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Abstract

The currency carry trade (CCT) strategy – borrowing in low-interest-rate currencies and investing in high-interest-rate currencies – has been found to generate excess returns that cannot be explained by common risk factors. We argue that companies implicitly execute carry trades, when they have input costs and sales in countries with differing interest rate levels. Consequently, the equity of companies that are not fully hedged against foreign exchange rate changes should be sensitive to returns from currency carry trades. Analyzing a broad sample of US firms, our contribution to the literature is twofold: (i) Based on an APT approach we find a risk premium for implicitly executed currency carry trades in equity returns. (ii) We examine the influence of various company-specific characteristics and find that a company's size and liquidity have the most significant impact on its sensitivity to currency carry trade returns.

Keywords: Carry trade; hedging; exchange rate exposure; uncovered interest parity

JEL classification: F31; G32; G15

1 Introduction

The currency carry trade (CCT) strategy borrows low-interest-rate currencies (short position) and invests in high-interest-rate currencies (long position). This widely used speculative trading strategy should not yield excess returns if the uncovered interest rate parity (UIP) holds. The UIP states that risk-neutral investors should show no preferences regarding their domestic interest rate and foreign rates, since exchange rate movements offset the interest rate differential. However, multiple studies have found that high-interest-rate currencies depreciate less than expected (or appreciate), and low-interest-rate currencies appreciate less than expected (or depreciate) against the UIP, which became known as the "forward premium puzzle" (Fama, 1984). Thus, violating the UIP, CCTs are often found to yield high average excess returns.

This paper studies CCTs of US companies. Companies that are based in a low-interest-rate country typically provide or obtain goods and services to/from various other currency areas. Due to their primary business objective and their choice of sales or input market, those companies are exposed to changes in the corresponding exchange rates. As companies often do not hedge all of their market risks (e.g. Bodnar et al., 1998; Glaum, 2002), such changes affect their firm value. If, for example, the value of sales in a high-interest-rate currency depreciates less than expected under the UIP, investors gain from the existing implicit CCTs (iCCTs). This is why we should expect a sensitivity to the realization of CCTs in the stock returns of companies. The related literature, presented in Section 2 in more detail, interprets the premium of CCTs as a premium for taking on the respective risk. We should therefore be able to find a similar risk premium in equity returns.

As our first contribution, we test if monthly excess returns from interest differentials and a premium from an iCCT strategy is priced in the stock market of US companies. For that, we sort the excess returns of the currencies of all major US trading partners into portfolios according to their monthly forward premium. Those portfolios are then adjusted by yearly trade weights to match the relative importance of a currency to an average US company. The AVG portfolio is given by the average excess return of all portfolios and the HML_{FX} portfolio is given by a long position with the highest forward premium and a short position of the portfolio with the lowest forward premium. For the stock returns, we consider public US non-financial companies listed between 1997 and 2016. After adjusting for missing data and infrequently traded companies, we are left with 2,113 companies in our considered time frame. Following Chen et al. (1986), Bessler and Opfer (2003) and Shanken and Weinstein (2006), we then perform a version of the Fama and MacBeth (1973) approach for the AVG and HML_{FX} portfolio, all excess return portfolios and a trade-weighted exchange rate index using the stock returns as the explained variable. We indeed find significant premia for the AVG, HML_{FX} and excess returns portfolios but not for the trade-weighted exchange rate index. Hence, companies perform iCCTs and investors earn a premium from this implicit trading strategy and these premia cannot be due to a mere change in the trade-weighted exchange rate index.

As a second contribution, we estimate the sensitivities of the companies' stock returns to the HML_{FX} and AVG portfolio. This estimation technique stems from the foreign exchange rate exposure literature and was first introduced by the linear one-factor model of Adler and Dumas (1984). As we are interested in the overall effect of interest differentials between countries, which is represented by the iCCT index of companies, we refrain from including a market factor that could proxy the currency effect we are looking for. In a next step, we take these sensitivities as the dependent variable and explain its variations by different company characteristics in various panel approaches. We aim to determine what kind of companies are most likely to effectuate iCCTS and what factors drive the magnitude of the reaction of stock returns to iCCTs. We find that the key drivers are the company's size and dividends per earnings.

The remainder of the paper is organized as follows. Section 2 gives an overview over the related strand of literature. In Section 3 we discuss for which companies we expect iCCTs to influence stock returns. In Section 4 we describe the dates and time intervals used in this study. In Section 5 we test the UIP for the currencies used in this study, introduce the iCCT excess return formulation, the portfolio construction and the empirical model approaches. In Section 6 we present the empirical findings of the APT approach. We show that iCCTs are priced in stock returns of companies and also what factors drive the stock returns' exposure to iCCTs. In Section 7 we perform additional robustness checks. Finally, in Section 8 we provide some concluding comments.

2 Related Literature

A large body of work aims to explain the excess returns of CCTs. Burnside et al. (2011a) form CCT portfolios and apply the CAPM, the Fama and French (1993) model and include realized stock volatility to replicate realized mean excess returns. Lustig and Verdelhan (2007) establish a consumption-based model with market risk that explains 87% of the cross-sectional variation of the excess returns. Their approach was criticized by Burnside (2011), who feel that accounting for estimated regressors in the cross-section leads to insignificant premia. Lustig et al. (2011) propose the average currency excess return and the return of the carry trade portfolio, which goes long in a portfolio of currencies with the highest foreign premium and short in a portfolio with the highest foreign discount. The aim of this paper is not to explain excess returns, but to analyze the impact of CCTs on equity returns. For this, we apply a form of the risk factors of Lustig et al. (2011).

Menkhoff et al. (2012) derive a factor inspired by Ang et al.'s (2006) work on equities to proxy for unexpected movements in the volatility of global FX markets. Their model prices more than

90% of the cross-sectional variation of excess returns across five CCT portfolios. Ahmed and Valente (2015) built upon this work and divide the global FX volatility in short- and long-run components. Another explanation for excess returns of CCTs my be investor overconfidence. Burnside et al. (2011b) point out that investors overreact to their information about future inflation, as they are too confident about their own market assessment.

Other studies link the existence of excess returns to peso problems or disaster risk. Delays in monetary decisions, a crisis on global financial markets or the occurrence of rare currency shifts can eliminate the excess returns of CCTs in between such events. Brunnermeier et al. (2008) highlight the role of investors in currency crashes. They argue that the limited speculative capital in a crash scenario with dried up liquidity forces highly-levered traders to unwind CCTs, thus leading to a depreciation of high-interest-rate currencies. Burnside et al. (2011a) use at-the-money currency options to hedge a CCT, which eliminates extreme losses. Based on this, Jurek (2014) employs both unhedged and hedged CCTs and divides the total risk premium of CCTs into separate premia for currency crashes and diffusive shock premium. As the hedged CCT eliminates crash risk, the diffusive shock premium accounts for 5% of the total risk premium.

3 Implicit Currency Carry Trades

Let us assume that a US company produces and distributes goods from the US to other countries. Hence, the costs mainly occur in US dollar (short position) and the revenues in a foreign currency (long position). The equivalent value of the latter is then transferred back to the US. This transaction between a US company and a foreign market can be seen as an iCCT. If such an US exporter does not hedge, the company can profit from iCCTs, but it is also exposed to a potential downside. This operates the other way around for a US importer. Overall, if there are excess returns of CCTs, we should be able to find a risk premium iCCTs in stock returns.

Even if we do not know the exact volume, time frame or interest until the realized revenues are transferred back, we should be able to find changes in the stock price of a company for varying iCCT returns. As operational and financial hedging lower the potential impact of iCCTs, we should only find such an influence if the respective company is not completely hedged. Furthermore, larger multinational companies might not only engage solely in exporting or importing activities. The more complex the international involvement of a company – for example if it has production sites and sales markets in multiple countries interacting with each other – the harder it gets to anticipate the directional effect of iCCTs, as this depends on the company being a (net) exporter or importer and on its interaction with high- or low-interest-rate countries relative to the US.

We also take into account domestic companies that sell all or most of their products within the US. Aggarwal and Harper (2010) show that the market values of domestic companies are equally exposed to currency changes in financial and product markets, which effect interest rates, competitors, suppliers, inputs, and international customers that are in turn confronted with exchange rate changes. Despite the fact that we ex-ante do not know if there is a risk premium from iCCTs for domestic companies, we do not remove these companies from our sample to avoid a potential selection bias in the subsequent analysis of iCCT sensitivities.[1]

4 Data and Company Selection

We retrieve monthly stock returns and corporate data for those public non-financial US corporations listed between 1997 and 2016 that are available in Datastream. Financial companies are subject to a separate line of study as those firms have different business objectives towards

[1] We also exclude the domestic companies and estimate the risk premia on the reduced sample. The risk premia are almost unchanged, with slightly reduced level of significance for some portfolios due to the reduction of the sample size.

financial risk taking. We exclude companies that have zero returns for more than then percent of their stock return data (see Khoo, 1994). The dataset is survivorship bias-free. This leaves us with 2,113 companies in our considered time frame. For these companies we retrieved monthly stock returns from Datastream. The risk-free rate is the one-month Treasury Bill rate.

We obtained monthly spot exchange rates and one-month forward exchange rates from Datastream. The sample contains 35 currencies that are included in the broad trade-weighted exchange rate of the FED, namly those of Argentina, Australia, Brazil, Canada, Chile, China, Colombia, the Euro area, Hong Kong, India, Indonesia, Israel, Japan, Malaysia, Mexico, the Philippines, Russia, Saudi Arabia, Singapore, South Korea, Sweden, Switzerland, Taiwan, Thailand, and the United Kingdom; The currencies of Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal and Spain were replaced by the euro from January 1999 onwards. Venezuela is excluded due to missing data. For most of the currencies the sample covers the years 1997 (February) until 2016. If forward exchange rates are not available starting from February 1997 onwards, the currency is entered beginning when available.[2] All exchange rates are quoted in units of foreign currency per US dollar.

We use trade weights developed by the US Federal Reserve for every country mentioned above to construct iCCT indices that capture the relative importance of the main currencies that are relevant for an average US company. We use yearly changing weights, because – corresponding to the corporate strategic decisions – the structure of iCCTs are more long-term oriented and unlikely to change on a monthly basis. We discuss this in Section 5.2 in more detail.

[2]Argentina (April 2004), Brazil (August 2000), China(March 2003), Chile (April 2004), Colombia (April 2004), Russia (April 2004), India (November 1997), Israel (April 2004) and South Korea (September 1999).

5 UIP, Currency Portfolios and Estimation Model

5.1 Failure of the UIP

As a first step we test if the UIP is violated for the currencies and time frame in our sample, to ensure there is indeed a forward premium puzzle for an analysis of companies' iCCTs. As mentioned, the UIP states that there is no arbitrage between the interest differentials of countries, since exchange rate movements offset the interest rate differential. This would mean that risk-neutral investors see no profit difference between investing in currency at the domestic interest rate (as opposed to the foreign rate), exchanging it for foreign currency and transferring it back at the end of the investment. For indirectly quoted exchange rates, so that an increase in the exchange rate indicates an appreciation of the US dollar, the UIP is given by:

$$(1 + i_t^k)\frac{s_t}{E(s_{t+1})} = 1 + i_t. \tag{1}$$

Here, i_t and i_t^k are the nominal interest rates at the end of period t in the US and foreign country k, respectively. The variables s_t and s_{t+1} represent the spot exchange rates for period t and $t+1$ in units of foreign currency k per US dollar and $E(.)$ is the expectations operator. We leave out the subscript k for the exchange rate expressions.

For the covered interest parity (CIP), investing locally or abroad is secured in t using the forward exchange rate f_t instead of s_{t+1}. If both the UIP and the CIP are valid, then $f_t = E(s_{t+1})$, i.e. f_t is an unbiased forecast of the future spot rate. The CIP is usually found to hold with daily and monthly data (e.g. Akram et al., 2008). But empirical evidence generally disagrees with the validity of the UIP. We employ the Fama (1984) test of the forward premium puzzle. For comparability in this study, we examine the violation of the UIP using the discrete formulation of the forward-spot returns to explain the spot return in the regression:

$$\frac{s_{t+1} - s_t}{s_t} = \alpha + \beta \frac{f_t - s_t}{s_t} + \eta_{t+1}. \tag{2}$$

For $\alpha = 0$ and $\beta = 1$, Equation (2) implies $E(s_{t+1}) = f_t$. Consistent with the literature, we test the failure of the UIP from the US point of view and thus that the β coefficients are different from 1. Fama (1984) showed that the forward exchange rates deviate from the future spot rates. Since then many other studies reported β coefficients below one and negative estimates (e.g. Froot and Thaler, 1990). More recently Burnside et al. (2006) find negative estimates of β for major currencies from 1976 to 2005. Like Fama (1984), we perform Zellner's (1962) seemingly unrelated regression (SUR) as we expect a high contemporaneous correlation across currencies. Table 1 reports the results. Note that the individual significance levels refer to $\alpha = 0$ and $\beta = 1$, respectively.

[Table 1 about here.]

We can confirm the failure of the UIP for the currencies in the time frame of 1997 to 2016. Nearly all β coefficients of the forward-spot rate are negative and significantly different from one. Notable exceptions are the Australian and Canadian dollars. For the currencies in the time frame from 2004 to 2016, the number of β coefficients different from one decrease – also partly due to the fewer number of observations. The joint F-test rejects the notion that all β coefficients are equal to one or zero and the constants are not distinguishable from zero. We can therefore conclude, that for most of the currencies in our sample the UIP does not hold true. As discussed by Burnside et al. (2011b), a negative β corresponds to the "forward premium puzzle". We will show this in the next section with the iCCT portfolios.

5.2 Excess Returns and Currency Portfolios

Following Lustig and Verdelhan (2007) and Lustig et al. (2011), we sort all currencies according to their forward premium $(f_t - s_t)/s_t$ or, in other words, according to their interest rate differential against the US interest rate. Currencies are ranked from a low to a high forward premium. Each currency is then allocated to one of three portfolios according to their forward premium. One third of the currencies with the lowest forward premium (or foreign discount) enter the "low" portfolio, the second third of the currencies with a higher forward premium enter the "middle" portfolio and the third of the currencies with the highest forward premium enter the "high" portfolio. If the number of currencies cannot be spread evenly between the portfolios, we allocate the same number of currencies to the high and low portfolio and insert the remaining currencies in the middle portfolio. We resort the portfolios every year.

In the next step, we form discrete excess returns rx^k_{t+1} of each currency k for each month t relative to the US dollar that represent the return from the respective interest differentials:[3]

$$rx^k_{t+1} = i^k_t - i_t - \Delta s_{t+1} \approx \frac{f_t - s_{t+1}}{s_t}. \tag{3}$$

The monthly excess return of each of the three portfolios is then given by the sum of the monthly excess returns of each currency of Equation (3) in the respective portfolio multiplied by yearly adjusted US trade weights. The sum of the trade weights in each portfolio equals one. As we want to analyze the iCCTs of companies, we do not take the viewpoint of an investor that is able to trade all currencies equally to perform CCTs. The trade weights are thus applied to account for the relative importance of the main currencies that are applicable for an average US company.

[3] In contrast to the yearly adjusted portfolios and trade weights – as we assume that the selection of the currency exposure of the companies does not change more frequently – it is however plausible that companies do transfer back or receive remunerations on the earnings from abroad on a monthly basis.

The difference in returns between the high portfolio minus those in the low portfolio (HML_{FX}) represents investors borrowing low-interest-rate currencies (low portfolio) and investing (lending) in high-interest-rate currencies (high portfolio). Corresponding to Lustig et al. (2011) we also calculate the average of the high, middle and low portfolios (AVG). This portfolio represents the average return on a trade-weighted investment at the main exchange rates of the US, financed by the US dollar. In the robustness checks we also show the results for different portfolio specifications based on Menkhoff et al. (2012) with, for example, five instead of three portfolios.

5.3 Descriptive Statistics

Table 2 reports the descriptive statistics for the high, middle, low, AVG and HML_{FX} portfolios. We also show the results for the trade-weighted exchange rate of the Federal Reserve and the total US market capitalization from Datastream as a market factor that represents the development of the US stock market. We report the annualized monthly returns for the mean, median, standard deviation and the Sharpe ratio. For the first order autocorrelation coefficients we use monthly returns.

[Table 2 about here.]

The annualized average returns and the median increase from portfolio low to portfolio high and the HML_{FX} portfolio from negative to positive values. The same applies for the Sharpe ratio. The high portfolio shows a positive annualized return of 2.37%, which corresponds to the negative β in Section 5.1. The low portfolio's return is negative with -3.37%. There are currencies in the low portfolio from countries lower interest rates than the US. The annualized average return of the AVG portfolio and the middle portfolio are close to zero. The annualized average return of the carry trade portfolio is close to 6%, delivering a Sharpe ratio of 0.62. The annualized average market return is 7.48% and the return of the trade-weighted exchange rate index is 1.45%. The standard deviations are in line with Lustig et al. (2011). The skewness decreases from the low to the high portfolio, and the kurtosis stays just below three. Furthermore, we find that the first order autocorrelation coefficient is only significant at the one percent level for the HML_{FX} portfolio.

The correlations of the portfolios low, middle and high range between 34% and 63%. As expected, the AVG portfolio shows high correlations with the three portfolios. The correlation of the HML_{FX} portfolio is per construction positive with the high and negative with the low portfolio. Whereas the correlations of the trade-weighted exchange rate index and the low, middle and high portfolios range from 39% to 52%, the correlations with the HML_{FX} portfolio that represents iCCTs is close to zero. We interpret the low correlations of the market factor with the portfolio as an indication that CCTs are not primarily driven by macroeconomic conditions in the US.

[Figure 1 about here.]

Figure 1 displays the cumulative discrete returns of the HML_{FX} portfolio, the market return and the trade-weighted exchange rate index. We marked months with a recession in the US according to NBER in gray. Carry trades were especially profitable until the financial crisis in 2008 decreased potential returns. From the financial crisis onwards we see more spikes roughly at the same level until now. The first recession in 2001 goes along with an increase in the HML_{FX} portfolio and an opposite market reaction. Only during the financial crisis we do see a synchronous movement of the two curves. After that the market returns steadily increased until 2016, in contrast to the HML_{FX} portfolio. The FX index does not show such major movements. There is only a smaller peak after 2009 and a slow but steady increase in recent years.

5.4 Pricing of iCCT of Companies

In the next step we want to determine whether iCCTs are priced in the stock market. For this we apply a version of the Fama and MacBeth (1973) approach to see if we find risk premia of iCCTs in the stock returns of companies. Following Chen et al. (1986), we first estimate the exposure of companies' stock returns as in Equation (4). For this time series regression per company we use 60 monthly preceding observations to measure β factors:

$$R_{i,t} = \alpha_i + \beta_{i_1} F_{1,t} + ... + \beta_{i,j} F_{j,t} + \varepsilon_{i,t}. \tag{4}$$

$R_{i,t}$ is the total excess stock return of company i over period t. α_i is the company-specific constant. For F we enter the excess returns $rx_{j,t}$ of the three portfolios j (high, middle and low) at time t together and the HML_{FX}, AVG portfolio and the FX index separately to find if the variations in the stock returns can be attributed to iCCTs. We do not include the AVG portfolio in the estimation of the low, middle and high portfolios, due to multicollinearity. As already stated, the AVG is the average of the three portfolios, which results in a correlation close to 90%. For the same reason we estimate the HML_{FX} portfolio separately. The FX Index is used to determine if the results from the portfolio can be attributed to a mere currency index, which is typically used in the exchange rate exposure literature. We report the result of the FX index to provide evidence that this influence is not the reasons for the pricing of the HML_{FX} portfolio.

The resulting β factors are the corresponding sensitivities of the portfolios. $\varepsilon_{i,t}$ is the idiosyncratic error term. We apply a standard OLS estimator with a correction of the standard errors according to Newey and West (1987) with at least 40 of the 60 observations to produce adequate econometric variance. The standard errors are corrected according to the level of autocorrelation and the presence of heteroscedasticity in the data.

Bessler and Opfer (2003) point out that most of the empirical studies that cover factor models assume that the model coefficients are constant over time. As Fama and French (1988) and Ferson and Harvey (1991) allude to the existence of risk premia varying over time, they use monthly overlapping subsamples to account for the time variability of the β estimation. We also apply this approach and roll over the monthly observations ($t = 1$ to $t = n$) to calculate the model's coefficient for $t = n + 1$ (i.e. for the second coefficient we use $t = 2$ to 61 and so on).[4]

The resulting β are then used to estimate the risk premia λ in the cross-sections for each month:

$$R_i = \lambda_0 + \beta_{i,1}\lambda_1 + ... + \beta_{i,j}\lambda_j + \varepsilon_{i,t}. \tag{5}$$

The risk premia λ are obtained using the Newey and West (1987) correction with a lag selection according to the number of the observations. Next to the overall time period of the β calculation from 2002 until 2016, we also report the results for three five-year subsamples. The time-series means of the risk premia λ are then tested by a t-test for significant differences from zero.

5.5 Analysis of iCCT Exposures of Companies

Next, we seek to analyze which company-specific determinants drive the relevance of iCCTs, i.e. which companies stock returns are more prone to react to iCCTs. For this, we first measure the sensitivities of companies' stock return to the HML_{FX} and AVG portfolio separately. We select the HML_{FX} portfolio and expect a positive impact for companies with costs in a low-interest

[4] Note that we also perform the β estimation as in Fama and MacBeth (1973) and Chen et al. (1986) with yearly rolling observations. Like Fama and MacBeth (1973); Chen et al. (1986) we then use the resulting β as the independent variable in the next twelve cross-sections for each month, with the stock return still being the dependent variable. The results correspond to our chosen estimation technique with monthly rolling observations and are displayed in the robustness checks.

country and earnings in a high-interest country. Keep in mind that the US dollar would be in the low portfolio, thus we expect a positive HML_{FX} sensitivity for a US exporter and a negative one for a US importer. We analyze the AVG portfolio to test the impact on a company with an average exposure to the main US foreign currencies. Again, we expect a positive AVG for exporters and a negative one for importers.

The estimation technique applied is derived from the literature on foreign exchange rate exposure. To estimate exposures to iCCTs, we focus on the linear one-factor model of Adler and Dumas (1984). As the market value of a company is represented by the present value of its future cash flows, the sensitivity of stock returns to variations in exchange rate returns can be considered as the exchange rate exposure.

The model was later amended by Jorion (1991) with a market factor, which lowered the residuals variance. Liu et al. (2015), criticizing this common practice, state that this amendment leaves only a residual exposure to be captured by the coefficient of the exchange rate exposure. As we are interested in the overall impact of interest differentials between countries, we refrain from including a market factor that could proxy the currency effect we are looking for.[5]

In the literature on exchange rate exposure, yearly moving window are often used if the analysis is based on monthly data. For example Chang et al. (2013) use three years $(t+1, t, t-1)$ of monthly data to calculate the exposures of year t with yearly moving windows. Allayannis and Ofek (2001) use both a three-year (1992-1994) and a five-year sample (1991-1995) to estimate each firm's exposure in 1993. Bodnar and Wong (2003) use five-year subsamples of their time frame and the five-year means of the corporate data to explain their exposures. We thus apply a model that is similar to the one stated in Equation (4), with the difference that for t we use

[5]Note that due to the low correlation of the portfolios and the market factor compared to the FX index and the market factor, we expect the proxying effect to not be very large. To further elicit this potential impact, we include a market factor as well as the Fama and French (1993) factors in the robustness checks.

a five-year interval and yearly roll the yearly observations to calculate the β factors:

$$R_{i,t} = \alpha_i + \beta_i F_t + \varepsilon_{i,t}. \tag{6}$$

In contrast to the exchange rate exposure literature we replace the typically used FX index returns with returns from the HML_{FX} and AVG portfolio, respectively, to measure each of their specific currency effect. We thus insert for F the HML_{FX} and AVG portfolio separately and interpret the resulting coefficients of the HML_{FX} and AVG portfolio to the stock returns as the exposure to HML_{FX} and AVG.

In a next step we explain the estimated sensitivities by different company characteristics. The company characteristics are the means of the respective five-year horizon ($t-2$ to $t+2$). The estimation has the following form:

$$\begin{aligned} |\hat{\beta}_{i,t-2,t+2}| = \omega_i + & \phi_1 \ Size_{i,t-2,t+2} + \phi_2 \ For.\ Assets_{i,t-2,t+2} + \phi_3 \ For.\ Sales_{i,t-2,t+2} \\ & + \phi_4 \ Intern.\ Inc._{i,t-2,t+2} + \phi_5 \ Lev._{i,t-2,t+2} + \phi_6 \ Quick_{i,t-2,t+2} \\ & + \phi_7 \ Div.\ p.\ E._{i,t-2,t+2} + \phi_8 \ R\&D_{i,t-2,t+2} + \phi_9 \ M./B._{i,t-2,t+2} \\ & + \eta_{i,t-2,t+2}. \end{aligned} \tag{7}$$

$|\hat{\beta}_{i,t-2,t+2}|$ is the absolute value of the β coefficient of the HML_{FX} or AVG portfolio for company i and the five-year window from year $t-2$ to year $t+2$. We use absolute values and therefore positive and negative $\hat{\beta}_{i,t-2,t+2}$ deviations from zero to analyze all companies at once. We also show the results for positive and negative $\hat{\beta}_{i,t-2,t+2}$ separately. ω_i are the company-specific time-invariant intercepts.

Keep in mind that for positive HML_{FX} or AVG sensitivities, being less exposed corresponds to decreased sensitivities (e.g. because the company in question hedges more). However, for negative HML_{FX} or AVG sensitivities, being less exposed corresponds to increased negative sensitivities (decreased in absolute terms). Thus for the unidirectional effects of company-specific characteristics on all $|\hat{\beta}_{i,t-2,t+2}|$, we will see the opposite direction of effects for positive and negative sensitivities separately. And if a company-specific characteristic shows the same direction of effect on both positive and negative sensitivities separately, the effect on all $|\hat{\beta}_{i,t-2,t+2}|$ is not likely to be significant.

To explain the exposure of companies to iCCTs (HML_{FX} sensitivities) and to AVG exposure, we estimate Equation (7) and first use a fixed-effects panel regression with robust and clustered standard errors on the company level. Secondly, we estimate a feasible generalized least square (FGLS) regression to correct for autocorrelation across periods and heteroscedasticity between the companies' residuals to better account for the time varying estimation windows and the overlapping averages of the company characteristics. Also, recall from Table 2 that we found a significant first autocorrelation coefficient for the HML_{FX} portfolio. As the FGLS estimation specification does not change our results, we place the respective table in Appendix A.

We consider firm size (SIZE) as the log of total assets. Most studies in the literature on foreign exchange rate exposure report a negative influence of this variable, e.g. because larger companies are able to reduce hedging costs or use operation hedging more often, a consideration that would also reduce the exposure to iCCTs or AVG in this study (e.g. Nance et al., 1993). Companies with a higher ratio of foreign assets to total assets (F.ASS.), a foreign to total sales ratio (F.SAL.) or an international to total operating income ratio (INT. INC.) are directly subject to iCCTs if they engage with high-interest-rate countries. If a company's foreign sales increase, but the company does not hedge equivalently, we would expect a positive impact on its iCCT sensitivities. The reaction therefore largely depends on the company's hedging activities. How companies react to this potential exposure of HML_{FX} or AVG has yet to be established (see El-Masry et al., 2007).

We also enter the leverage ratio (LEV.), which represents reactions to higher expected distress costs and define it as total debt to common equity (Muller and Verschoor, 2006). Keep in mind that a reaction to LEV. could also be caused by the fact that higher leveraged companies have riskier equity. The quick ratio (QUICK) and dividend per earnings ratio (DIV.P.E.) both serve as a proxy for a higher short-term liquidity cushion against adverse currency movements. Thus, a company has less need to hedge reactions to interest differentials (He and Ng, 1998). The ratio of research and development expenditures to total sales (R&D) and the market to book ratio (M./B.) of the equity represent companies' growth opportunities. We have yet to analyze whether, for example, research-intensive companies hedge more in order to lower the cost of external financing caused by a higher cash-flow volatility (see Froot et al., 1993) or if such companies are in general younger and trade less with high-interest-rate countries, therefore lowering their exposure to iCCTs. Also we should consider that companies could use R&D to insulate themselves both from domestic and foreign competition.

Table 3 reports summary statistics of the variables that we use to explain the sensitivities of the AVG and HML_{FX} portfolios. We can see that the average foreign assets ratio (8%) is below the international income ratio (11%) and the average foreign sales ratio (21%). The three variables do have a correlation of 51% to 58%, but with different standard deviations and distributions. While there is some correlation between the foreign assets, international income and foreign sales ratio, we conclude that these three different variables do not necessarily go hand in hand with each other. For example, there are certainly companies that provide lots of goods or services to other countries and thus have high foreign sales, but do not produce abroad and thus have low foreign assets (see Section 4) – or conversely, importers that exhibit no foreign sales but do have foreign assets.

Furthermore, some companies report substantial values for the leverage, R&D, and market to book ratio. Turning to the rest of the pairwise correlations, we find low values for almost all variables. With the exception of the foreign assets, sales and international income ratio, we find larger companies to be more likely to exhibit higher foreign assets, sales and dividends per earnings with correlations from 26% to 37% respectively. Also, higher leveraged companies do have a higher market to book ratio.

[Table 3 about here.]

6 Empirical Results

This section first presents the results of the asset pricing test in Section 6.1 and then analyzes of what factors drive the iCCT exposure of companies in Section 6.2.

6.1 Asset Pricing Test

Table 4 reports the estimated beta coefficients, the top panel covering the time frame 2002 to 2016 using five years of preceding data, and the lower panel with the two time frames of 2002 to 2008 and 2009 to 2016. The average sensitivities for the whole time frame show a clear picture of negative coefficients for the low portfolio (-0.337), coefficients close to zero for the middle portfolio (0.051) and positive coefficients for the high portfolio (0.567). Thus, there are companies that react positively, e.g. to the high portfolio, which suggests that there is a considerable number of US export-oriented companies in our sample. The amount of the significant portfolio return coefficients (at the 10% level) ranges between 13 to 21%, while the three portfolios explain 7.2% of the variation in stock returns.

The average sensitivities of the AVG and HML_{FX} portfolio are both positive and about the same size (0.403 and 0.411). Twenty percent of the AVG and 24% of the HML_{FX} coefficients have a significant influence on the 10% level and the two portfolios explain around 3% of the stock returns' variations individually. The results of the FX index differ considerably from the portfolios with an average coefficient of 1.869 and 40% of the significant β-factors on the 10% level.

For the two subsamples we do find some considerable variation. In the subsample for 2002 to 2008, the coefficients of the low and middle portfolio increase in size compared to the overall time frame with the coefficients of the low portfolio still being negative. Consequently, the coefficient of the HML_{FX} portfolio becomes smaller along with the high portfolio and is about half the size compared to the whole time frame. In the subsample for 2009 to 2016, the low, middle and high portfolio again show increasing average coefficients from low to high. Here the middle portfolio is slightly negative.

The FX index shows much higher coefficients for the whole time frame as well as for the sub-periods. The amount of the significant portfolio return coefficients at the 10% level also increases to around 40% for the whole time frame and to 18% in the first sub-period.

[Table 4 about here.]

Table 5 shows the cross-sectional pricing results of the Fama and MacBeth (1973) model in percent. We first focus on Panel A, which considers the whole time frame from February 1997 to December 2016 and reports risk premia for the years 2002 to 2016. All risk premia λ of the portfolios are significant except the low portfolio and the FX index. We see an increasing premium from the low to the high portfolio from 0.044 % to 0.220%. The AVG portfolios' premium is 0.140%, while the HML_{FX} portfolio's premium is slightly higher with 0.185%. The joint F-tests reject the notion that the portfolios' λ are all zero for the whole time frame.

In contrast to the risk premium for the AVG and HML_{FX} portfolio, we do not find a significant risk premium for the FX index in the stock returns for the whole time frame and all subsamples. Even if the FX index does not measure the same currency risk, this still underlines our findings of iCCTs in equity returns.

We now turn to the subsamples in Panel B. For the portfolio estimates of the years 2002 to 2008, we now find a significant risk premium only for the middle portfolio and again a significant AVG portfolio. The HML_{FX} portfolio shows a risk premium close to zero. For the sub-period of 2009 to 2016 we again find increasing risk premia from the low to the high portfolio and increased significant risk premia for the middle and high portfolios as well as for the AVG and the HML_{FX} portfolio.

[Table 5 about here.]

6.2 Analysis of iCCT Exposure

Table 6 reports the exposures of the HML_{FX} and AVG portfolio for the five-year intervals from 1997 to 2016. The number of the observations increases during our time period as more companies enter the sample. For the HML_{FX} portfolio we find an average exposure to iCCTs of 0.423. The carry trades yield a negative influence on the companies' stock returns for the intervals of 1997 to 2002 and 2010 to 2015. For the rest of the intervals we observe positive sensitivities across the companies with peaks in the years 2004 to 2012. The amount of the significant coefficients at the 10% level for the HML_{FX} portfolio varies from 6% to 43%, with an average of 16%, which is in line with the exchange rate exposure literature that also focuses on US multinationals (e.g. Bartram and Bodnar, 2007).

For the AVG portfolio, the sensitivities are mostly positive with peaks in the three intervals of 2004 to 2010 and an average over all intervals of 0.393. We find negative values for the interval of 1998 to 2002 and the intervals of 2009 to 2015. The amount of the significant coefficients at the 10% level varies from 5% to 30%, with an average of 14% across all intervals, which is slightly lower compared to the HML_{FX} portfolio. The R^2 for both portfolios are at about the same level with an average of roughly 3%.[6]

[Table 6 about here.]

Figure 2 displays the cross-sectional distribution of the HML_{FX} and AVG portfolio exposures. For the HML_{FX} sensitivities we see a distinct time variation with positive values in all quantiles for the intervals of 2003 to 2008 until the interval of 2007 to 2012. Here the quantiles follow the mean and median closely for most of the time frame. This is not the case for the AVG sensitivities with a much broader distribution that moderately narrows down over the time frame. For both exposures we see negative impact for the intervals of 2009 to 2014 and onwards.

[Figure 2 about here.]

To further analyze the industry-specific determinants of iCCTs, we use the SIC codes of each company and take the first two digits to sort them into 17 industry sectors as suggested by the OECD. Table 7 reports this industry classification. We can see that the number of companies as well as the estimated coefficients varies between the chosen sectors. We find positive sensitivities for nearly all industries. The average HML_{FX} sensitivity varies between 0.200 for food products, beverages and tobacco (FBT) to 0.677 for mining and quarrying. The only industry sector with a negative average HML_{FX} sensitivity is agriculture, hunting, forestry and fishing (AGR). With only four companies and 54 estimated coefficients this sector is underrepresented in our sample. For the AVG we only find a negative average sensitivities for the construction (CON) industry.

[Table 7 about here.]

[6] Note that we estimate the exposure model of Adler and Dumas (1984) and do not include a market factor to retrieve the total exposure and not a residual one. Therefore, the explained variation of our model decreases.

In the next step we use a fixed-effects regression with, respectively, the HML_{FX} and AVG exposures as the dependent variable, to assign the influence of the above-mentioned explanatory corporate data variables. Table 8 reports their influence for absolute as well as positive and negative sensitivities. As we can see, there are more company-years with a positive exposure to the HML_{FX} factors. The share of positive exposures is even larger for the AVG portfolio.

We find a negative significant absolute effect for the size variable on HML_{FX}. Larger companies hedge more thus lowering their potential exposure to iCCTs. This also applies for negative sensitivities, as the size variable increases the negative exposures, thus reducing the exposure to iCCTs. We confirm the same effect for companies with higher dividends per earnings ratio. A higher short-term liquidity cushion, working as a substitute for hedging activities, reduces the exposure to iCCTs. For the AVG sensitivities we document the same effects of the size and dividends per earnings ratio, which are larger in absolute terms.

We now turn to companies' foreign engagement. Those with a higher foreign assets ratio show a positive reaction to iCCTs for the absolute sensitivities. This positive effect is only significant for positive exposures. Foreign sales are not significant for HML_{FX}, but shows a significant positive effect of 0.901 for negative AVG sensitivities. If a potential (net) US importing company increases its foreign sales, so do its AVG sensitivities. The reduced negative sensitivities are associated with a reduced risk premium for iCCTs. The impact of international income is always positive but only significant for absolute and positive HML_{FX} sensitivities.

If we estimate Equation (7) with a FGLS regression to account for the time varying estimation windows and the overlapping averages of the company characteristics, we get similar results. Only for the foreign engagement variables do we now see a significant absolute positive effect of the foreign sales ratio and an absolute negative effect for the international income ratio. The foreign asset ratio has now a significant positive effect for HML_{FX} exposures below zero. The results are displayed in Table A.1 in the Appendix A. Furthermore, note that by using only the HML_{FX} absolute sensitivities significant at the 10% level, neither the effects nor the significance of the variables changes for either estimation technique.

[Table 8 about here.]

In Table 9 we report the industry-specific effect of the company characteristic variables. In the upper Panel A, we see their effect for the HML_{FX} sensitivities and in the lower Panel B that for the AVG sensitivities. We do not include agriculture, hunting, forestry and fishing due to too few observations for this sector. For presentation purposes we further exclude sectors with a low number of observations and low average HML_{FX} sensitivities. The whole table can be found in Appendix B. In the first row we added the estimation of Equation (7) with the whole sample displayed in Table 8.

We again find a highly significant effect of size and the dividends per earnings. These results do not seem to be driven by differences in industries. For the rest of the results we see differing directions of effect and levels of significance.

[Table 9 about here.]

7 Robustness Checks

In this section we perform additional robustness checks. We show the results from rolling over yearly instead of monthly observations as in Fama and MacBeth (1973), the pricing and explanation of five instead of three portfolios and differences in the explanation of iCCTs that occur if we include a market factor in our exposure model as in Jorion (1991) and thus measure the residual exposure after controlling for a market-wide iCCT influence. Stated briefly, all our results are robust to these modifications. Results that do not vary considerably are displayed in

Appendix C.

7.1 Pricing of iCCTs of Companies: Yearly Rolling Estimation

As already mentioned in Section 5.4, we aim to substantiate the pricing of iCCTs of companies by also adopting the yearly rolling Fama and MacBeth (1973) regression as in Chen et al. (1986). As before, Equation (4) is estimated with five years of monthly preceding observations, applying a standard OLS estimator with the Newey and West (1987) correction with at least 40 of the 60 observations. The resulting coefficients are then applied to the stock returns of the next twelve cross-sections of the subsequent year for the HML_{FX} and AVG portfolios and are thus no longer rolled over monthly. The resulting risk premia are again tested using a t-test for a significant difference from zero.

The results in percent of Equation (5) are displayed in Table C.1 in Appendix C for the years 2002 to 2016 and the two subsamples. Overall, the risk premia of the HML_{FX} and AVG portfolios are slightly smaller than the monthly rolling estimation and show the same significance level for the whole time frame. For the subsample of the years 2009 to 2016 we actually see an even higher level of significance for the HML_{FX} risk premium. We can therefore conclude that choosing a yearly rolling estimation does not alter our findings.

7.2 Pricing iCCTs and Analysis of iCCT Exposure of Companies: Using Five Portfolios

In an additional step we want to check that our choice of portfolio specification does not influence our findings regarding iCCTs. Studies like Menkhoff et al. (2012) or Lustig et al. (2011) sort their chosen currencies into five or six portfolios instead of three, so that the HML_{FX} factor built from five portfolios that invest in high-interest-rate currencies (Portfolio 5) and borrow in low-interest-rate currencies (Portfolio 1) should clearly depict an increased difference between forward premia and forward discounts and thus higher returns with the CCT strategy.

Table 10 reports the summary statistics of Portfolios 1 to 5, and as before of the AVG and HML_{FX} portfolios. As expected, we see that the means of the low (Portfolio 1) and high (Portfolio 5) portfolios are now larger in size. Equally, the HML_{FX} portfolio's average excess return is now 8.95% compared to the 6.04% with only three portfolios. Portfolios 1 and 2 are negative and Portfolios 3 to 5 are positive. Furthermore, the average excess returns of Portfolios 1 to 5 no longer gradually increase, with Portfolio 4 being lower than Portfolio 3. The average excess return of the AVG portfolio is now positive with 0.82%. The standard deviations of all portfolios are higher than in our previous analysis with three portfolios. The same applies for the sharp ratio of the HML_{FX} portfolio.

The skewness no longer shows a decreasing tendency for the low to high portfolios but is still negative for the Portfolios 4 and 5 that contain the currencies with a higher forward premium. The kurtosis is slightly lower for all portfolios compared to the three-portfolio specification. The first order autocorrelation coefficient is no longer significant for the HML_{FX} portfolio. We only find a significant first order autocorrelation for Portfolio 3. The correlations of Portfolios 1 to 5 in the lower panel of Table 10 range from 22% to 66%, similar to the three-portfolio specification. As expected, the HML_{FX} is negatively correlated with Portfolio 1 and positively with Portfolio 5.

[Table 10 about here.]

Next, we present the cross-sectional pricing results using the five portfolios specification. As we can see in Table 11, the risk premia of the HML_{FX} and AVG factors are still significantly priced considering the whole time frame. The premia are only slightly lower than the three-portfolio specification. For the subsamples in the five-portfolio specification, we find a higher significantly priced HML_{FX} factor for the years 2009 to 2016. The AVG factor is still significant for both subsamples.

[Table 11 about here.]

Finally, we analyze the HML_{FX} factor and present the average dollar risk with the AVG factor for the five-portfolio specification. We again aim to clarify which companies' stock returns are most prone to reacting to iCCTs and what company characteristics drive their exposure to iCCTs. In Table D.1 (which can be found in Appendix D) we use the fixed-effects regression with robust and clustered standard errors; we find only slight deviations from the results with the three-portfolio specification. We do not report the FGLS regression as the results are almost identical.

For the HML_{FX} sensitivities, estimated with Equation (6), we find an equal effect with regard to significant size, international income ratio and the dividends per earnings ratio variable compared to Table 8. We no longer find that the foreign assets ratio significantly influences positive coefficients. The leverage ratio is now significant for positive and not for negative HML_{FX} sensitivities. Furthermore, the overall R^2 is slightly increased and we find more positive sensitivities for the HML_{FX} portfolio than before.

For the AVG exposures we find equal effects for the significant size, foreign sales ratio and dividends per earnings ratio. The foreign assets ratio is now only significant for absolute exposures and the international income ratio is now significant for negative coefficients. All in all, using five instead of three portfolios produces higher average excess returns for the HML_{FX} portfolio. Neither the pricing of iCCTs, nor the analysis of iCCT exposures of companies changes considerably due to the altered specification.

7.3 Pricing and Analysis of iCCTs of Companies: Including a Market Factor

In a last step we include a market factor in both Equations (4) and (5) to analyze the pricing of companies' iCCT, as well as in Equation (6) to analyze the iCCT exposure of companies. With this we control for the market-wide impact of iCCT and only measure the residual premium and exposure. Table 12 lists the results of the pricing of iCCTs. With an included market factor the HML_{FX} portfolio is not significant for the time frame as a whole, but does correspond to the results without a market factor for the years 2009 to 2016. The premium for the years 2002 to 2008 is again close to zero. The premium of the AVG portfolio is significant for the whole time frame and the subsample of 2002 to 2008.

[Table 12 about here.]

Table 13 displays the exposures of the HML_{FX} and AVG portfolio for the five-year intervals between 1997 and 2016. In contrast to the model without a market factor, the HML_{FX} exposures are all positive and are much more stable until the intervals of 2010 to 2014 and onwards. The same applies for the average amount of the significant exposures at the 10% level, which also vary only comparatively slightly and range between 5.3% and 16.8%. The market factor flattens out peaks like the ones in the intervals of 2005 to 2009 and 2006 to 2010. The average HML_{FX} exposure over all intervals is also lower, with 0.26 compared to the 0.42 without a market factor. Furthermore, and not surprisingly, the average explained variation in the model with an included market factor increases to over 20%.

For the AVG portfolio we also find some deviations. For the intervals from 1997 to 2007 we report almost exclusively low but negative exposures. Corresponding to the HML_{FX} exposures, we also find low negative exposures for the intervals of 2010 to 2016. The average AVG exposure over all intervals is close to zero and therefore much lower compared to the model without a market factor.

[Table 13 about here.]

The results of Equation (7) of the HML_{FX} and AVG exposures with an included market factor are displayed in Table 14. We do find the same significant effects of the size and the dividends per earnings ratio compared to the model without a market factor. We find a negative exposure for more companies when measuring only the residual exposure after the market-wide impact. Despite the fact that we find the same direction of effect for almost all variables except the international income ratio, the level of significance varies for the foreign engagement variables for the HML_{FX} and AVG exposures. The foreign asset ratio as well as the international income ratio are less significant and the significance of the foreign sales ratio increases for both the HML_{FX} and AVG factors. But the overall impact of the company characteristics on the explanation of iCCTs of companies stays unchanged by the inclusion of a market factor.

[Table 14 about here.]

8 Concluding Remarks

This study empirically examines whether returns from a carry trade strategy, i.e. borrowing low-interest-rate currencies that trade at a forward discount and investing in high-interest-rate currencies that trade at a forward premium, implicitly affect stock returns of US companies. This carry trade strategy has been found to yield excess returns, since currencies with a forward premium depreciate less than expected (or appreciate) under the UIP, a phenomenon that became known as the forward premium puzzle. Companies that are based in a low-interest-rate country such as the US, are prone to react to such currency changes and thus iCCTs if they are not fully hedged. Thus, such companies should be exposed to appreciations of high-interest-rate currencies to the extent of their foreign involvement, for example through their sales or input markets in such countries or more indirectly through competition with foreign companies or foreign suppliers.

In this paper, we do not aim to explain excess returns from CCT with, for example, time-varying risk premia. With our focus on the implicit impact of CCT on stock returns we aim to (i) determine whether iCCTs are priced in the stock returns of US companies at all and if so (ii) which companies and industries are more likely to react to iCCTs. To do so, we first point out the failure of the UIP for almost all currencies in our sample and thus the existence of the forward premium puzzle that gives rise to CCTs. We use trade weights and adjust yearly a portfolio that goes long in currencies with the highest forward premium and short in currencies with the highest forward discount, to account for the international ties and adaptations of an average US company. The return of this portfolio represents the return of iCCTs of an average US company. Following Lustig et al. (2011) we also build a portfolio that represents the average return of a trade-weighted investment in the main US trade partner's exchange rates, financed by the US dollar.

We use a version of the Fama and MacBeth (1973) procedure and find significantly priced risk premia for iCCTs and the average portfolio in the stock returns of 2,113 listed US companies for our considered time frame of 1997 to 2016. In doing so, we detect that the level and the significance of the risk premia vary over time. In the next step, we estimate sensitivities of the iCCT returns on the stock returns in five-year intervals. These sensitivities represent each company's exposure to carry trades. Following the literature on exchange rate exposure, we then explain these sensitivities using different company characteristics. Bigger companies, companies with more dividends per earnings and a higher market-to-book ratio exhibit less exposure to iCCTs. Furthermore, we find that a higher international income ratio increases the exposure to iCCTs. On the industry level we find, for example, that an increased foreign sales ratio decreases the exposure to iCCTs of sectors such as the construction, electricity, gas and water supply and mining and quarrying. Our results are not altered if we include a market factor in our analysis, use five instead of three currency portfolio categories or use a FGLS regression to account for the overlapping interval estimation.

Further research should answer the question of what factors drive the time variation of iCCTs of companies. As this was not the focus of this study, we did not identify reasons for potentially changing hedging behavior of companies or other factors that lower the impact of CCTs in general as the driving force of insignificant risk premia in certain sub-periods. Furthermore, more detailed data about the foreign involvement of each individual company, e.g. the location of each companies' subsidiaries, production, sales and input market, would enable further studies to identify the iCCTs of companies individually and thus more specifically their exposures to certain currencies.

Appendix A Feasible generalized least squares regression

[Table A.1 about here.]

Appendix B Industry breakdown including all sectors

[Table B.1 about here.]

[Table B.2 about here.]

Appendix C Pricing of iCCTs of companies: using yearly rolling observations

[Table C.1 about here.]

Appendix D Analysis of iCCT exposure of companies: using five portfolios

[Table D.1 about here.]

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Tables

Table 1: Violation of the Uncovered Interest Parity

	1997-2016				2004-2016			
Country	α	SE	β	SE	α	SE	β	SE
Argentina	-	-	-	-	-0.000	(0.003)	0.600***	(0.052)
Australia	0.000	(0.003)	0.327	(0.946)	-0.001	(0.004)	0.996	(1.209)
Austria	0.001	(0.002)	-0.532***	(0.086)	-	-	-	-
Belgium	0.001	(0.002)	-0.568***	(0.089)	-	-	-	-
Brazil	-	-	-	-	0.003	(0.007)	-0.118	(0.713)
Canada	0.000	(0.002)	2.050	(1.424)	0.000	(0.002)	2.496	(2.462)
Chile	-	-	-	-	0.002	(0.003)	-0.498	(0.998)
China	-	-	-	-	-0.001*	(0.000)	0.520***	(0.137)
Colombia	-	-	-	-	-0.000	(0.004)	0.830	(0.879)
Eurozone	-	-	-	-	0.002	(0.002)	0.899	(1.570)
Finland	0.001	(0.002)	-0.704***	(0.115)	-	-	-	-
France	0.001	(0.002)	-0.520***	(0.091)	-	-	-	-
Germany	0.001	(0.002)	-0.550***	(0.087)	-	-	-	-
Hong Kong	0.000	(0.000)	-0.063***	(0.095)	-0.000	(0.000)	-0.342***	(0.225)
India	-	-	-	-	0.005	(0.003)	-0.315**	(0.525)
Indonesia	0.009	(0.006)	0.037***	(0.080)	0.002	(0.003)	0.106***	(0.053)
Ireland	0.001	(0.002)	-0.444***	(0.273)	-	-	-	-
Israel	-	-	-	-	-0.002	(0.002)	1.864	(1.656)
Italy	0.001	(0.002)	-0.359***	(0.119)	-	-	-	-
Japan	0.001	(0.003)	0.084	(0.942)	0.002	(0.003)	0.659	(1.335)
Malaysia	0.003	(0.003)	0.212***	(0.045)	0.002	(0.002)	-0.117***	(0.124)
Mexico	0.007***	(0.003)	-0.446***	(0.285)	0.004	(0.004)	0.155	(0.934)
Netherlands	0.001	(0.002)	-0.568***	(0.087)	-	-	-	-
Philippines	0.000	(0.002)	0.858**	(0.361)	0.001	(0.002)	-0.869***	(0.673)
Portugal	0.001	(0.002)	-0.314***	(0.100)	-	-	-	-
Russia	-	-	-	-	-0.003	(0.004)	1.703**	(0.317)
Saudi Arabia	0.000	(0.000)	-0.217***	(0.088)	-0.000	(0.000)	-0.343***	(0.129)
Singapore	-0.000	(0.001)	-0.657***	(0.459)	-0.001	(0.001)	0.756	(0.578)
South Korea	-	-	-	-	0.001	(0.003)	-0.491*	(0.893)
Spain	0.001	(0.002)	-0.305***	(0.093)	-	-	-	-
Sweden	0.002	(0.002)	-0.354*	(0.705)	0.002	(0.003)	0.822	(1.175))
Switzerland	-0.003	(0.002)	-1.615***	(0.869)	-0.002	(0.003)	-1.187	(1.574)
Taiwan	0.001	(0.001)	0.190***	(0.279)	0.000	(0.001)	0.108***	(0.317)
Thailand	0.001	(0.002)	0.400	(0.269)	-0.000	(0.002)	-0.382**	(0.562)
United Kingdom	0.002	(0.002)	-0.175	(1.316)	0.002	(0.002)	1.361	(1.831)
Observations	239				152			
Avg. adj. R^2	0.005				0.030			
F-test	1. All $\beta = 1$: p-value = 0.000				p-value = 0.000			
	2. All $\beta = 0$: p-value = 0.000				p-value = 0.000			
	3. All $\alpha = 0$: p-value = 0.285				p-value = 0.391			

This table shows the UIP test for the currencies of our dataset using a seemingly unrelated regression of Zellner (1962). Currencies with the forward rate available from February 1997 onwards as well as the single Eurozone countries are included in the first column. Currencies that are available from April 2004 onwards are displayed in the second column. The euro replaces the individual currencies of its member states. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We test if $\alpha = 0$ and $\beta = 1$ individually and jointly in the F-tests at the bottom of the table. Standard errors (SE) are given next to the coefficients in parenthesis.

Table 2: Descriptive Statistics

Annualized returns:

Portfolio	Low	Mid.	High	AVG	HML_{FX}	FX index	Market
Mean	-3.37	0.91	2.37	-0.09	6.04	1.45	7.48
	[0.41]	[0.57]	[0.51]	[0.40]	[0.63]	[0.38]	[1.19]
Median	-3.64	1.75	2.72	0.32	6.77	1.41	11.08
Std. dev.	6.37	8.88	7.92	6.13	9.78	5.97	18.46
Sharpe ratio	-0.53	0.10	0.30	-0.01	0.62	0.24	0.41
Skewness	0.34	-0.09	-0.38	-0.02	0.08	0.20	-0.80
Kurtosis	2.79	2.96	2.54	2.64	2.98	2.22	3.00
AC(1)	-0.01	0.10	0.10	0.04	0.15	0.40	0.08
	(0.87)	(0.12)	(0.13)	(0.52)	(0.02)	(0.00)	(0.19)

Correlation:

	Low	Middle	High	AVG	HML_{FX}	FX index	Market
Low	1.00						
Middle	0.52	1.00					
Hig	0.34	0.63	1.00				
AVG	0.73	0.88	0.83	1.00			
HML_{FX}	-0.45	0.20	0.68	0.22	1.00		
FX index	0.48	0.57	0.39	0.58	0.00	1.00	
Market	-0.03	0.08	0.09	0.06	0.11	0.35	1.00

This table reports the mean, median, standard deviation and the Sharpe ratio using annualized monthly returns of the low, middle, high, AVG and HML_{FX} portfolio from 1997 to 2016. AVG represents the average portfolio of the low, middle and high portfolio and HML_{FX} stands for the CCT portfolio, which is long in portfolio high and short in portfolio low. We also show the descriptive statistics of the trade-weighted exchange rate index of the Federal Reserve (FX index) in indirect quotation, whose weights we use in the portfolio construction, and total US market capitalization of Datastream as a market factor (Market) that represents the development of the US stock market. The mean, the median and the standard deviation are given in percentage points. Sharpe Ratios are computed as the annualized means divided by the annualized standard deviations. For the first order autocorrelation coefficients (AC(1)) we used monthly returns. The respective p-values are displayed in parentheses. We also report the standard errors of the average returns in brackets. The lower panel present the respective monthly correlations.

Table 3: Summary statistics and correlations of the explanatory variables

Summary statistics:									
	Size	F.Ass.	F.Sal.	Int.Inc.	Lev.	Quick	Div.p.E.	R&D	M./B.
Obs.	29,202	26,357	27,555	29,545	29,075	28,812	28,950	29,091	27,115
Mean	12.77	0.08	0.21	0.11	1.22	2.85	0.11	2.90	4.49
Median	12.81	0.00	0.09	0.00	0.23	1.41	0.00	0.01	2.27
10% q.	9.86	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.82
90% q.	15.73	0.29	0.60	0.40	1.58	5.41	0.41	0.52	7.14
Std. dev.	2.36	0.15	0.25	0.23	13.99	10.62	0.19	29.41	16.81

Correlation:									
	Size	F.Ass.	F.Sal.	Int.Inc.	Lev.	Quick	Div.p.E.	R&D	M./B.
Size	1.00								
F.Ass.	0.26	1.00							
F.Sal.	0.32	0.58	1.00						
Int.Inc.	0.25	0.51	0.57	1.00					
Lev.	0.04	0.00	0.01	-0.01	1.00				
Quick	-0.21	-0.11	-0.07	-0.07	-0.02	1.00			
Div.p.E.	0.37	0.13	0.08	0.08	-0.01	-0.13	1.00		
R&D	-0.12	-0.05	-0.05	-0.05	-0.00	0.15	-0.06	1.00	
M./B.	-0.05	-0.02	-0.01	-0.02	0.51	0.01	-0.02	0.02	1.00

This table reports the number of observations (Obs.), the mean, the median, the 10% quantile, the 90% quantile, and the standard deviation of the explanatory variables used to explain the iCCT exposure of the AVG and HML_{FX} portfolio. The lower panel presents the respective correlations.

Table 4: Betas of iCCTs of companies

NW		Low	Mid.	High	AVG	HML_{FX}	FX
All	avg. β	-0.337	0.051	0.567	0.403	0.441	1.869
Max. obs. in group			179		179	179	179
Overall obs.			271,976		271,976	271,976	27,1976
sign. 10% level		0.172	0.131	0.210	0.197	0.242	0.404
avg. adj. R^2			0.072		0.028	0.033	0.054
2002-2008	avg. β	-0.075	0.230	0.388	0.512	0.213	1.31
Max. obs. in group			84		84	84	84
Overall obs.			109,686		109,686	109,686	109,686
sign. 10% level		0.140	0.117	0.160	0.159	0.145	0.178
avg. adj. R^2			0.56		0.023	0.021	0.023
2009-2016	avg. β	-0.581	-0.007	0.688	0.434	0.596	2.245
Max. obs. in group			96		96	96	96
Overall obs.			162,290		162,290	162,290	162,290
sign. 10% level		0.194	0.140	0.244	0.250	0.307	0.556
avg. adj. R^2			0.083		0.035	0.041	0.075

This table shows the β factors as specified in Equation (4). We roll over monthly observations. For each estimation we use the monthly data of five preceding years, with at least 40 observations. The displayed β factors are the average coefficients with the companies' stock return as the depended variable. The low, middle and high portfolios are estimated together and the AVG, HML_{FX} and FX index separately. To account for outliners of the companies' sensitivities, we winsorize 0.5% of the estimated β factors at each end. We also show the average R^2 as well as the perceptual number of the, on the 10% level, significant β factors.

Table 5: Pricing of iCCTs of companies

FMB		Low	Mid.	High	AVG	HML_{FX}	FX
Panel A	λ	0.044	0.172**	0.220**	0.140**	0.185*	0.066
2002-2016	(t)	(1.473)	(2.418)	(2.214)	(2.578)	(1.696)	(0.967)
F-test			4.306		6.646	2.876	0.936
p-value			0.006		0.011	0.092	0.335
adj. R^2			0.011		0.005	0.005	0.010
Panel B	λ	0.054	0.096*	0.066	0.076**	0.018	0.006
2002-2008	(t)	(1.196)	(1.679)	(1.313)	(2.048)	(0.259)	(0.096)
F-test			1.991		4.195	0.067	0.009
p-value			0.122		0.044	0.796	0.923
adj. R^2			0.009		0.003	0.003	0.008
Subsample	λ	0.035	0.237**	0.353**	0.196**	0.330*	0.118
2009-2016	(t)	(0.789)	(2.057)	(2.148)	(2.173)	(1.889)	(1.104)
F-test			3.156		4.722	3.568	1.220
p-value			0.028		0.032	0.062	0.272
adj. R^2			0.014		0.006	0.008	0.011

This table reports the FMB results of the cross-sectional pricing of the low, middle and high, AVG, HML_{FX} portfolios as well as the FX index on the companies' stock returns. The low, middle and high portfolio are calculated together and the rest of the variables separately. We display the risk premia λ and the respective t-statistics in parenthesis. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. In the above Panel A, we show the results for the whole time frame of February 1997 to 2016, which are calculated using 60 month of preceding data points and rolling monthly observations. In the lower Panel B, we conduct the analysis for sub-periods for β. For every FMB procedure we provide the time observations of estimated β, the overall observations for every company, the F-test with the respective p-value and the adjusted R^2.

Table 6: Betas of iCCTs of companies

Interval	Obs.	HML_{FX} $\hat{\beta}$	HML_{FX} SN*	HML_{FX} R^2	AVG $\hat{\beta}$	AVG SN*	AVG R^2
1997-2001	1,136	-0.261	0.061	0.016	0.277	0.045	0.015
1998-2002	1,201	-0.072	0.061	0.021	-0.206	0.058	0.017
1999-2003	1,290	0.318	0.093	0.021	0.085	0.059	0.017
2000-2004	1,326	0.387	0.107	0.025	0.371	0.062	0.017
2001-2005	1,353	0.051	0.084	0.018	0.318	0.073	0.017
2002-2006	1,374	0.327	0.084	0.018	0.580	0.080	0.017
2003-2007	1,416	0.144	0.069	0.016	0.692	0.095	0.019
2004-2008	1,474	0.943	0.334	0.056	1.526	0.302	0.054
2005-2009	1,529	1.171	0.405	0.066	1.420	0.282	0.050
2006-2010	1,612	1.267	0.427	0.066	1.284	0.251	0.045
2007-2011	1,660	0.874	0.187	0.041	0.803	0.120	0.029
2008-2012	1,674	0.904	0.069	0.018	0.679	0.107	0.027
2009-2013	1,736	0.287	0.069	0.018	-0.350	0.099	0.019
2010-2014	1,785	-0.260	0.141	0.019	-0.610	0.208	0.031
2011-2015	1,849	-0.101	0.088	0.016	-0.620	0.205	0.029
2012-2016	1,926	0.519	0.186	0.023	0.011	0.124	0.018
	24,341	0.423	0.162	0.031	0.393	0.136	0.027

This table shows the β factors for the HML_{FX} and AVG portfolio using a Newey and West (1987) estimator. The number of lags is obtained from an autocorrelation test. For each estimation we use the monthly data of five-year intervals, with at least 40 observations. The displayed β factors are the average coefficients of each interval with the companies' stock return as the dependent variable. The AVG and HML_{FX} portfolio are estimated separately. Consistent with the pricing of iCCT of companies, we account for outliners of the companies' sensitivities by winsorizing 0.5% of the estimated β factors at each end. We also show the average R^2 as well as the percentage amount of the significant β factors (SN) at the 10% level. Significance level: * p<10%

Table 7: Industry classification of companies

Industry sector		Description	SIC Codes	Comp.	Coef.	HML_{FX}	AVG
1	AGR	Agriculture, hunting, forestry and fishing	01-09	4	54	-0.187	0.346
2	BFP	Basic metals and fabricated metal products	33-34	71	959	0.525	0.463
3	BUS	Business services	73	294	2,793	0.275	0.254
4	CMP	Chemicals and non-metallic mineral products	28-30, 32	331	3,601	0.352	0.477
5	CON	Construction	15-17	23	299	0.807	-0.034
6	EGW	Electricity, gas and water supply	49	58	586	0.206	0.287
7	EOQ	Electrical and optical equipment	36, 38	387	4,892	0.372	0.388
8	FBT	Food products, beverages and tobacco	20-21	61	761	0.200	0.279
9	MEN	Machinery and equipment, nec	35	120	1,583	0.531	0.336
10	MNR	Manufacturing nec; recycling	25, 39	27	385	0.587	0.346
11	MQA	Mining and quarrying	10-14	85	982	0.677	0.375
12	OSE	Other services	27, 75-89, 91-99	185	1,670	0.507	0.449
13	TLF	Textiles, textile products, leather and footwear	22-23, 31	21	277	0.825	0.506
14	TPT	Transport and storage, post and telecommunication	40-48	94	1,049	0.261	0.515
15	TRQ	Transport equipment	37	77	943	0.360	0.605
16	WPP	Wood, paper, paper products, printing and publishing	24, 26-27	48	568	0.450	0.361
17	WRH	Wholesale and retail trade; Hotels and restaurants	50-59, 70	227	2,939	0.597	0.395
	All			2,113	24,341	0.423	0.392

This table displays the industry breakdown into 17 sectors according to the OECD. We only include non-financial companies. We also report the corresponding SIC codes, the number of companies in each industry (Comp.) as well as the amount of estimated coefficients of the HML_{FX} and AVG portfolios (Coef.). Furthermore, we added the average coefficients of the HML_{FX} and AVG portfolios for each industry sector.

Table 8: Fixed-effects regression for HML_{FX} and AVG

	HML_{FX}-$\hat{\beta}_{i,t-2,t+2}$			AVG-$\hat{\beta}_{i,t-2,t+2}$		
	$\lvert\hat{\beta}\rvert$	$\hat{\beta} > 0$	$\hat{\beta} < 0$	$\lvert\hat{\beta}\rvert$	$\hat{\beta} > 0$	$\hat{\beta} < 0$
Size	-0.146***	-0.095***	0.180***	-0.404***	-0.461***	0.270***
	(-7.002)	(-3.562)	(5.649)	(-11.973)	(-9.485)	(6.138)
F.Ass.	0.197	0.312**	-0.050	0.363**	0.398*	-0.381
	(1.547)	(2.125)	(-0.198)	(2.077)	(1.650)	(-1.599)
F.Sal.	0.006	0.021	0.170	-0.599***	-0.234	0.901***
	(0.053)	(0.129)	(1.170)	(-3.257)	(-1.023)	(2.984)
Int.Inc.	0.139**	0.216***	0.060	0.043	0.071	0.180
	(2.468)	(3.419)	(0.631)	(0.510)	(0.618)	(1.393)
Lev.	-0.001	-0.000	0.002***	-0.001	0.000	0.000
	(-1.505)	(-0.286)	(2.646)	(-0.808)	(0.212)	(0.122)
Quick	-0.002	-0.001	0.002	-0.006	-0.009	-0.001
	(-0.521)	(-0.198)	(0.318)	(-0.880)	(-0.965)	(-0.123)
Div.p.E.	-0.436***	-0.461***	0.344***	-0.622***	-0.728***	0.456***
	(-5.617)	(-4.897)	(3.106)	(-6.012)	(-4.933)	(3.111)
R&D	-0.000	-0.000**	0.000	0.000	0.001***	0.000**
	(-0.002)	(-2.195)	(1.142)	(0.058)	(2.835)	(2.251)
M./B.	-0.001***	-0.002**	-0.001	0.001	0.000	-0.001
	(-2.768)	(-2.510)	(-1.339)	(0.321)	(0.124)	(-0.884)
overall R^2	0.067	0.056	0.126	0.111	0.120	0.076
adj. R^2	0.018	0.013	0.032	0.052	0.042	0.053
F-test	16.072	10.672	8.716	32.646	18.504	13.482
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Obs.	21,812	12,574	9,238	21,812	14,532	7,280

Dependent variables: the sensitivities of the HML_{FX} and AVG portfolio that represent the exposure to iCCTs of companies. Absolute values of the coefficients are used for the first regressions. For the latter the sign of the coefficients is used to separate the sample into positive and negative values. All regressions are estimated using a fixed-effects panel regression with robust and clustered standard errors on the company level. T-statistics are given in parentheses. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We also report the overall R^2, the adjusted R^2, the joint F-test with the respective p-value and the overall observations (Obs.).

Table 9: Fixed-effects regression for each industry sector with HML_{FX}

Panel A HML_{FX}	$\lvert\hat{\beta}\rvert$ All	2 BFP	3 BUS	4 CMP	5 CON	6 EGW	7 EOQ	9 MEN	11 MQA	12 OSE	13 TLF	17 WRH
Size	-0.15***	-0.09	-0.24***	-0.19***	0.32	-0.10	-0.13***	-0.11	-0.24***	-0.17**	-0.12	-0.05
	(-7.00)	(-0.68)	(-4.35)	(-3.52)	(1.60)	(-1.24)	(-3.28)	(-1.63)	(-3.11)	(-2.09)	(-0.43)	(-0.86)
F.Ass.	0.20	1.39***	0.09	0.05	1.71*	0.48	-0.02	0.66**	1.31*	0.34	2.42**	-0.33
	(1.55)	(2.94)	(0.25)	(0.12)	(2.03)	(0.65)	(-0.11)	(2.22)	(1.79)	(0.50)	(2.81)	(-0.65)
F.Sal.	0.01	0.20	0.01	0.40	-3.14***	-1.60***	-0.23	0.22	-1.14**	-0.07	-0.65	0.69
	(0.05)	(0.42)	(0.03)	(1.10)	(-3.26)	(-3.02)	(-1.16)	(0.87)	(-2.29)	(-0.17)	(-0.34)	(1.38)
Int.Inc.	0.14**	-0.28	0.21**	0.12	-0.09	-0.19	0.27***	0.20	-0.33*	-0.15	1.02	0.42
	(2.47)	(-0.68)	(2.11)	(0.74)	(-0.27)	(-0.59)	(2.60)	(1.50)	(-1.85)	(-0.53)	(1.28)	(1.16)
Lev.	-0.00	0.04	0.00	-0.00	0.04	0.02	-0.00	-0.00	0.06	-0.00	0.28**	0.00
	(-1.51)	(1.03)	(0.46)	(-0.36)	(0.23)	(0.99)	(-1.27)	(-0.66)	(1.33)	(-0.66)	(2.55)	(0.28)
Quick	-0.00	-0.02	0.03	-0.00	-0.06	-0.03*	-0.00	0.02	0.02	0.01	0.13	-0.06**
	(-0.52)	(-1.27)	(0.94)	(-0.52)	(-0.29)	(-1.97)	(-0.72)	(0.66)	(0.84)	(0.92)	(0.61)	(-2.00)
Div.p.E.	-0.44***	-0.37	-0.37	-0.46*	-0.99**	-0.58**	-0.20	-0.88***	-0.56	-0.39	-0.97	-0.52*
	(-5.62)	(-1.46)	(-1.55)	(-1.77)	(-2.21)	(-2.27)	(-1.33)	(-3.18)	(-1.41)	(-1.27)	(-1.16)	(-1.94)
R&D	-0.00	0.26	0.03***	-0.00	72.67	0.54	-0.00	0.01***	-0.06**	0.00***	-5.11	0.30**
	(-0.00)	(1.08)	(8.00)	(-0.30)	(1.12)	(1.51)	(-1.10)	(4.82)	(-2.23)	(3.32)	(-0.42)	(2.38)
M./B.	-0.00***	-0.03	-0.01	-0.00**	0.30***	-0.01**	-0.00	0.00	-0.03	0.00	-0.18	-0.01***
	(-2.77)	(-1.35)	(-0.77)	(-2.28)	(3.04)	(-2.09)	(-0.22)	(0.38)	(-1.35)	(0.12)	(-1.45)	(-2.89)
overall R^2	0.07	0.07	0.08	0.08	0.04	0.15	0.05	0.08	0.14	0.03	0.19	0.03
adj. R^2	0.02	0.07	0.05	0.02	0.08	0.08	0.02	0.03	0.05	0.02	0.14	0.02
F	16.07	500.37	75.65	4.40	22.76	7.74	63.98	5.86	3.61	13.56	9.47	3.26
F-test	16.07	500.37	75.65	4.40	22.76	7.74	63.98	5.86	3.61	13.56	9.47	3.26
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Obs.	21,812	878	2,564	3,292	277	518	4,262	1,440	851	1,437	243	2,655

Panel B AVG	$\lvert\hat{\beta}\rvert$ All	2 BFP	3 BUS	4 CMP	5 CON	6 EGW	7 EOQ	9 MEN	11 MQA	12 OSE	13 TLF	17 WRH
Size	-0.40***	-0.14	-0.43***	-0.55***	-0.94*	-0.33***	-0.37***	-0.29***	-0.29***	-0.64***	-0.45*	-0.21***
	(-11.97)	(-0.74)	(-4.95)	(-6.46)	(-1.90)	(-3.79)	(-4.71)	(-3.48)	(-2.78)	(-4.22)	(-2.05)	(-2.78)
F.Ass.	0.36**	1.48**	0.38	0.34	-1.23	1.00	0.48	0.51	-0.33	-0.89	1.38	-0.38
	(2.08)	(2.13)	(0.74)	(0.69)	(-0.75)	(1.37)	(1.62)	(1.25)	(-0.27)	(-1.14)	(0.73)	(-0.62)
F.Sal.	-0.60***	0.41	-1.89***	-0.48	2.93	-2.32***	-0.92***	-0.27	-0.14	0.17	-0.59	-0.67
	(-3.26)	(0.53)	(-2.70)	(-0.98)	(1.45)	(-3.64)	(-2.95)	(-0.72)	(-0.20)	(0.20)	(-0.36)	(-0.86)
Int.Inc.	0.04	-0.16	0.18	0.02	-0.99***	0.32	0.16	-0.09	-0.30	-0.34	0.56	0.23
	(0.51)	(-0.50)	(0.72)	(0.06)	(-2.95)	(0.44)	(1.08)	(-0.43)	(-0.75)	(-1.02)	(0.81)	(0.60)
Lev.	-0.00	0.03	-0.00	0.01	0.15	0.07**	-0.00**	-0.01	0.00	-0.00	0.24**	0.00
	(-0.81)	(0.85)	(-0.04)	(0.40)	(0.66)	(2.51)	(-2.06)	(-0.74)	(0.03)	(-1.21)	(2.29)	(0.47)
Quick	-0.01	-0.19***	0.04	-0.01	0.38	0.14**	-0.01	-0.03	-0.03*	0.00	-0.20	-0.10**
	(-0.88)	(-7.05)	(0.85)	(-0.41)	(1.17)	(2.09)	(-0.73)	(-0.96)	(-1.93)	(0.18)	(-0.71)	(-2.19)
Div.p.E.	-0.62***	-0.62*	-0.24	-0.52	-0.61	-0.87**	-0.82***	-0.77**	-1.36**	-0.40	-0.02	-0.67**
	(-6.01)	(-1.79)	(-0.75)	(-1.46)	(-0.85)	(-2.54)	(-2.91)	(-2.10)	(-2.59)	(-0.81)	(-0.02)	(-2.45)
R&D	0.00	0.44	0.01*	0.00	1.00	1.02	-0.00	0.01*	-0.08	0.00	-25.79**	0.48***
	(0.06)	(1.06)	(1.96)	(0.12)	(0.03)	(1.60)	(-0.43)	(1.88)	(-0.58)	(0.39)	(-2.09)	(3.62)
M./B.	0.00	-0.02	0.02	-0.00	0.25	-0.05***	0.00***	0.01	-0.00	0.00	-0.11	-0.01***
	(0.32)	(-0.98)	(1.36)	(-0.43)	(1.60)	(-4.38)	(2.99)	(1.52)	(-0.10)	(0.08)	(-1.12)	(-2.75)
overall R^2	0.11	0.06	0.08	0.13	0.05	0.17	0.10	0.10	0.12	0.08	0.06	0.09
adj. R^2	0.05	0.11	0.08	0.07	0.15	0.20	0.06	0.03	0.03	0.09	0.05	0.03
F-test	32.65	21.71	7.95	7.13	3.91	21.11	14.66	3.16	2.82	15.08	4.38	8.80
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Obs.	21,812	878	2,564	3,292	277	518	4,262	1,440	851	1,437	243	2,655

Dependent variables: the sensitivities of the HML_{FX} portfolio that represent the exposure to iCCTs of companies in Panel A and the sensitivities of the AVG portfolio in the lower Panel B. Absolute values of the coefficients are used for each of the first regressions. All regressions are estimated using a fixed-effects panel regression with robust and clustered standard errors on the company level. T-statistics are given in parentheses. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We also report the overall and adjusted R^2, the joint F-test with the respective p-value and the overall Observations (Obs.). We used the industry breakdown displayed in Table 7 to divide the sample into 17 sectors. We do not include the agriculture, hunting, forestry and fishing sector due to the the insufficient number of observations. For presentation purposes we further exclude sectors with a low number of observations and low average HML_{FX} sensitivities (food products, beverages and tobacco; manufacturing nec, recycling; transport and storage, post and telecommunication; transport equipment; wood, paper, paper products, printing and publishing). The table with all industries is displayed in the Appendix B.

Table 10: Pricing and explanation of iCCTs using five portfolios

Annualized returns:

Portfolio	1	2	3	4	5	AVG	HML_{FX}
Mean	-4.04	-1.81	1.41	0.58	4.55	0.82	8.95
	[0.43]	[0.63]	[0.55]	[0.58]	[0.55]	[0.42]	[0.66]
Median	-4.59	-1.99	1.15	1.93	3.98	0.23	9.91
Std. dev.	6.59	9.76	8.52	8.91	8.49	6.57	10.27
Sharpe ratio	-0.61	-0.19	0.17	0.07	0.54	0.12	0.87
Skewness	0.04	0.19	0.17	-0.42	-0.11	0.01	0.04
Kurtosis	1.80	2.21	3.45	2.19	2.27	2.63	2.43
AC(1)	-0.05	-0.01	0.14	0.10	0.07	0.06	0.05
	(0.48)	(0.86)	(0.03)	(0.11)	(0.29)	(0.38)	(0.45)

Correlation:

	1	2	3	4	5	AVG	HML_{FX}
1	1.00						
2	0.45	1.00					
3	0.36	0.66	1.00				
4	0.22	0.51	0.54	1.00			
5	0.33	0.50	0.61	0.59	1.00		
AVG	0.60	0.82	0.82	0.77	0.80	1.00	
HML_{FX}	-0.51	0.09	0.26	0.36	0.65	0.24	1.00

This table reports the mean, median, standard deviation and the Sharpe ratio using annualized monthly returns of the portfolio 1 to 5 (from low to high forward premiums), AVG and HML_{FX} portfolio from 1997 to 2016. AVG represents the average portfolio of the low, middle and high portfolio and HML_{FX} stands for the CCT portfolio, which is long in portfolio high and short in portfolio low. We also show the descriptive statistics of the trade-weighted exchange rate index of the Federal Reserve (FX index) in indirect quotation, whose weights we use in the portfolio construction, and total US market capitalization of Datastream as a market factor (Market) that represents the development of the US stock market. The mean, the median and the standard deviation are given in percentage points. Sharpe Ratios are computed as the annualized means divided by the annualized standard deviations. For the first order autocorrelation coefficients (AC(1)) we used monthly returns. The respective p-values are displayed in parentheses. We also report the standard errors of the average returns in brackets. The lower panel presents the respective monthly correlations.

Table 11: Pricing of iCCTs of companies with five portfolios

FMB		All	Subsamples	
		2002-2016	2002-2008	2009-2016
HML_{FX}	λ	0.145*	-0.022	0.289**
	(t)	(1.663)	(-0.323)	(2.010)
F-test		2.767	0.104	4.039
p-value		0.098	0.748	0.047
adj. R^2		0.005	0.002	0.007
AVG	λ	0.136**	0.066	0.196**
	(t)	(2.286)	(1.614)	(1.995)
F-test		5.227	2.604	3.981
p-value		0.023	0.110	0.049
adj. R^2		0.005	0.003	0.006

This table reports the FMB results of the cross-sectional pricing of the HML_{FX} and AVG portfolio on the companies' stock returns separately. The two portfolios are retrieved from Portfolios 1 to 5 (low to high forward premium). We display the risk premia λ and the respective t-statistics in parenthesis. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We show the results for the time frame of February 1997 to 2016 and sub-periods, which are calculated using five years of consecutive monthly data points and monthly rolling over observations. We also display the F-test with the respective p-value and the adjusted R^2.

Table 12: Pricing of iCCTs of companies with included market

FMB		All	Subsamples	
		2002-2016	2002-2008	2009-2016
HML_{FX}	λ	0.113	-0.038	0.243*
	(t)	(1.340)	(-0.528)	(1.754)
F-test		0.908	1.645	2.324
p-value		0.405	0.199	0.103
adj. R^2		0.010	0.013	0.008
AVG	λ	0.116**	0.104**	0.127
	(t)	(2.295)	(2.628)	(1.454)
F-test		2.663	5.020	1.964
p-value		0.073	0.009	0.146
adj. R^2		0.011	0.013	0.010

This table reports the FMB results of the cross-sectional pricing of the HML_{FX} and AVG portfolio on the companies' stock returns separately with an included market factor. We display the risk premia λ and the respective t-statistics in parenthesis. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We show the results for the time frame of February 1997 to 2016 and sub-periods, which are calculated using five years of consecutive monthly data points and monthly rolling over observations. We also display the F-test with the respective p-value and the adjusted R^2.

Table 13: Betas of iCCTs of companies with an included market factor

		HML_{FX}			AVG		
Interval	Obs.	$\hat{\beta}$	SN*	R^2	$\hat{\beta}$	SN*	R^2
1997-2001	1,136	0.243	0.053	0.118	-0.042	0.066	0.119
1998-2002	1,201	0.316	0.065	0.135	-0.044	0.075	0.135
1999-2003	1,290	0.382	0.080	0.134	0.002	0.090	0.136
2000-2004	1,326	0.319	0.077	0.147	-0.100	0.101	0.153
2001-2005	1,353	0.575	0.094	0.178	-0.253	0.088	0.178
2002-2006	1,374	0.639	0.100	0.168	-0.046	0.070	0.165
2003-2007	1,416	0.339	0.094	0.151	-0.018	0.076	0.149
2004-2008	1,474	0.262	0.145	0.217	0.104	0.167	0.218
2005-2009	1,529	0.433	0.168	0.245	0.124	0.126	0.238
2006-2010	1,612	0.445	0.153	0.265	0.271	0.168	0.262
2007-2011	1,660	0.369	0.161	0.283	0.258	0.178	0.280
2008-2012	1,674	0.324	0.156	0.288	0.216	0.173	0.286
2009-2013	1,736	0.251	0.122	0.249	0.066	0.124	0.246
2010-2014	1,785	-0.061	0.143	0.237	-0.001	0.150	0.235
2011-2015	1,849	-0.190	0.163	0.198	-0.072	0.168	0.196
2012-2016	1,926	-0.148	0.149	0.161	-0.019	0.113	0.158
	24,341	0.260	0.120	0.204	0.035	0.121	0.202

This table shows the β factors for the HML_{FX} and AVG portfolios using a Newey and West (1987) estimator including a market factor. The number of lags is obtained from an autocorrelation test. For each estimation we use the monthly data of five-year intervals, with at least 40 observations. The displayed β factors are the average coefficients of each interval with the companies' stock return as the dependent variable. The AVG and HML_{FX} portfolio are estimated separately. Consistent with the pricing of iCCT of companies, we account for outliners of the companies' sensitivities by winsorizing 0.5% of the estimated β factors at each end. We also show the average R^2 as well as the percentage amount of the significant β factors (SN) at the 10% level. Significance level: * p<10%

Table 14: Fixed-effects regression for HML_{FX} and AVG with included market factor

	HML_{FX}-$\hat{\beta}_{i,t-2,t+2}$			AVG-$\hat{\beta}_{i,t-2,t+2}$		
	$\|\hat{\beta}\|$	$\hat{\beta} > 0$	$\hat{\beta} < 0$	$\|\hat{\beta}\|$	$\hat{\beta} > 0$	$\hat{\beta} < 0$
Size	-0.210***	-0.178***	0.221***	-0.457***	-0.537***	0.296***
	(-10.388)	(-6.561)	(7.408)	(-13.849)	(-10.558)	(7.398)
F.Ass.	0.118	0.232*	-0.009	0.190	0.075	-0.171
	(1.021)	(1.655)	(-0.049)	(1.122)	(0.295)	(-0.805)
F.Sal.	-0.228**	-0.299*	0.255*	-0.738***	-0.520**	0.893***
	(-2.031)	(-1.837)	(1.683)	(-4.386)	(-2.188)	(3.668)
Int.Inc.	-0.008	0.101*	0.098	-0.033	-0.043	0.147
	(-0.183)	(1.660)	(1.472)	(-0.420)	(-0.339)	(1.417)
Lev.	0.000	0.001	0.000	-0.001	0.001	0.001
	(0.297)	(1.581)	(0.736)	(-0.722)	(0.456)	(1.487)
Quick	0.003	0.006	-0.000	-0.003	-0.008	-0.002
	(0.722)	(0.877)	(-0.080)	(-0.416)	(-0.811)	(-0.325)
Div.p.E.	-0.299***	-0.174**	0.272***	-0.459***	-0.555***	0.404***
	(-4.722)	(-2.118)	(2.769)	(-4.676)	(-3.787)	(3.047)
R&D	0.000***	-0.000	-0.000***	-0.000	0.000**	0.000
	(5.113)	(-1.512)	(-3.627)	(-0.600)	(2.065)	(1.270)
M./B.	-0.001***	-0.002***	0.000	-0.000	0.000	-0.001
	(-2.635)	(-2.623)	(0.586)	(-0.154)	(0.098)	(-1.054)
overall R^2	0.114	0.091	0.134	0.138	0.156	0.096
adj. R^2	0.038	0.029	0.038	0.073	0.064	0.063
F-test	26.091	9.512	14.633	39.860	20.951	16.805
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Obs.	21,804	11,480	10,324	21,804	11,753	10,051

Dependent variables: the sensitivities of the HML_{FX} and AVG portfolio that represent the exposure to iCCTs of companies, which were estimated including a market factor. Thus, the sensitivities represent the residual exposure after the market-wide influence. Absolute values of the coefficients are used for the first regressions. For the latter the sign of the coefficients is used to separate the sample into positive and negative values. All regressions are estimated using a fixed-effects panel regression with robust and clustered standard errors on the company level. T-statistics are given in parentheses. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We also report the overall and adjusted R^2, the joint F-test with the respective p-value and the overall observations (Obs.).

Table A.1: Feasible generalized least squares regression for HML_{FX} and AVG

	HML_{FX}-$\hat{\beta}_{i,t-2,t+2}$			AVG-$\hat{\beta}_{i,t-2,t+2}$		
	$\lvert\hat{\beta}\rvert$	$\hat{\beta}>0$	$\hat{\beta}<0$	$\lvert\hat{\beta}\rvert$	$\hat{\beta}>0$	$\hat{\beta}<0$
Size	-0.051***	-0.043***	0.071***	-0.106***	-0.117***	0.079***
	(-17.987)	(-12.009)	(14.976)	(-24.725)	(-22.760)	(19.349)
F.Ass.	-0.004	0.035	0.118***	0.188***	0.243***	-0.048
	(-0.095)	(0.657)	(2.805)	(3.111)	(3.665)	(-0.830)
F.Sal.	0.054*	0.057	-0.056	-0.044	-0.002	0.027
	(1.855)	(1.602)	(-1.602)	(-1.069)	(-0.037)	(0.672)
Int.Inc.	-0.046*	-0.040	-0.063**	-0.058*	-0.122***	0.061
	(-1.860)	(-1.413)	(-2.302)	(-1.665)	(-3.350)	(1.633)
Lev.	0.000	0.001	0.001*	-0.000	-0.000	-0.000
	(0.574)	(1.299)	(1.659)	(-0.137)	(-0.202)	(-0.104)
Quick	-0.001	-0.004*	-0.003**	-0.001	-0.006**	-0.007**
	(-0.522)	(-1.660)	(-2.283)	(-0.356)	(-2.138)	(-1.970)
Div.p.E.	-0.510***	-0.561***	0.162***	-0.628***	-0.678***	0.503***
	(-22.161)	(-19.343)	(5.404)	(-19.132)	(-17.088)	(14.968)
R&D	0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.949)	(-1.411)	(-0.702)	(0.458)	(0.885)	(0.443)
M./B.	-0.000	-0.001**	-0.000	0.000	0.000	-0.000
	(-1.299)	(-2.304)	(-1.075)	(0.982)	(0.494)	(-0.941)
$cor(\hat{\beta},\hat{\hat{\beta}})^2$	0.080	0.073	0.129	0.125	0.134	0.102
N	21,722	14,374	7,070	21,722	12,438	9,084

Dependent variables: the sensitivities of the HML_{FX} and AVG portfolio that represent the exposure to iCCTs of companies. Absolute values of the coefficients are used for the first regressions. For the latter the sign of the coefficients is used to separate the sample into positive and negative values. All regressions are estimated using a feasible generalized least square regression to correct for autocorrelation across periods and heteroskedasticity between the residuals on the firm level. The T-statistics are given in parentheses. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We also report the squared correlation (cor) of the estimated exposures and fitted values of the dependent variable, as a standard R^2 statistic is not useful as a diagnostic tool for GLS regressions.

Table B.1: Fixed-effects regression for each industry sector with HML_{FX}

	$\lvert\hat{\beta}\rvert$ All	2 BFP	3 BUS	4 CMP	5 CON	6 EGW	7 EOQ	8 FBT	9 MEN	10 MNR	11 MQA	12 OSE	13 TLF	14 TPT	15 TRQ	16 WPP	17 WRH
Size	-0.15***	-0.09	-0.24***	-0.19***	0.32	-0.10	-0.13***	-0.02	-0.11	-0.63*	-0.24***	-0.17**	-0.12	-0.17*	0.06	-0.04	-0.05
	(-7.00)	(-0.68)	(-4.35)	(-3.52)	(1.60)	(-1.24)	(-3.28)	(-0.23)	(-1.63)	(-1.92)	(-3.11)	(-2.09)	(-0.43)	(-1.83)	(0.53)	(-0.28)	(-0.86)
F.Ass.	0.20	1.39***	0.09	0.05	1.71*	0.48	-0.02	-0.02	0.66**	-0.94	1.31*	0.34	2.42**	-0.74	1.97**	-0.69	-0.33
	(1.55)	(2.94)	(0.25)	(0.12)	(2.03)	(0.65)	(-0.11)	(-0.03)	(2.22)	(-1.35)	(1.79)	(0.50)	(2.81)	(-0.82)	(2.11)	(-0.81)	(-0.65)
F.Sal.	0.01	0.20	0.01	0.40	-3.14***	-1.60***	-0.23	-0.44	0.22	1.54	-1.14**	-0.07	-0.65	-0.56	0.71	-0.11	0.69
	(0.05)	(0.42)	(0.03)	(1.10)	(-3.26)	(-3.02)	(-1.16)	(-0.66)	(0.87)	(1.22)	(-2.29)	(-0.17)	(-0.34)	(-0.56)	(1.07)	(-0.10)	(1.38)
Int.Inc.	0.14**	-0.28	0.21**	0.12	-0.09	-0.19	0.27***	0.56*	0.20	-0.36	-0.33*	-0.15	1.02	-0.17	-0.40	-0.03	0.42
	(2.47)	(-0.68)	(2.11)	(0.74)	(-0.27)	(-0.59)	(2.60)	(1.93)	(1.50)	(-1.04)	(-1.85)	(-0.53)	(1.28)	(-0.33)	(-1.28)	(-0.08)	(1.16)
Lev.	-0.00	0.04	0.00	-0.00	0.04	0.02	-0.00	0.03**	-0.00	0.00	0.06	-0.00	0.28**	0.01	-0.04***	0.11**	0.00
	(-1.51)	(1.03)	(0.46)	(-0.36)	(0.23)	(0.99)	(-1.27)	(2.60)	(-0.66)	(0.03)	(1.33)	(-0.66)	(2.55)	(0.83)	(-2.87)	(2.24)	(0.28)
Quick	-0.00	-0.02	0.03	-0.00	-0.06	-0.03*	-0.00	0.01	0.02	-0.03**	0.02	0.01	0.13	-0.11	-0.16*	0.00	-0.06**
	(-0.52)	(-1.27)	(0.94)	(-0.52)	(-0.29)	(-1.97)	(-0.72)	(0.14)	(0.66)	(-2.46)	(0.84)	(0.92)	(0.61)	(-0.85)	(-1.97)	(0.30)	(-2.00)
Div.p.E.	-0.44***	-0.37	-0.37	-0.46*	-0.99**	-0.58**	-0.20	-1.13***	-0.88***	-0.42	-0.56	-0.39	-0.97	-0.41	-0.03	0.06	-0.52*
	(-5.62)	(-1.46)	(-1.55)	(-1.77)	(-2.21)	(-2.27)	(-1.33)	(-3.17)	(-3.18)	(-0.77)	(-1.41)	(-1.27)	(-1.16)	(-1.47)	(-0.09)	(0.22)	(-1.94)
R&D	-0.00	0.26	0.03***	-0.00	72.67	0.54	-0.00	1.27***	0.01***	-0.10	-0.06**	0.00***	-5.11	-0.04***	0.05	-0.04**	0.30**
	(-0.00)	(1.08)	(8.00)	(-0.30)	(1.12)	(1.51)	(-1.10)	(2.80)	(4.82)	(-0.09)	(-2.23)	(3.32)	(-0.42)	(-2.64)	(1.25)	(-2.67)	(2.38)
M./B.	-0.00***	-0.03	-0.01	-0.00**	0.30***	-0.01**	-0.00	-0.00	0.00	-0.00	-0.03	0.00	-0.18	-0.00	0.03**	-0.05*	-0.01***
	(-2.77)	(-1.35)	(-0.77)	(-2.28)	(3.04)	(-2.09)	(-0.22)	(-1.06)	(0.38)	(-0.07)	(-1.35)	(0.12)	(-1.45)	(-0.07)	(2.09)	(-1.80)	(-2.89)
overall R^2	0.07	0.07	0.08	0.08	0.04	0.15	0.05	0.13	0.08	0.09	0.14	0.03	0.19	0.08	0.00	0.11	0.03
adj. R^2	0.02	0.07	0.05	0.02	0.08	0.08	0.02	0.10	0.03	0.08	0.05	0.02	0.14	0.05	0.06	0.05	0.02
F-test	16.07	500.37	75.65	4.40	22.76	7.74	63.98	3.55	5.86	2.63	3.61	13.56	9.47	354.33	3.58	490.77	3.26
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Obs.	21,812	878	2,564	3,292	277	518	4,262	677	1,440	348	851	1,437	243	942	825	543	2,655

Dependent variables: the sensitivities of the HML_{FX} portfolio that represent the exposure to iCCTs of companies. Absolute values of the coefficients are used for each of the first regressions. All regressions are estimated using a fixed-effects panel regression with robust and clustered standard errors on the company level. T-statistics are given in parentheses. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We also report the overall and adjusted R^2, the joint F-test with the respective p-value and the overall observations (Obs.). We used the industry breakdown displayed in Table 7 to divide the sample into 17 sectors. We do not include the agriculture, hunting, forestry and fishing sector due to the insufficient number of observations.

Table B.2: Fixed-effects regression for each industry sector with *AVG*

	$\lvert\hat{\beta}\rvert$ All	2 BFP	3 BUS	4 CMP	5 CON	6 EGW	7 EOQ	8 FBT	9 MEN	10 MNR	11 MQA	12 OSE	13 TLF	14 TPT	15 TRQ	16 WPP	17 WRH
Size	-0.40***	-0.14	-0.43***	-0.55***	-0.94*	-0.33***	-0.37***	-0.36***	-0.29***	-0.25	-0.29***	-0.64***	-0.45*	-0.53***	-0.26	-0.07	-0.21***
	(-11.97)	(-0.74)	(-4.95)	(-6.46)	(-1.90)	(-3.79)	(-4.71)	(-3.08)	(-3.48)	(-1.01)	(-2.78)	(-4.22)	(-2.05)	(-2.75)	(-1.19)	(-0.42)	(-2.78)
F.Ass.	0.36**	1.48**	0.38	0.34	-1.23	1.00	0.48	-0.10	0.51	-1.49	-0.33	-0.89	1.38	-2.57	1.19	-0.05	-0.38
	(2.08)	(2.13)	(0.74)	(0.69)	(-0.75)	(1.37)	(1.62)	(-0.12)	(1.25)	(-1.64)	(-0.27)	(-1.14)	(0.73)	(-1.15)	(1.40)	(-0.07)	(-0.62)
F.Sal.	-0.60***	0.41	-1.89***	-0.48	2.93	-2.32***	-0.92***	0.51	-0.27	1.07	-0.14	0.17	-0.59	-0.37	1.10	0.48	-0.67
	(-3.26)	(0.53)	(-2.70)	(-0.98)	(1.45)	(-3.64)	(-2.95)	(0.73)	(-0.72)	(0.90)	(-0.20)	(0.20)	(-0.36)	(-0.27)	(1.54)	(0.54)	(-0.86)
Int.Inc.	0.04	-0.16	0.18	0.02	-0.99***	0.32	0.16	0.42	-0.09	-0.15	-0.30	-0.34	0.56	0.55	-0.06	-0.48	0.23
	(0.51)	(-0.50)	(0.72)	(0.06)	(-2.95)	(0.44)	(1.08)	(1.38)	(-0.43)	(-0.41)	(-0.75)	(-1.02)	(0.81)	(1.12)	(-0.23)	(-1.64)	(0.60)
Lev.	-0.00	0.03	-0.00	0.01	0.15	0.07**	-0.00**	0.01	-0.01	0.01	0.00	-0.00	0.24**	-0.01	-0.02	0.07**	0.00
	(-0.81)	(0.85)	(-0.04)	(0.40)	(0.66)	(2.51)	(-2.06)	(0.91)	(-0.74)	(0.23)	(0.03)	(-1.21)	(2.29)	(-0.32)	(-0.64)	(2.47)	(0.47)
Quick	-0.01	-0.19***	0.04	-0.01	0.38	0.14**	-0.01	0.03	-0.03	-0.01	-0.03*	0.00	-0.20	-0.08	-0.16	0.01**	-0.10**
	(-0.88)	(-7.05)	(0.85)	(-0.41)	(1.17)	(2.09)	(-0.73)	(1.13)	(-0.96)	(-1.05)	(-1.93)	(0.18)	(-0.71)	(-0.39)	(-1.09)	(2.41)	(-2.19)
Div.p.E.	-0.62***	-0.62*	-0.24	-0.52	-0.61	-0.87**	-0.82***	-1.03**	-0.77**	-1.01**	-1.36**	-0.40	-0.02	-0.71	0.10	-0.66*	-0.67**
	(-6.01)	(-1.79)	(-0.75)	(-1.46)	(-0.85)	(-2.54)	(-2.91)	(-2.16)	(-2.10)	(-2.58)	(-2.59)	(-0.81)	(-0.02)	(-1.64)	(0.18)	(-1.83)	(-2.45)
R&D	0.00	0.44	0.01*	0.00	1.00	1.02	-0.00	-1.13***	0.01*	0.83	-0.08	0.00	-25.79**	0.10***	0.13**	0.09***	0.48***
	(0.06)	(1.06)	(1.96)	(0.12)	(0.03)	(1.60)	(-0.43)	(-7.16)	(1.88)	(1.00)	(-0.58)	(0.39)	(-2.09)	(3.41)	(2.03)	(4.85)	(3.62)
M./B.	0.00	-0.02	0.02	-0.00	0.25	-0.05***	0.00***	-0.00	0.01	-0.01	-0.00	0.00	-0.11	0.01	0.01	-0.03	-0.01***
	(0.32)	(-0.98)	(1.36)	(-0.43)	(1.60)	(-4.38)	(2.99)	(-0.16)	(1.52)	(-0.60)	(-0.10)	(0.08)	(-1.12)	(0.69)	(0.93)	(-1.02)	(-2.75)
overall R^2	0.11	0.06	0.08	0.13	0.05	0.17	0.10	0.15	0.10	0.09	0.12	0.08	0.06	0.08	0.09	0.12	0.09
adj. R^2	0.05	0.11	0.08	0.07	0.15	0.20	0.06	0.06	0.03	0.07	0.03	0.09	0.05	0.10	0.02	0.02	0.03
F-test	32.65	21.71	7.95	7.13	3.91	21.11	14.66	10.86	3.16	13.81	2.82	15.08	4.38	1454.17	29.17	2582.69	8.80
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Obs.	21,812	878	2,564	3,292	277	518	4,262	677	1,440	348	851	1,437	243	942	825	543	2,655

Dependent variables: the sensitivities of the *AVG* portfolio that represent the exposure to iCCTs of companies. Absolute values of the coefficients are used for each of the first regressions. All regressions are estimated using a fixed-effects panel regression with robust and clustered standard errors on the company level. T-statistics are given in parentheses. The coefficients are tagged with the respective significance levels: * $p<10\%$, ** $p<5\%$, *** $p<1\%$. We also report the overall and adjusted R^2, the joint F-test with the respective p-value and the overall observations (Obs.). We used the industry breakdown displayed in Table 7 to divide the sample into 17 sectors. We do not include the agriculture, hunting, forestry and fishing sector due to the insufficient number of observations.

Table C.1: Yearly pricing of iCCTs of companies

FMB		All	Subsamples	
		2002-2016	2002-2008	2009-2016
HML_{FX}	λ	0.163*	-0.032	0.334**
	(t)	(1.670)	(-0.452)	(2.002)
F-test		2.787	0.205	4.008
p-value		0.097	0.652	0.048
adj. R^2		0.005	0.002	0.007
AVG	λ	0.129**	0.053	0.195*
	(t)	(2.312)	(1.586)	(1.961)
F-test		5.345	2.515	3.846
p-value		0.022	0.117	0.053
adj. R^2		0.004	0.003	0.006

This table reports the FMB results of the cross-sectional pricing of the HML_{FX} and AVG portfolio on the companies' stock returns separately. We display the risk premia λ and the respective t-statistics in parenthesis. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We show the results for the time frame of February 1997 to 2016 and sub-periods, which are calculated using five years of consecutive monthly data points and yearly rolling over observations. We also display the F-test with the respective p-value and the adjusted R^2.

Table D.1: Fixed-effects regression for HML_{FX} and AVG using five portfolios

	HML_{FX}-$\hat{\beta}_{i,t-2,t+2}$			AVG-$\hat{\beta}_{i,t-2,t+2}$		
	$\lvert\hat{\beta}\rvert$	$\hat{\beta} > 0$	$\hat{\beta} < 0$	$\lvert\hat{\beta}\rvert$	$\hat{\beta} > 0$	$\hat{\beta} < 0$
Size	-0.187***	-0.198***	0.163***	-0.410***	-0.468***	0.287***
	(-8.689)	(-6.482)	(6.548)	(-12.709)	(-9.992)	(7.044)
F.Ass.	0.221	0.189	-0.050	0.368**	0.304	-0.349
	(1.533)	(1.017)	(-0.244)	(2.198)	(1.318)	(-1.611)
F.Sal.	-0.026	-0.006	0.158	-0.583***	-0.273	0.794***
	(-0.189)	(-0.031)	(1.128)	(-3.365)	(-1.213)	(2.884)
Int.Inc.	0.260***	0.315***	-0.066	0.043	0.098	0.226*
	(4.218)	(4.268)	(-0.848)	(0.545)	(0.923)	(1.872)
Lev.	0.000	0.001**	0.000	-0.001	-0.000	0.001
	(1.138)	(2.494)	(0.376)	(-1.011)	(-0.135)	(0.949)
Quick	-0.005	-0.002	0.007**	-0.006	-0.005	0.003
	(-1.424)	(-0.307)	(2.004)	(-0.956)	(-0.562)	(0.353)
Div.p.E.	-0.577***	-0.646***	0.528***	-0.594***	-0.732***	0.457***
	(-6.655)	(-5.446)	(5.019)	(-6.148)	(-5.064)	(3.253)
R&D	0.000*	-0.000**	-0.000	-0.000	0.000	0.000*
	(1.710)	(-2.172)	(-1.454)	(-0.510)	(1.592)	(1.876)
M./B.	-0.001***	-0.002***	-0.001	0.001	0.000	-0.001
	(-2.657)	(-2.987)	(-1.000)	(0.375)	(0.398)	(-1.159)
overall R^2	0.071	0.063	0.130	0.111	0.123	0.075
adj. R^2	0.025	0.022	0.036	0.056	0.045	0.060
F-test	21.604	13.748	11.621	35.872	19.484	15.560
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Obs.	21,804	13,934	7,870	21,804	12,480	9,324

Dependent variables: the sensitivities of the HML_{FX} and AVG portfolio that represent the exposure to iCCTs of companies. Absolute values of the coefficients are used for the first regressions. For the latter the sign of the coefficients is used to separate the sample into positive and negative values. All regressions are estimated using a fixed-effects panel regression with robust and clustered standard errors on the company level. T-statistics are given in parentheses. The coefficients are tagged with the respective significance levels: * p<10%, ** p<5%, *** p<1%. We also report the overall and adjusted R^2, the joint F-test with the respective p-value and the overall observations (Obs.).

Figures

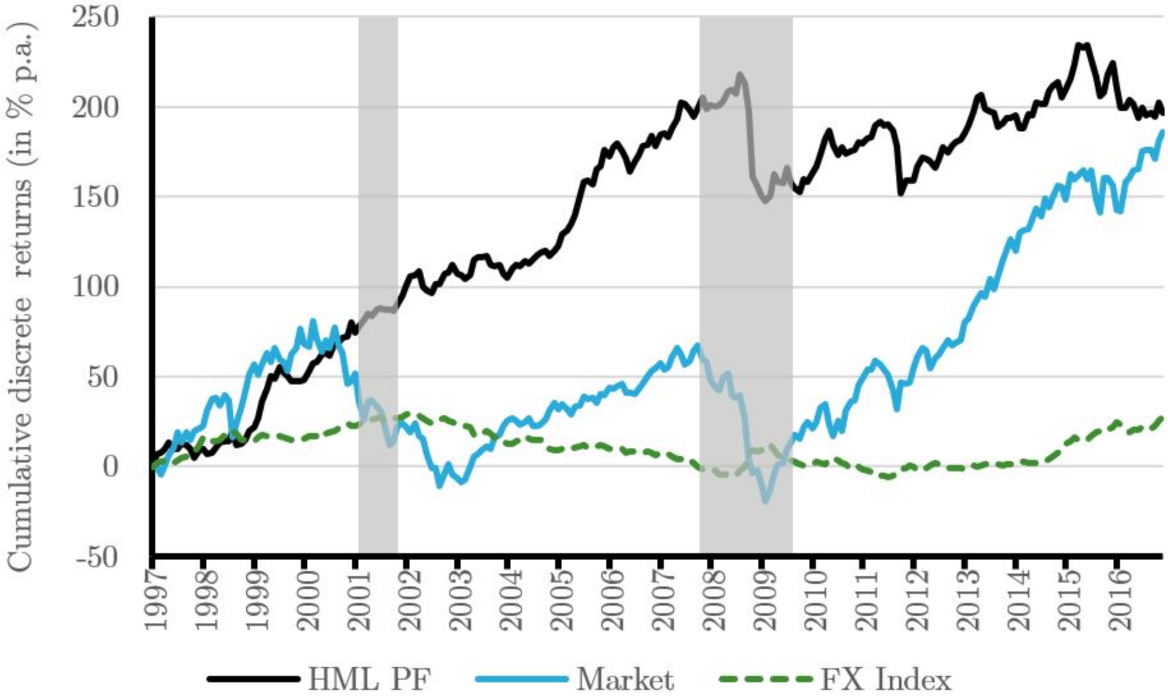

Figure 1: Cumulative returns of the HML_{FX} portfolio, the market return and the FX index

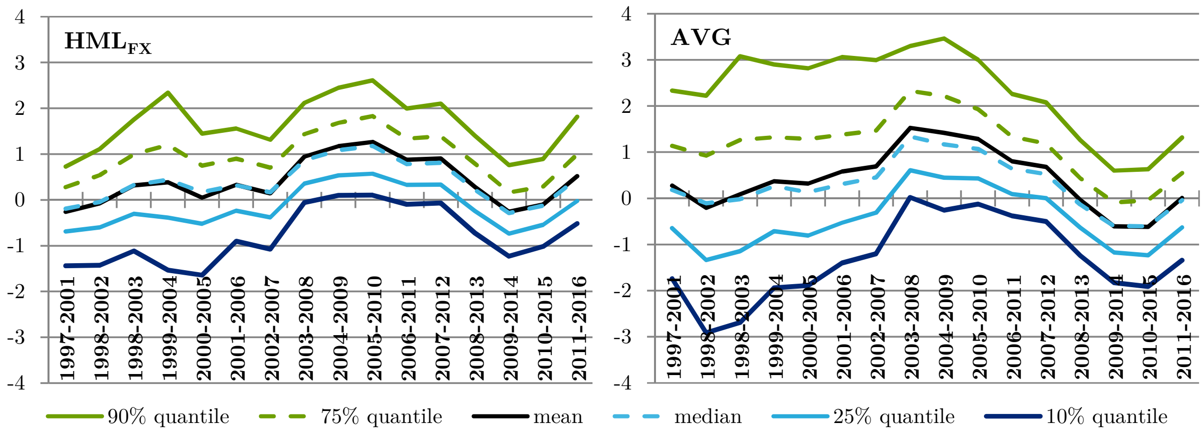

Figure 2: Cross-sectional distribution of the sensitivities of the HML_{FX} and AVG portfolio to stock returns of US companies

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