the U.S. foreign exchange index. *FX* is the price of U.S. dollar in foreign currency; higher value means appreciated dollar. (Source: the Trade Weighted Exchange Index, TWEXBMTH, available from the Federal Reserve Bank of St. Louis.) We expect the sign of *dFX* to be negative: Firms with higher foreign sales benefit when the U.S. dollar depreciates, i.e., $dFX < 0$.

---

[12] Data for this factor is kindly provided by the authors.

We obtain (see Appendix Table A2) that the coefficient of dFX_t is negative and significant, -0.113 with t = -1.91 for VW *HMLFS* returns and -0.158 with t = -2.79 for RW *HMLFS* returns. This is consistent with expectations and with the results of Marston (2001) and Doidge, Griffin and Williamson (2006). However, in the two subperiods the coefficients of dFX_t are quite insignificant as in Amihud (1994) and Bartov and Bodnar (1994). Notably, the contribution of *dFX* to the regression R^2 is very small: it rises from 0.306 to 0.313 for VW returns. The intercept *alpha* of *HMLFS* remains positive and significant in all regressions.

C. The pricing of the systematic risk (β) of HMLFS, the foreign sales exposure factor

C.1. Data and outline of the estimation procedure

The results so far have shown that stock returns are higher for firms with higher *level* of foreign sales ratio, *FSratio*. This tests the effect of a *stock characteristic*, assuming that higher level of *FSratio* implies higher risk which is priced. In this section we use *HMLFS* as a risk factor and test whether β_{HMLFS} – the systematic risk associated with foreign sales – is priced across stocks.

We use three sets of data, the first two obtained from the data library of Kenneth French and the third from CRSP:

(i) 100 (10x10) portfolios of stocks that are sorted independently into 10 size groups and 10 book-to-market (BM) ratio groups.

(ii) 43 industry portfolios which are the 48 industry portfolios of Fama and French, excluding four finance industry portfolios (banking, insurance, real estate and trading) and one utility industry portfolio.

(iii) Stock of industrial firms that satisfy the requirements described in constructing the sample for Tables 2, 3 and 4.

We employ Fama and MacBeth's (1973) two-step procedure. First, we estimate for each portfolio or stock *j* the time series regression FFCM model, augmented by *HMLFS*:

$$R_{j,t} - rf_t = alpha_j + \beta_{HMLFS,j} HMLFS_t + \beta_{RMrf,j} RMrf_t + \beta_{SMB,j} SMB_t + \beta_{HML,j} HML_t + \beta_{UMD,j} UMD_t + \beta_{MSCIr,i} MSCIr_t + \varepsilon_{i,t} \quad (3)$$

$R_{j,t} - rf_t$ is the monthly return on portfolio or stock *j* in month *t* in excess of the one month T-bill rate. The slope coefficients $\beta_{K,j}$, $K = HMLFS, RMrf, SMB, HML, UMD$ and *MSCIr*, are estimated over a window of five years (60 months, minimum 24 observations) which is rolling month by month.

INSERT TABLE 5

Table 5 presents statistics of the estimated $\beta_{HMLFS,j}$ for the three data sets. presents the mean, the median and the standard deviation of $\beta_{HMLFS,j}$ across the portfolios or of the stocks estimated in each month over the previous 60 months (the estimates are naturally overlapping), starting from 6/1983 and ending in 11/2012. The table presents the average of these three statistics over the sample 354 months. The average mean of $\beta_{HMLFS,j}$ is close to zero for all three data sets. The average cross-section standard deviation is naturally larger for individual stocks than for portfolios, and it is larger for stock portfolios sorted by industry than for stock portfolios sorted by size and book-to-market ratio. A large part of the portfolios or stocks have negative $\beta_{HMLFS,j}$, meaning that their values decline when economic conditions favor foreign sales exposure. For example, when foreign prices rise in terms of U.S. dollar, exporting firms benefit while importing firms hurt. Notably, the coefficient $\beta_{HMLFS,j}$ is estimated not from a multiple regression that includes five other factors. Hence, its magnitude reflects the covariance of the *HMLFS* return with the test asset *conditional* on the covariance of these assets with the other factors, including the market (domestic and foreign).

Returns of industries with higher *FSratio* firms are more sensitive to the return on the *HMLFS* factor, whose construction is based on the *FSratio*. We indeed obtain that $\beta_{HMLFS,j}$ and $FSratio_j$ are positively correlated across industries. For each industry we calculate the average of the monthly estimates of the industry's $\beta_{HMLFS,j}$ (using a moving 60 month estimation window) and the average of the monthly value-weighted average of $FSRatio_j$ of the stocks that constitute the industry (using the SIC classification that Fama and French assign to each of their industries).[13] We thus have 43 estimates of average $\beta_{HMLFS,j}$ and of average $FSratio_j$. We then calculate the cross-industry correlation between the two averages and obtain Corr($\beta_{HMLFS,j}$, $FSratio_j$) = 0.360, statistically significant.

This high correlation between $\beta_{HMLFS,j}$ and $FSratio_j$ remains after we control for the exposure to *dFX*, the exchange rate changes. We add to model (3) the variable dFX_t, estimate $\beta_{HMLFS,j}$ and $\beta_{dFX,j}$ for each industry *j* over a moving window of 60 months and average the series of monthly estimates of these two βs for each industry. We obtain that Corr($\beta_{HMLFS,j}$, $FSratio_j$) = 0.371, and Corr($\beta_{dFX,j}$, $FSratio_j$) = -0.245. The correlation between $\beta_{HMLFS,j}$ and $FSratio_j$ hardly changes and it remains statistically significant, and the sign of Corr($\beta_{dFX,j}$, $FSratio_j$) is negative, as expected, but it is statistically insignificant. This is consistent with the results of Amihud (1994) and Bartov and Bodnar (1994) on the insignificant relation between the β of exchange rate changes for stocks of exporting

[13] By construction, *FSratio* remains constant for each stock over 12 months, from July of one year to June of the following year.

firms. We further test below the effects of both these measures of systematic risk on the cross section of stock returns.

C.2. Second-step Fama-MacBeth cross-section estimations

In the second step we use $\beta_{K,j,m-1}$ estimated up to month *m-1* and do the following cross-section regression for each month *m*:

$$R_{j,m} - rf_m = \lambda_{0,m} + \lambda_{HMLFS,m}\beta_{HMLFS,j,m-1} + \lambda_{RMrf,m}\beta_{RMrf,j,m-1} + \lambda_{SMB,m}\beta_{SMB,j,m-1} + \lambda_{HML,m}\beta_{HML,j,m-1} + \lambda_{UMD,m}\beta_{UMD,j,m-1} + \lambda_{MSCI,m}\beta_{MSCIr,j,m-1} + v_{j,m} \quad (4)$$

We thus estimate *K* time series of $\lambda_{K,m}$ for which we calculate the mean and *t*-statistics. For the series $\lambda_{HMLFS,m}$, which is the focus of our study, we present additional statistics detailed in Section III.A. above: median, *Pos:Neg* and weighted mean. Given that the series $\lambda_{HMLFS,m}$ are serially uncorrelated, we add a binomial test of whether the proportion of positive coefficients is significantly different from ½, the chance result.

Our hypothesis is that $\lambda_{HMLFS} > 0$, i.e., expected return is increasing in β_{HMLFS}, the systematic risk that results from exposure to foreign sales.

INSERT TABLE 6 HERE

Table 6 reports the results for the second-step Fama-MacBeth procedure for the three data sets. Results are shown for the entire sample period, July 1983 – 2012 (the first 60 months are used to estimate the coefficients β_K) and for the two subperiods, 7/1983-12/1995 and 1/1996-12/2012. (The breakpoint in time is as in Table 4.)

Our hypothesis is supported for all three data sets: for the entire period, columns (1), (4) and (7), λ_{HMLFS} is positive and significant. That is, expected return is an increasing function of β_{HMLFS}, the systematic risk of foreign sales exposure. The mean

λ_{HMLFS} is 0.461 and 0.468 in Panels A and B, which use portfolio returns, and it is 0.126 in Panel C which uses individual stock returns. The lower mean λ_{HMLFS} in Panel C for individual stocks may result from the well-known downward bias due to error-in-the-variable (EIV) problem, which is greater when β_{HMLFS} is estimated for individual stocks compared to its estimation for stock portfolios.

As for the subperiods, we observe in Panels A and B that in the recent period – 1996-2012 – the mean λ_{HMLFS} is higher than its overall average and it is quite significant. This may reflect the increased importance of foreign sales exposure, documented in Table 1, which seems to have raised the estimated risk premium λ_{HMLFS}. It is also consistent with Dennis, Dennis and Yost's (2002) observation on the increased global diversification of U.S. corporations over time. In Panel C, column (9) the low estimated mean of λ_{HMLFS} seems inconsistent with this conclusion. Notably, all other statistics for that subperiod show statistical significance. Also, the median is larger by 50% than the mean, suggesting that the mean is affected by negative outliers. Indeed, the low mean λ_{HMLFS} in column (9) is mainly because of a single negative outlier of $\lambda_{HMLFS,m}$, -9.365, which is 6.4 standard deviations below the mean. Excluding this single estimate, the mean of λ_{HMLFS} is 0.168, closer to the median, with t = 1.83, which is marginally significant. As with the estimates in Panels A and B, this second-subperiod coefficient is larger than that of the first subperiod.

C.3. Five robustness tests

C.3.1. Controlling for FSratio

The results in Tables 3 and Table 6 show that return is an increasing function, respectively, of *FSratio*, the level of foreign sales ratio, and of β_{HMLFS}, the systematic risk of the *HMLFS* factor. Given the positive cross-sectional correlation between *FSratio* and β_{HMLFS}, a question come us: is it the factor risk or the characteristic (that may proxy for risk) that is priced? A similar question was raised by Daniel and Titman (1997) in their analysis of characteristics versus factor pricing.

We re-do the second-step Fama-MacBeth cross-section regression, adding to model (4) the variable $FSratio_{j,m-1}$, the lagged annual foreign sales ratio. We again follow the Fama-French (1992) convention, applying $FSratio_j$ ratio from the annual reports in one year to the twelve monthly returns that begin from July of the following year. We do the analysis for the three data sets: 100 size and book-to-market portfolios and 43 industry portfolios, where the portfolio's $FSratio_j$ is the value-weighted *FSratio* of portfolio's constituent stocks, and for individual stocks.

INSERT TABLE 7

Table 7 presents the Fama-MacBeth estimates of the coefficients of β_{HMLFS} and *FSratio*. To save space, we do not include the coefficients of the other five factors' βs which are included in the cross-section model. For the 100 portfolios based on size and book-to-market, column (A1)-(A3), and for the 43 industry portfolios, columns (B1)-(B3), the coefficients of *FSratio* are statistically insignificant. The coefficients of β_{HMLFS} and their statistical significance here are about the same as those in the respective columns in Table 6. That is, β_{HMLFS} remains positive and statistically significant determinant of the cross section of stock returns.

For individual stocks, columns (C1)-(C3), *FSratio* has positive and significant coefficient for the entire sample period as well as for the first subperiod, and it is positive and insignificant for the second subperiod. The coefficients of β_{HMLFS} present a similar pattern and again they are little changed from those in Table 6. Again, for the entire period, the coefficient of β_{HMLFS} is positive and significant, with particular strong significance for the weighted mean (for which the coefficient of *FSratio* is more weakly significant).

These results, especially those for stock portfolios, demonstrate that β_{HMLFS} is a more comprehensive measure of firms' exposure to foreign trade risk than is *FSratio* because – as discussed above – it also accounts for the extent of foreign purchases and imports, in which case *FSratio* = 0. While *FSratio* is used to construct the factor *HMLFS*, the sensitivity of firms' return to this factor is more informative about their exposure to foreign trade than the *FSratio* alone.

We conclude that the pricing of the risk of *HMLFS* remains significant in the presence of the stock characteristic *FSratio*.

C.3.2. Testing the effect of the systematic risk of dFX, the change in exchange rate.

We replicate the test procedure using a *six*-factor model that includes *FFCM*, *HMLFS* and *dFX*, the latter being the monthly percent change in the U.S. foreign exchange index (see section B above), used in other studies to capture the systematic risk resulting from exposure to foreign trade.[14] That is, the cross-section model includes β_K where *K = RMrf, SMB, HML, UMD, MSCIr, HMLFS* and *dFX*. We obtain (results are in Table A3 of the Appendix) that the mean coefficient of β_{dFX}, denoted λ_{dFX}, is insignificantly different from zero. Its magnitude and *t*-statistic when estimated in the

[14] See Jorion (1991) and the literature that followed.

context of columns (A1), (B1) and (C1) in Table 6 is, respectively, -0.037 (t = -0.28), 0.141 (t = -0.74) and -0.031 (t = -0.83). At the same time, the estimated λ_{HMLFS} in these models hardly changes. The mean λ_{HMLFS} in this model in columns (A1), (B1) and (C1) is 0.416 (t = 3.29), 0.447 (2.68) and 0.129 (t = 2.09), respectively, quite close to the values of these coefficients presented in Table 6. Consistent with some earlier results, we conclude that β_{dFX} is not priced while β_{HMLFS} is priced.

C.3.3. Replacing HMLFS by the return on portfolio 5-0

In this test we replace *HMLFS* by the factor 5-0, the return of quintile 5 (highest *FSratio*) minus the return on the portfolio of all stocks with *FSratio* = 0. We have shown in Table 4 that *alpha* of this portfolio is 0.278 (t = 2.81), quite close to *alpha* of portfolio 5-1 or *HMLFS*. Replicating the entire Fama-MacBeth procedure using the factor 5-0 in lieu of *HMLFS*, we obtain results that are similar to those presented in Table 6 (results are in Table A4 of the Appendix). The mean $\lambda_{5\text{-}0}$ from this analysis in columns (A1), (B1) and (C1) is 0.448 (t = 3.94), 0.374 (t = 2.72) and 0.122 (t = 2.72), respectively, all positive and statistically significant as is the case when using *HMLFS*.

C.3.4. Using Fama-French's 25 portfolios

We replicate our analysis for another data set, the commonly used Fama-French 25 (5x5) portfolios of stocks sorted by size and book-to-market ratio (results are in Panel A of Table A5 in the Appendix). The resulting mean λ_{HMLFS} is 0.629 (t = 2.62) and the median is 0.651, significantly different from zero. These point estimates are larger than those for the 100 portfolios (Panel A of Table 6) which are also sorted on the same characteristics. A possible reason for that is that here the portfolios include more stocks, which mitigates the EIV problem in the estimation of β_{HMLFS} and thus reduces the downward bias in the estimation of λ_{HMLFS}.

C.3.5. Using 2-digit SIC code industry portfolios

We replicate our analysis using the 2-digit SIC code industry portfolios, by dropping utilities and financials (results are in Panel B of Table A5 in the Appendix). From year to year, the number of 2-digit SIC industries varies from 68 to 74, with a mean of 72. The resulting mean λ_{HMLFS} is 0.290 (t = 2.07) and the median is 0.288, significantly different from zero. These point estimates are smaller than those for the Fama-French 43 industry portfolios (Panel B of Table 6). One possible reason is that here the portfolios are composed of fewer stocks, which exacerbates the EIV problem in the estimation of β_{HMLFS} and thus increases the downward bias in the estimation of λ_{HMLFS}. Another reason could be that the industry classification by Fama and French is more informative.

IV. Conclusions

This paper uses the ratio of foreign sales to total sales of firms, denoted *FSratio*, as a measure of exposure to foreign trade. We argue that this is a more comprehensive measure of exposure to foreign trade than is the measure of the exposure to exchange rate shocks, and it would measure such a risk even if exchange rates were fixed or managed and even if the firms could completely hedge exchange rate changes. Indeed, studies have shown that the effect of foreign exchange changes on stock returns is very weak. We show the following results for the period 1978-2012:

1) Across firms, expected returns is an increasing function of *FSratio* after controlling for firm characteristics.

2) We construct a zero-investment portfolio, *HMLFS*, of high-minus-low-*FSratio* stocks by investing in a quintile portfolio with the highest *FSratio* and short selling the quintile portfolio with the lowest *FSratio*. We find that a positive and significant average *HMLFS* return and risk-adjusted return (*alpha*) from its regression on the Fama-French (1993) and Carhart (1997) factors as well as the global (MSCI) excess return.

3) We estimate a CAPM model augmented by *HMLFS*, the other factors being those of Fama-French and Carhart and the MSCI factor. In a cross-section Fama-MacBeth (1973) estimation we find that the β of *HMLFS*, denoted β_{HMLFS}, is significantly priced. As test assets we use (i) the Fama-French 100 or 25 portfolios, sorted on size and book-to-market ratio, (ii) The Fama-French industry portfolios or portfolios of stocks aggregated by their two-digit SIC codes, and (iii) individual stocks. In all estimates, the coefficient of β_{HMLFS} is positive and statistically significant. The effect of β_{HMLFS} remains positive and significant when we control for another source of systematic risk – the β of foreign exchange changes – and for the level of *FSratio*. The coefficient of β_{HMLFS} is generally greater in the more recent period when global diversification of U.S. corporations increased.

In conclusion, we show that exposure of U.S. firms to foreign trade is a priced risk.

References

Allayannis, George, Jane Ihrig, and James Weston, 2001, Exchange-Rate Hedging: Financial versus Operational Strategies, *American Economic Review* 91 (2): 391-395.

Allayannis, George, and Eli Ofek, 2001, Exchange Rate Exposure, Hedging, and the Use of Foreign Currency Derivatives, *Journal of International Money and Finance* 20 (2): 273-296.

Amihud, Y. 1994, Exchange Rates and the Valuation of Equity Shares. In Yakov Amihud and Richard M. Levich, Eds: *Exchange Rates and Corporate Performance,* Irwine, New York.

Ang, Andrew, Robert J. Hodrick, Yuhang. Xing, and Xiaoyan Zhang, 2006, The Cross-Section of Volatility and Expected Returns, *Journal of Finance* 61 (1): 259-299.

Apergis, Nicholas, Panagiotis Artikis, and John Sorros, 2011, Asset Pricing and Foreign Exchange Risk, *Research in International Business and Finance* 25 (3): 308-328.

Asparouhova, Elena, Hendrik Bessembinder, and Ivalina Kalcheva, 2010, Liquidity Biases in Asset Pricing Tests, *Journal of Financial Economics* 96 (2), 215-237.

Asparouhova, Elena, Hendrik Bessembinder, and Ivalina Kalcheva, 2013, Noisy Prices and Inference Regarding Returns, *Journal of Finance* 68, 665-714.

Bartov, E., and G. Bodnar, 1994, Firm Valuation, Earnings Expectations, and the Exchange-Rate Exposure Effect, *Journal of Finance* 49 (5): 1755-1785.

Bartram, Sohnke M., and Gordon M. Bodnar, 2007, The Exchange Rate Exposure Puzzle, *Managerial Finance* 33 (9): 642-666.

Bartram, Sohnke M., Gregory W. Brown, and Bernadette A. Minton, 2010, Resolving the Exposure Puzzle: The Many Facets of Exchange Rate Exposure, *Journal of Financial Economics* 95 (2): 148-173.

Berger, Philip G., and Rebecca Hann, 2003, The Impact of SFAS No. 131 on Information and Monitoring, *Journal of Accounting Research* 41 (2): 163-223.

Bodnar, Gordon M., and William M. Gentry, 1993, Exchange Rate Exposure and Industry Characteristics: Evidence from Canada, Japan, and the USA, *Journal of International Money and Finance* 12 (1): 29-45.

Carhart, M., 1997, On persistence in mutual fund performance, *Journal of Finance* 52 (1): 57-82.

Daniel, Kent, and Sheridan Titman, 1997, Evidence on the Characteristics of Cross Sectional Variation in Stock Returns, *Journal of Finance* 52 (1): 1-33.

Denis, David J., Diane K. Denis, and Keven Yost, 2002, Global Diversification, Industrial Diversification, and Firm Value, *Journal of Finance* 57 (5): 1951-1979.

Doidge, Craig, John Griffin, and Rohan Williamson, 2006, Measuring the Economic Importance of Exchange Rate Exposure, *Journal of Empirical Finance* 13 (4-5): 550-576.

Fama, E.F., and K.R. French, 1992, The Cross-Section of Expected Stock Returns, *Journal of Finance* 47 (2), 427-465.

Fama, E.F., and K.R. French, 1993, Common Risk Factors in the Returns of Stocks and Bonds, *Journal of Financial Economics* 33 (1): 3-56.

Fama, E.F., and K.R. French. 2008, Dissecting Anomalies, *Journal of Finance* 63 (4): 1653-1678.

Fama, E.F., and J.D. MacBeth, 1973, Risk, Return, and Equilibrium: Empirical Tests, *Journal of Political Economy* 81 (3), 607-636.

Ferson, W.E. and C.R. Harvey, 1999, Conditioning Variables and the Cross Section of Stock Returns, *Journal of Finance* 54 (4): 1325-1360.

Geczy, C., B. Minton, and C. Schrand, 1997, Why Firms Use Currency Derivatives, *Journal of Finance* 52 (4): 1323-1354.

Griffin, J., and R. Stulz, 2001, International Competition and Exchange Rate Shocks: A Cross-Country Industry Analysis of Stock Returns, *Review of Financial Studies* 14 (1): 215-241.

Jorion, Philippe, 1990, The Exchange-Rate Exposure of US Multinationals, *The Journal of Business* 63 (3): 331-45.

Jorion, Philippe, 1991, The Pricing of Exchange Rate Risk in the Stock Market, *The Journal of Financial and Quantitative Analysis* 26 (3): 363-76.

Kolari, James W., Ted C. Moorman, and Sorin M. Sorescu, 2008, Foreign Exchange Risk and the Cross-Section of Stock Returns, *Journal of International Money and Finance* 27 (7): 1074-1097.

Lustig, Hanno, Nikolai Roussnov, and Adrien Verdelhan, 2011, Common Risk Factors in Currency Markets, *Review of Financial Studies* 24 (11): 3731-3777.

Marston, Richard C., 2001, The Effects of Industrial Structure on Economic Exposure, *Journal of International Money and Finance* 20 (2), 149-164.

Newey, Whitney K., and Kenneth D. West, 1987, A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix, *Econometrica* 55 (3): 703-708.

Shumway, Tyler, 1997, The Delisting Bias in CRSP Data, *Journal of Finance* 52 (1): 327-340.

White, Halbert, 1980, A Heteroscedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroscedasticity, *Econometrica* 48 (4): 817-838

Table 1. Summary statistics for foreign sales ratio (*FSratio*) in Compustat Segment file
Sales data are retrieved for all the geographic segments from the Compustat Segment File and are classified into domestic or nondomestic based on the GEOTP variable (2 indicates domestic and 3 indicates nondomestic sales). *ForeignSales* = sales from the nondomestic segments + export sales from the domestic segments. *DomesticSales* = domestic segments – export sales. *FSratio* = *ForeignSales*/(*DomesticSales* + *ForeignSales*). Excluded are firms from the finance industries (SIC codes 6000-6999) and firms in the utility industry (SIC codes 4900-4999), firms without stock return data on CRSP, firms whose market equity is below $10 million or whose price is below $1. We also delete firm years with negative *ForeignSales* or *DomesticSales* (19 firm years or 125 firm months). The final sample contains 102,519 firm years and 1,105,432 firm months. The table reports the total number of firms in our sample, number of firms with positive *FSratio*, and the mean, median, 25th percentile and 75th percentile of *FSratio* applied to the subsample of firm-years with positive *FSratio*.

	Total number	Fraction of firms	Statistics of *FSratio* for *FSratio*>0			
Year	of firms	with *FSratio*>0	Mean	Median	25th pct.	75th pct.
1977	1744	0.512	0.300	0.221	0.132	0.368
1978	2316	0.475	0.230	0.198	0.112	0.311
1979	2521	0.455	0.229	0.199	0.109	0.311
1980	2501	0.455	0.233	0.203	0.111	0.323
1981	2744	0.439	0.217	0.193	0.103	0.300
1982	2816	0.415	0.215	0.182	0.104	0.297
1983	2879	0.413	0.209	0.179	0.096	0.290
1984	3022	0.410	0.201	0.167	0.090	0.285
1985	2987	0.395	0.202	0.172	0.091	0.282
1986	3028	0.389	0.219	0.181	0.099	0.304
1987	3026	0.398	0.236	0.194	0.105	0.330
1988	2948	0.407	0.250	0.209	0.114	0.360
1989	2828	0.425	0.255	0.216	0.119	0.364
1990	2952	0.426	0.259	0.221	0.117	0.370
1991	3104	0.433	0.268	0.229	0.122	0.379
1992	3463	0.434	0.263	0.222	0.119	0.368
1993	3758	0.433	0.257	0.221	0.116	0.360
1994	4108	0.430	0.260	0.221	0.124	0.367
1995	4298	0.443	0.277	0.248	0.128	0.389
1996	4606	0.444	0.288	0.254	0.135	0.401
1997	4531	0.438	0.292	0.264	0.146	0.403
1998	4156	0.487	0.270	0.237	0.115	0.387
1999	3226	0.570	0.291	0.263	0.122	0.412
2000	2844	0.608	0.299	0.266	0.131	0.426
2001	2583	0.606	0.304	0.270	0.137	0.441
2002	2494	0.617	0.307	0.269	0.134	0.443
2003	2478	0.628	0.328	0.294	0.142	0.478
2004	2564	0.640	0.345	0.312	0.147	0.499
2005	2545	0.635	0.347	0.311	0.142	0.511
2006	2450	0.632	0.356	0.317	0.148	0.522
2007	2338	0.642	0.376	0.340	0.162	0.547
2008	2234	0.649	0.395	0.367	0.168	0.574
2009	2149	0.651	0.398	0.360	0.160	0.579
2010	2161	0.677	0.409	0.369	0.162	0.608
2011	2117	0.673	0.413	0.382	0.174	0.601

Table 2. Cross-stock correlations between the variables

This table reports the correlation matrix of the main variables. *FSratio* is the ratio of foreign sales to the sum of foreign and domestic sales (defined in Table 1). *NoFS* is a dummy variable that equals 1 if *FSratio* = 0 (zero otherwise). β (systematic risk) is the slope coefficient from a regression of stock monthly excess return on the market excess return *RMrf* over the past 60 months (with minimum of 24 observations). *Size* is the firm capitalization (in logarithm). *BM* is the book-to-market ratio (in logarithm), calculated as in Fama and French (1992). *R11* is lagged eleven-month buy-and-hold return, from month *t-12* to month *t-2*. *IVOL* is idiosyncratic volatility, the standard deviation of residuals from a regression of daily stock excess returns on the returns of the Fama-French factors during the month (following Ang, Hodrick, Xing, and Zhang (2006)). Stock market (return-based) variables for each month *t* are the values known as of the end of month *t-1*. Accounting data for a calendar year are matched with return-based data for the 12 month beginning with July of the following year, following the convention in Fama and French (1992).

The numbers presented are the means of the month-by-month cross-stock correlations. There are 414 months, July 1978 to December 2012.

	FSratio	*NoFS*	*beta*	*Size*	*BM*	$R_{t-12,t-2}$	*IVOL*
FSratio	1						
NoFS	-0.707	1					
β	0.098	-0.075	1				
Size	0.247	-0.212	0.002	1			
BM	-0.020	0.008	-0.128	-0.247	1		
R11	-0.026	0.023	0.008	0.087	-0.168	1	
IVOL	-0.068	0.072	0.182	-0.405	-0.001	-0.065	1

Table 3. Cross-section effect of firm foreign sales exposure
Results from cross-sectional monthly Fama-MacBeth regressions of stock excess returns on *FSratio* and stock characteristics. Sample criteria appear in Table 1. Variable definitions appear in Table 2. *Size* and *BM* are in logarithm. We present the mean of the coefficients of these variables from monthly cross-sectional regressions and their *t* statistics (in parentheses). *NW* is the *t* statistic calculated by the Newey-West (1987) method with one lag. *Pos/Neg* is the number of positive and negative coefficients. *Weighted* is the weighted mean of the coefficients, with the weight being a reciprocal of the standard error of the estimated coefficient (following Ferson and Harvey (1999), giving higher weight to coefficients that are estimated more precisely). *, ** and *** indicate significance at 10%, 5% and 1% level, respectively (two-tail test). The sample period is July 1978 to December 2012, 414 months.

	7/1978-2012		7/1978-1995	1996-2012
	(1)	(2)	(3)	(4)
FSratio	0.554	0.382	0.519	0.590
	(2.89)***	(2.15)**	(2.01)**	(2.07)**
NW	(2.64)***	(2.02)**	(1.82)*	(1.91)*
Median	0.526**	0.209	0.560*	0.514*
Pos/Neg	232/182	222/192	119/91	113/91
Weighted	0.375	0.171	0.516	0.270
	(2.13)**	(1.04)	(2.08)**	(1.08)
NoFS		-0.086		
		(-1.70)*		
B	0.120	0.119	0.133	0.107
	(1.13)	(1.12)	(1.03)	(0.63)
Size	-0.114	-0.114	-0.097	-0.131
	(-3.02) ***	(-3.03)***	(-1.98)**	(-2.27)**
BM	0.247	0.246	0.296	0.196
	(4.28) ***	(4.26)***	(4.25)***	(2.12)**
R11	0.007	0.007	0.011	0.270
	(5.76)***	(5.72)***	(8.80)***	(1.31)
IVOL	-0.299	-0.299	-0.417	-0.178
	(-9.62)***	(-9.60)***	(-11.00)***	(-3.70)***
Constant	2.645	2.717	2.554	2.738
	(5.29)***	(5.38)***	(3.79)***	(3.69)***
R^2	0.046	0.047	0.041	0.051
N	414	414	210	204

Table 4. *FSratio* portfolios: *alpha* and factor loadings

This table reports in Panel A the alpha (intercept) from the FFCM five-factor regression model that includes the Fama-French (1993) factors *RMrf, SMB, HML*, Carhart's (1997) *UMD* and the (orthogonalized) global factor *MSCIr*, the residuals, plus intercept, from a regression of the excess return on the *MSCI* index on *RMrf*. The portfolios are of stocks ranked by their *FSratio*. Sample selection criteria appear in Table 1. Following Fama and French (1993), we sort all stocks into three size groups (the size breakpoints are defined only based on NYSE listed companies). Within each size tercile, we sort all stocks into 6 portfolios: firms with zero *FSratio* are in portfolio 0 and all other stocks are sorted into quintiles, from quintile 1 (lowest *FSratio*) to quintile 5. We calculate the average return-weighted (RW, weights being 1+lagged return, to correct for microstructure noise) and value-weighted (VW) returns of each portfolio. Then, we average the portfolio returns across the three size groups for each of the 6 *FSratio* portfolios. For example, the return on quintile 5 is the average return of the three quintile-5 portfolios across the three size terciles. The 5-1 or *HMLFS* (high-minus-low *FSratio*) portfolio return is the return on quintile 5 (high *FSratio*) minus the return on quintile 1 (lowest *FSratio*). Panel C includes results for a regression of portfolio *HMLFS* (5-1) on the FFCM model+*HMLfx*, a factor of the returns on high-minus-low interest rate currencies (Lustig, Roussanov and Verdelhan (2011)). In parentheses are *t*-statistics based on robust standard errors (White, 1960). *, ** and *** indicate significance at 10%, 5% and 1% level, respectively (two-tail test). The sample period is from July 1978 to December 2012.

Panel A. *Alpha* of portfolios ranked by their *FSratio*

Portfolio	Entire period 7/1978-2012		Subperiod 1 7/1978-1995		Subperiod 2 1996-2012	
	RW	VW	RW	VW	RW	VW
0	-0.075	-0.040	-0.107	-0.018	-0.006	-0.053
	(-1.33)	(-0.67)	(-2.03)**	(-0.33)	(-0.07)	(-0.57)
1	-0.071	-0.016	-0.232	-0.172	0.018	0.070
	(-1.05)	(-0.23)	(-3.32)***	(-2.26)**	(0.16)	(0.63)
2	0.036	0.048	-0.044	-0.013	0.148	0.152
	(0.57)	(0.80)	(-0.56)	(-0.17)	(1.66)	(1.64)
3	0.164	0.117	0.183	0.158	0.227	0.168
	(2.60)**	(1.93)*	(2.37)**	(2.25)**	(2.50)**	(1.92)*
4	0.256	0.271	0.306	0.328	0.344	0.349
	(3.27)***	(3.73)***	(3.56)***	(3.78)***	(2.97)***	(3.28)***
5	0.203	0.240	0.168	0.158	0.371	0.450
	(2.34)**	(2.86)***	(1.84)*	(1.64)	(2.74)***	(3.40)***
5-1	0.273	0.256	0.400	0.331	0.353	0.379
HMLFS	(2.83)***	(2.56)**	(3.71)***	(2.89)***	(2.33)**	(2.42)**
5-0	0.278	0.280	0.275	0.176	0.377	0.503
	(2.86)***	(2.59)***	(2.34)**	(1.42)	(2.44)**	(2.98)***

Panel B. factor loadings of portfolio *HMLFS*, 5-1						
RMrf	0.025	-0.033	-0.032	-0.067	-0.017	-0.070
	(1.11)	(-1.40)	(-1.36)	(-2.58)**	(-0.42)	(-1.48)
SMB	-0.053	-0.014	-0.068	-0.068	0.004	0.050
	(-1.31)	(-0.37)	(-1.26)	(-1.48)	(0.07)	(0.92)
HML	0.410	0.395	0.149	0.182	0.512	0.480
	(8.93)***	(8.21)***	(2.81)***	(3.18)***	(9.40)***	(8.30)***
UMD	0.033	0.061	-0.007	-0.012	0.054	0.094
	(1.07)	(2.19)**	(-0.22)	(-0.38)	(1.55)	(2.85)***
MSCIr	0.106	0.136	0.024	0.057	0.533	0.530
	(2.60)**	(3.43)***	(0.76)	(1.75)	(4.23)***	(3.88)***
R^2	0.311	0.306	0.135	0.220	0.462	0.416
N	414	414	210	210	204	204
Panel C. Regression of *HMLFS* on the FFCM model + *HMLfx*						
	11/1983-5/2010		11/1983-1995		1996-5/2010	
	RW	VW	RW	VW	RW	VW
alpha$_{5-1}$	0.337	0.258	0.500	0.365	0.361	0.308
HMLFS	(2.89)***	(2.12)**	(3.70)***	(2.62)***	(2.07)**	(1.71)*
HMLfx	0.069	0.110	-0.051	-0.028	0.170	0.234
	(1.31)	(1.91)*	(-0.98)	(-0.50)	(2.13)**	(2.52)**
R^2	0.360	0.347	0.095	0.171	0.516	0.474
N	319	319	146	146	173	173

Table 5. Summary statistics of β_{HMLFS}, the systematic risk of foreign sales exposure

This table reports the average of the monthly estimates of the mean, median, and standard deviation of β_{HMLFS}, across the portfolios or stocks. For each portfolio or stock *j*, we estimate the factor loadings (β_K, *K = HMLFS, RMrf, SMB, HML, UMD* and *MSCIr*) from the regression model

$$R_{j,t} - rf_t = alpha_j + \beta_{HMLFS,j}HMLFS_t + \beta_{RMrf,j}RMrf_t + \beta_{SMB,j}SMB_t + \beta_{HML,j}HML_t + \beta_{UMD,j}UMD_t + \beta_{MSCIr,j}MSCIr_t + \varepsilon_{j,t} \quad (3)$$

HMLFS is our factor of High-Minus-Low Foreign Sales exposure (portfolio 5-1; see Table 4). *RMrf*, *SMB* and *HML* are the Fama-French (1993) factors, *UMD* is Carhart's (1997) momentum factor and *MSCIr* is the orthogonalized global factor excess return. The coefficients are estimated over rolling 60-month window (we require minimum 24 observations), moving one month at the time, starting with a window that ends in 6/1983 to 12/2012.

We use three data sets: (i) 100 portfolios of stocks sorted on size and book-to-market ratio; (ii) 43 industry portfolios which are the 48 Fama-French portfolio excluding financials and utilities; and (iii) all stocks on CRSP that satisfy our data requirements. Data for (i) and (ii) are from Kenneth French's web site. The estimation period is 7/1978-2012.

Data set	Mean	Median	Standard Deviation
(i) 100 portfolios sorted on Size and B/M	0.005	0.011	0.230
(ii) 43 industry portfolios -- 48 Fama-French portfolios, excluding financial and utilities industries.	0.126	0.107	0.433
(iii) Individual stocks, excluding financial and utilities	0.004	0.029	1.425

Table 6. The pricing of β_{HMLFS}, the systematic risk of foreign sales exposure

This table reports the second step of the two-pass Fama-MacBeth (1973) procedure. The first pass – the estimation of the systematic risk coefficients (β_K, *K = HMLFS, RMrf, SMB, HML, UMD* and *MSCIr*, is described in the legend of Table 4. In the second step we estimate a cross-section regression model (4) for each month *m*,

$$R_{j,m} - rf_m = \lambda_{0,m} + \lambda_{HMLFS,m}\beta_{HMLFS,j,m-1} + \lambda_{RMrf,m}\beta_{RMrf,j,m-1} + \lambda_{SMB,m}\beta_{SMB,j,m-1} + \lambda_{HML,m}\beta_{HML,j,m-1} + \lambda_{UMD,m}\beta_{UMD,j,m-1} + \lambda_{MSCIr,m}\beta_{MSCIr,j,m-1} + v_{j,m} \quad (4)$$

The table presents for each series $\lambda_{K,m}$ the mean and *t*-statistic, *, * and *** indicate significance at 10%, 5% and 1% level, respectively. For $\lambda_{HMLFS,m}$ we also present the median, the number of positive/negative coefficients (*Pos/Neg*), and the weighted mean, the weight being the reciprocal of the estimated standard error of the coefficient in the cross-section regression (giving higher weight to coefficients that are estimated more precisely, see Ferson and Harvey (1999)). For *Pos/Neg* we test whether the proportion of positive coefficients is different from ½, the chance result.

The estimation period is 7/1983 to 12/2012, 354 months.

	Panel A. 100 portfolios by Size and B/M			Panel B: 43 industry portfolios			Panel C: Individual stocks		
	1983-2012	1983-1995	1996-2012	1983-2012	1983-1995	1996-2012	1983-2012	1983-1995	1996-2012
N	354	150	204	354	150	204	354	150	204
	(A1)	(A2)	(A3)	(B1)	(B2)	(B3)	(C1)	(C2)	(C3)
$\boldsymbol{\beta_{HMLFS}}$	0.461	0.291	0.585	0.468	0.200	0.664	0.126	0.134	0.121
	(3.49)***	(2.31)**	(2.80)***	(2.83)***	(1.14)	(2.60)***	(2.03)**	(2.82)***	(1.18)
Median	0.559***	0.317***	0.723***	0.413***	0.125	0.614**	0.147***	0.137***	0.182*
Pos/Neg	209/145***	84/66*	125/79***	192/162*	78/72	114/90**	203/151***	89/61**	114/90**
Weighted	0.406	0.345	0.475	0.367	0.169	0.526	0.175	0.170	0.183
	(4.45)***	(2.90)***	(3.44)***	(2.84)***	(1.00)	(2.80)***	(4.19)***	(3.92)***	(2.50)**
β_{RMrf}	-0.272	-0.356	-0.210	0.285	0.353	0.234	0.056	-0.077	0.155
	(1.17)	(1.06)	(0.66)	(0.91)	(0.86)	(0.51)	(0.40)	(-0.47)	(0.73)
β_{SMB}	0.013	-0.271	0.221	-0.274	-0.226	-0.309	-0.079	-0.174	-0.010
	(0.08)	(-1.55)	(0.89)	(-1.43)	(-1.24)	(-1.02)	(-1.01)	(-2.33)**	(-0.08)
β_{HML}	0.352	0.470	0.264	0.453	0.456	0.450	0.157	0.130	0.177
	(2.22)**	(2.37)**	(1.13)	(2.41)**	(2.04)**	(1.60)	(1.61)	(1.45)	(1.14)
β_{UMD}	0.108	-0.325	0.426	0.628	0.852	0.463	-0.158	0.004	-0.277
	(0.50)	(-1.45)	(1.28)	(2.16)**	(3.11)***	(1.00)	(-1.93)*	(0.05)	(-2.13)**
β_{MSCI}	0.035	-0.270	0.258	0.109	0.124	0.097	0.019	0.027	0.014
	(0.27)	(-1.05)	(2.08)**	(0.56)	(0.33)	(0.50)	(0.53)	(0.47)	(0.29)
Constant	0.858	1.061	0.707	0.320	0.367	0.286	0.644	0.625	0.659
	(3.96)***	(3.50)***	(2.34)**	(1.23)	(0.88)	(0.86)	(3.46)***	(2.33)**	(2.56)**
R^2	0.307	0.290	0.319	0.359	0.339	0.374	0.032	0.021	0.040

Table 7. The pricing β_{HMLFS} together with *FSratio*

This table presents estimation results of model (4) as it appears in the legend of Table 6 with an added variable, *FSratio*, the foreign sales ratio, defined in the legend of Table 1. The explanation of the model and the estimation procedure is in the legend of Table 6. *FSratio* of the industry portfolios is the value-weighted *FSratio* of the stocks that constitute the industry. We use the last annual foreign sales ratio available, following the Fama-French (1992) convention of applying $FSratio_j$ ratio from the annual reports in one year to the twelve monthly returns that begin from July of the following year.
To save space, the table presents only the coefficients of β_{HMLFS} and *FSratio*.

	Panel A. 100 portfolios by Size and B/M			**Panel B: 43 industry portfolios**			**Panel C: Individual stocks**		
	1983-2012	1983-1995	1996-2012	1983-2012	1983-1995	1996-2012	1983-2012	1983-1995	1996-2012
N	354	150	204	354	150	204	354	150	204
	(A1)	(A2)	(A3)	(B1)	(B2)	(B3)	(C1)	(C2)	(C3)
β_{HMLFS}	0.428	0.380	0.463	0.428	0.168	0.618	0.126	0.125	0.127
	(3.43)***	(3.25)***	(2.33)**	(2.49)**	(0.92)	(2.33)**	(2.04)**	(2.60)**	(1.25)
Median	0.405***	0.418***	0.405**	0.287**	-0.028	0.545**	0.160***	0.150***	0.214*
Pos/Neg	213/141***	95/55***	118/86**	190/164*	74/76	116/88**	203/151***	89/61**	114/90*
Weighted	0.359	0.393	0.324	0.355	0.131	0.525	0.173	0.160	0.191
	(4.38)***	(3.55)***	(2.69)***	(2.67)***	(0.73)	(2.78)***	(4.15)***	(3.65)***	(2.62)**
FSratio	-0.357	-0.555	-0.212	0.415	0.349	0.463	0.455	0.844	0.168
	(-1.49)	(-1.61)	(-0.64)	(1.24)	(0.66)	(1.06)	(2.58)**	(3.15)***	(0.72)
Median	0.096	0.054	0.100	0.131	0.307	-0.158	0.349**	1.017***	0.058
Pos/Neg	180/174	75/75	105/99	180/174	80/70	100/104	196/158	92/58	104/100
Weighted	-0.091	-0.446	0.094	0.417	0.386	0.430	0.321	0.928	0.054
	(-0.52)	(-1.48)	(0.44)	(1.55)	(0.81)	(1.30)	(1.96)*	(3.63)***	(0.25)
Other five ***β*** *coefficients* & constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.324	0.309	0.334	0.384	0.363	0.400	0.034	0.023	0.043

APPENDIX (Tables A1-A5)

Table A1. Excess returns

This table report the excess return (raw return minus the risk free interest rate) of different *FSratio* portfolios. We follow Fama and French (1993) to calculate the portfolio returns for different *FSratio* portfolios. First, we sort all the stocks into three size groups. The size breakpoints are defined only based on NYSE listed companies. Within each size tercile, we sort all the stocks into 6 portfolios: 0 is the portfolio of firms with zero *FSratio*, and all the other firms are sorted into quintiles, from quintile 1 to quintile 5. Then we calculate the average returns across the three different size groups for each of the 6 portfolios. For example, the reported quintile 5 portfolio return is the average return across the three within-size-group quintile 5 portfolios. We also report the return of two long-short portfolios: quintile 5 (high *FSratio*) minus quintile 1 (low *FSratio*) *FSratio* portfolio. EW/VW represent equally weighted, and value weighted portfolio returns, respectively. The sample period is from July 1978 to December 2012.

	1978-2012			1978-1995			1996-2012		
	EW	RW	VW	EW	RW	VW	EW	RW	VW
0	0.661	0.622	0.639	0.706	0.665	0.716	0.614	0.578	0.559
	(2.48)	(2.35)	(2.44)	(1.95)	(1.85)	(2.07)	(1.56)	(1.48)	(1.42)
1	0.560	0.524	0.566	0.537	0.500	0.542	0.585	0.548	0.591
	(1.85)	(1.74)	(1.89)	(1.38)	(1.29)	(1.39)	(1.25)	(1.18)	(1.30)
2	0.700	0.661	0.667	0.679	0.639	0.661	0.721	0.684	0.673
	(2.42)	(2.29)	(2.35)	(1.77)	(1.68)	(1.73)	(1.66)	(1.57)	(1.60)
3	0.869	0.823	0.768	0.882	0.843	0.817	0.857	0.804	0.717
	(3.09)	(2.94)	(2.85)	(2.34)	(2.25)	(2.22)	(2.04)	(1.93)	(1.81)
4	0.958	0.922	0.927	1.001	0.969	0.968	0.914	0.874	0.885
	(3.38)	(3.27)	(3.37)	(2.67)	(2.60)	(2.62)	(2.14)	(2.06)	(2.17)
5	0.960	0.927	0.932	0.941	0.909	0.856	0.980	0.945	1.011
	(3.34)	(3.25)	(3.41)	(2.58)	(2.51)	(2.44)	(2.19)	(2.13)	(2.40)
5-1	0.400	0.403	0.366	0.405	0.409	0.314	0.396	0.396	0.420
	(3.45)	(3.49)	(3.09)	(3.83)	(3.85)	(2.69)	(1.89)	(1.91)	(2.01)
5-0	0.300	0.305	0.293	0.235	0.244	0.140	0.366	0.366	0.451
	(2.96)	(2.96)	(2.73)	(2.10)	(2.20)	(1.16)	(2.15)	(2.10)	(2.52)

Table A2. Portfolio' sensitivity to foreign exchange rate change

This table reports the return sensitivity of *HMLFS* to the change of foreign exchange rate, dFX_t, the month-t percentage change of the U.S. dollar exchange rate (the price of U.S. dollar in units of foreign currency). The regression model includes the FFCM factors and *dFX*:

$$HMLFS_t = \alpha + \beta_{dFX} dFX_t + \beta_{MktRf} MktRf_t + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \beta_{UMD} UMD_t + \beta_{MSCIr} MSCIr_t + \varepsilon_t$$

The FFCM factors are detailed in the legend of Table 4. To save space, we report only *alpha* (the intercept) and the coefficient of *dFX*. *t*-statistics based on robust standard errors are in the parentheses.

	7/1978-2012		7/1978-1995		1996-2012	
	RW	VW	RW	VW	RW	VW
$alpha_{5\text{-}1}$	0.252	0.241	0.385	0.314	0.338	0.380
HMLFS	(2.64)***	(2.41)**	(3.64)***	(2.80)***	(2.23)**	(2.39)**
dFX	-0.158	-0.113	-0.078	-0.085	-0.094	0.005
	(-2.79)***	(-1.91)*	(-1.23)	(-1.27)	(-1.10)	(0.05)
FFCM included	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.324	0.313	0.143	0.227	0.465	0.416
N	414	414	210	210	204	204

Table A3. Testing the effect of the systematic risk of *dFX*, the change in exchange rates

This table extends Table 6, adding $\boldsymbol{\beta_{dFX}}$**,** the *beta* coefficient of *dFX*, which is the monthly percent change in the U.S. foreign exchange rate. The Table reports the second step of the two-pass Fama-MacBeth (1973) procedure. The legend is identical to that of Table 6 with the added term in the cross-section model (4), $\boldsymbol{\lambda_{dFX,m} * \beta_{dFX,j,m-1}}$. The mean $\boldsymbol{\lambda_{dFX}}$ appears in the last raw.

	Panel A. 100 portfolios by Size and B/M			**Panel B: 43 industry portfolios**			**Panel C: Individual stocks**		
	1983-2012	1983-1995	1996-2012	1983-2012	1983-1995	1996-2012	1983-2012	1983-1995	1996-2012
N	354	150	204	354	150	204	354	150	204
	(A1)	(A2)	(A3)	(B1)	(B2)	(B3)	(C1)	(C2)	(C3)
$\boldsymbol{\beta_{HMLFS}}$	0.416	0.328	0.480	0.447	0.217	0.617	0.129	0.131	0.128
	(3.29)***	(2.77)***	(2.38)**	(2.68)***	(1.23)	(2.39)**	(2.09)**	(2.76)***	(1.26)
Median	0.431***	0.436***	0.431***	0.262**	0.076	0.478**	0.161***	0.140***	0.192*
Pos/Neg	211/143***	90/60***	121/83***	189/165	78/72	111/93	204/150***	89/61**	115/89**
Weighted	0.376	0.364	0.390	0.292	0.125	0.421	0.174	0.166	0.185
	(4.47)***	(3.24)***	(3.12)***	(2.24)**	(0.74)	(2.23)**	(4.18)***	(3.82)***	(2.54)**
β_{RMrf}	-0.250	-0.431	-0.116	0.178	0.045	0.276	0.056	-0.078	0.155
	(-1.04)	(-1.33)	(-0.34)	(0.57)	(0.11)	(0.61)	(0.40)	(-0.47)	(0.72)
β_{SMB}	-0.023	-0.277	0.164	-0.257	-0.093	-0.377	-0.076	-0.175	-0.003
	(-0.14)	(-1.66)	(0.67)	(-1.33)	(-0.50)	(-1.23)	(-0.98)	(-2.36)**	(-0.02)
β_{HML}	0.339	0.395	0.298	0.426	0.437	0.418	0.155	0.128	0.175
	(2.13)**	(2.04)**	(1.26)	(2.25)**	(1.92)*	(1.48)	(1.60)	(1.43)	(1.13)
β_{UMD}	0.210	-0.178	0.495	0.477	0.831	0.216	-0.157	0.007	-0.277
	(1.03)	(-0.92)	(1.53)	(1.61)	(2.95)***	(0.46)	(-1.91)*	(0.10)	(-2.13)**
β_{MSCI}	0.038	-0.405	0.364	0.061	0.037	0.079	0.019	0.025	0.014
	(0.30)	(-1.70)*	(2.78)***	(0.32)	(0.10)	(0.41)	(0.52)	(0.45)	(0.30)
$\boldsymbol{\beta_{dFX}}$	**-0.037**	**0.068**	**-0.115**	**0.141**	**0.487**	**-0.113**	**-0.031**	**-0.025**	**-0.036**
	(-0.28)	**(0.31)**	**(-0.66)**	**(0.74)**	**(1.67)***	**(-0.45)**	**(-0.83)**	**(-0.50)**	**(-0.66)**
Constant	0.865	1.158	0.649	0.416	0.659	0.238	0.646	0.634	0.654
	(3.85)***	(3.77)***	(2.04)**	(1.59)	(1.57)	(0.71)	(3.47)***	(2.36)**	(2.55)**
R^2	0.321	0.306	0.332	0.393	0.367	0.413	0.033	0.022	0.042

Table A4. Replacing *HMLFS* (portfolio 5-1) by the return on portfolio 5-0

This table replicated Table 6 with the following difference. We replace the factor *HMLFS*, which is the differential return between the 5th and 1st quintile of *FSratio* with the return on portfolio 5-0, the differential return between the 5th quintile of FSratio stocks and the portfolio of stocks with *FSratio* = 0. Portfolio 5-0 has a positive and significant *alpha* (see Table 3). The legend is identical to that of Table 5.

	Panel A. 100 portfolios by Size and B/M			**Panel B: 43 industry portfolios**			**Panel C: Individual stocks**		
	1983-2012	1983-1995	1996-2012	1983-2012	1983-1995	1996-2012	1983-2012	1983-1995	1996-2012
N	354	150	204	354	150	204	354	150	204
	(A1)	(A2)	(A3)	(B1)	(B2)	(B3)	(C1)	(C2)	(C3)
$\beta_{5\text{-}0}$	0.448	0.113	0.694	0.374	0.088	0.585	0.122	0.062	0.166
	(3.94)***	(0.91)	(4.01)***	(2.72)***	(0.59)	(2.76)***	(2.72)***	(1.44)	(2.34)**
Median	0.310***	0.183	0.521***	0.294**	-0.002	0.521**	0.140***	0.099*	0.144***
Pos/Neg	211/143***	83/67	128/76***	191/163*	74/76	117/87**	203/151***	84/66*	119/85**
Weighted	0.218	0.108	0.361	0.144	0.009	0.306	0.115	0.093	0.140
	(2.65)***	(0.95)	(2.99)***	(1.34)	(0.06)	(1.85)*	(3.20) ***	(2.30)**	(2.39)**
β_{RMrf}	-0.240	-0.351	-0.159	0.225	0.318	0.156	0.054	-0.071	0.145
	(-0.99)	(1.07)	(-0.46)	(0.72)	(0.77)	(0.35)	(0.38)	(-0.43)	(0.68)
β_{SMB}	-0.025	-0.284	0.165	-0.252	-0.171	-0.312	-0.087	-0.178	-0.021
	(-0.16)	(-1.68)*	(0.68)	(-1.32)	(-0.94)	(-1.02)	(-1.12)	(-2.39)**	(-0.17)
β_{HML}	0.315	0.393	0.258	0.454	0.453	0.455	0.151	0.119	0.174
	(1.97)**	(2.02)**	(1.08)	(2.41)**	(2.07)**	(1.59)	(1.54)	(1.35)	(1.11)
β_{UMD}	0.195	-0.156	0.453	0.631	0.924	0.416	-0.150	0.013	-0.270
	(0.94)	(-0.80)	(1.37)	(2.17)**	(3.35)***	(0.90)	(-1.82)*	(0.17)	(-2.06)**
β_{MSCI}	0.040	-0.411	0.372	0.115	0.201	0.051	0.015	0.024	0.009
	(0.31)	(-1.67)*	(2.82)***	(0.60)	(0.54)	(0.27)	(0.41)	(0.42)	(0.18)
Constant	0.855	1.078	0.692	0.372	0.402	0.349	0.655	0.626	0.676
	(3.76)***	(3.57)***	(2.11)**	(1.41)	(0.96)	(1.03)	(3.51)***	(2.33)**	(2.63)**
R^2	0.307	0.293	0.317	0.360	0.340	0.374	0.033	0.022	0.041

Table A5. The pricing of β_{HMLFS}, the systematic risk of foreign sales exposure: 25 Fama-French size and book-to-market sorted portfolios and 2-digit SIC industry portfolios

This table is identical to Table 6, except that it uses two different test assets:
(i) Panel A: The 25 Fama-French size and book-to-market portfolios are downloaded from French's website.
(ii) Panel B: The 2-digit SIC industry portfolios are constructed by the authors. We exclude financials and utilities. Excluded are industry portfolios with less than three stocks in them.

	Panel A. 25 portfolios by Size and B/M			**Panel B: 2 digit SIC industry portfolios**		
	1983-2012	1983-1995	1996-2012	1983-2012	1983-1995	1996-2012
N	354	150	204	354	150	204
	(A1)	(A2)	(A3)	(B1)	(B2)	(B3)
β_{HMLFS}	0.629	0.436	0.771	0.290	0.173	0.376
	(2.62)**	(1.77)*	(2.05)**	(2.07)**	(1.11)	(1.75)*
Median	0.651***	0.671**	0.581**	0.288***	0.015	0.388***
Pos/Neg	208/146***	90/60***	118/86**	196/158**	76/74	120/84***
Weighted	0.538	0.504	0.574	0.252	0.177	0.300
	(2.84)***	(2.21)**	(1.93)*	(2.28)**	(1.21)	(1.92)*
β_{RMrf}	-1.121	-0.960	-1.238	-0.160	-0.360	-0.012
	(-3.33)***	(-1.95)*	(-2.70)***	(-0.53)	(-0.83)	(-0.03)
β_{SMB}	-0.007	-0.339	0.238	-0.154	-0.280	-0.061
	(-0.03)	(-1.77)*	(0.89)	(-1.06)	(-1.67)*	(-0.28)
β_{HML}	0.272	0.412	0.168	0.178	0.229	0.141
	(1.49)	(1.98)**	(0.61)	(0.97)	(1.07)	(0.51)
β_{UMD}	0.083	-0.539	0.540	-0.353	-0.106	-0.534
	(0.22)	(-1.37)	(0.91)	(-1.35)	(-0.36)	(-1.33)
β_{MSCI}	0.084	-0.677	0.643	0.056	-0.232	0.268
	(0.30)	(-1.21)	(2.52)**	(0.34)	(-0.74)	(1.60)
Constant	1.877	1.740	1.978	0.712	1.067	0.452
	(6.30)***	(4.20)***	(4.73)***	(2.60)**	(2.23)**	(1.41)
R^2	0.638	0.659	0.644	0.246	0.220	0.266