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The Carry Trade: Risks and Drawdowns – *Online Appendix*

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ABSTRACT

This document is the online appendix for "The Carry Trade: Risks and Drawdowns," by Kent Daniel, Robert J. Hodrick, and Zhongjin Lu (***add full reference when available***)

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A Additional Tables

Table A1 provides distributional information on the risk factors examined in the paper. Table A2 examines the carry trade exposures to the downside risk measure of Lettau *et al.* (2014) but uses two alternative cutoffs for determining downside-risk.

B Estimation of Unconditional Moments and GMM Standard Errors

In all of the Tables in the paper, we use standard GMM as developed by Hansen (1982) to estimate the parameters and their standard errors, which are presented in parentheses or are used to construct t-statistics that are presented in square brackets. This section describes the calculation of the parameter estimators and their standard errors. their standard errors.

Let μ denote the sample mean, σ denote the standard deviation, γ_3 denote sample standardized skewness, and γ_4 denote sample standardized kurtosis. The four orthogonality conditions are

$$\begin{aligned} E\left(r_t\right)-\mu &= 0 \\ E\left[(r_t-\mu)^2\right]-\sigma^2 &= 0 \\ \frac{E\left[(r_t-\mu)^3\right]}{\sigma^3}-\gamma_3 &= 0 \\ \frac{E\left[(r_t-\mu)^4\right]}{\sigma^4}-\gamma_4-3 &= 0 \end{aligned}$$

Let $\theta=\left(\mu,\sigma,\gamma_3,\gamma_4\right)'$, let $g_T(\theta)$ denote the sample mean of the orthogonality conditions for a sample of size T, and let S_T denote an estimate of the variance of the sample moments for which we use three Newey and West (1987) lags. Hansen (1982) demonstrates that choosing the parameter estimates to minimize $g_T(\theta)'S_T^{-1}g_T(\theta)$ produces asymptotically unbiased estimates of the parameters with asymptotic variance $\frac{1}{T}(D_T'S_T^{-1}D_T)^{-1}$, where D_T is the gradient of $g_T(\theta)$ with respect to θ. The Sharpe ratio is defined to be $SR=\frac{\mu}{\sigma}$, and the variance of SR is found by the delta method:

$$var(SR)=\frac{1}{T}\left[\begin{array}{cccc}\frac{1}{\sigma} & \frac{-\mu}{\sigma^2} & 0 & 0\end{array}\right](D_T'S_T^{-1}D_T)^{-1}\left[\begin{array}{cccc}\frac{1}{\sigma} & \frac{-\mu}{\sigma^2} & 0 & 0\end{array}\right]'$$

Table A1: Summary Statistics of Risk Factors (Monthly Returns)

Description: This table reports the summary statistics of the risk factors, which are all monthly returns, used in this study. These risks include the three equity market factors constructed by Fama and French (1993), the two pure foreign exchange factors constructed by Lustig *et al.* (2011), the returns on two USD bond market factors, the return on a variance swap, and the downside risk index (DRI) constructed by Jurek and Stafford (2015). The reported parameters, mean, standard deviation, skewness, excess kurtosis, and autocorrelation coefficient, and their associated standard errors are simultaneous GMM estimates. The Sharpe ratio is the ratio of the annualized mean and standard deviation, and its standard error is calculated using the delta method (see Appendix B). The sample period for the DRI summary statistics is 1990:1-2013:7.

	1976:02-2013:08					1990:2-2013:8						1983:11-2013:8		
	Mkt	SMB	HML	10y-1M	10y-2y	Mkt	SMB	HML	10y-1M	10y-2y	V Swap	RX	HML_{FX}	DRI
Mean Ret (% p.a.)	7.01	3.04	3.75	3.08	1.49	7.20	2.51	2.95	3.92	2.14	-17.24	2.47	7.85	9.42
	(2.62)	(1.70)	(1.91)	(1.37)	(0.96)	(3.37)	(2.25)	(2.60)	(1.44)	(1.13)	(3.93)	(1.42)	(1.82)	(1.43)
Standard Dev.	15.54	10.49	10.25	8.11	6.04	15.29	11.55	11.04	6.95	5.70	12.15	7.02	8.97	6.70
	(0.84)	(1.08)	(0.74)	(0.41)	(0.32)	(0.98)	(1.53)	(1.04)	(0.42)	(0.42)	(5.37)	(0.35)	(0.50)	(0.94)
Sharpe Ratio	0.45	0.29	0.37	0.38	0.25	0.47	0.22	0.27	0.56	0.38	-1.42	0.35	0.88	1.41
	(0.18)	(0.16)	(0.19)	(0.17)	(0.16)	(0.24)	(0.19)	(0.23)	(0.21)	(0.20)	(0.92)	(0.21)	(0.23)	(0.38)
Skewness	-0.73	0.55	0.02	0.18	0.23	-0.65	0.82	0.08	0.03	0.05	8.63	-0.25	-0.59	-2.92
	(0.27)	(0.47)	(0.33)	(0.18)	(0.19)	(0.21)	(0.48)	(0.40)	(0.26)	(0.30)	(9.98)	(0.14)	(0.21)	(0.48)
Excess Kurt.	2.20	8.00	2.72	1.07	1.29	1.11	8.17	2.86	1.06	1.72	117.16	0.69	1.29	13.57
	(1.14)	(3.73)	(0.68)	(0.36)	(0.46)	(0.62)	(3.21)	(0.70)	(0.59)	(0.74)	(212.58)	(0.28)	(0.59)	(3.79)
Autocorr.	0.08	0.00	0.16	0.08	0.01	0.09	-0.04	0.15	0.08	0.04	0.44	0.00	0.11	0.12
	(0.05)	(0.06)	(0.06)	(0.05)	(0.05)	(0.07)	(0.07)	(0.08)	(0.05)	(0.06)	(0.27)	(0.06)	(0.07)	(0.08)
Max (%)	12.5	22.0	13.9	9.5	7.3	11.3	22.0	13.9	8.5	7.3	48.1	5.8	8.8	5.2
Min (%)	-23.2	-16.4	-12.7	-7.6	-6.0	-17.2	-16.4	-12.7	-6.7	-6.0	-10.8	-6.9	-10.4	-13.0
No. Positive	270	239	248	243	236	176	144	149	158	157	42	200	236	239
No. Negative	181	212	203	208	215	107	139	134	125	126	241	158	122	44

Table A2: Carry Trade Exposures to Downside Market Risk (Alternative Cutoff Values for Downside Risk Cutoff)

Description: This table replicates Panel B of Table 8 for alternative downside risk cutoffs. Specifically, both panels present estimated coefficients and GMM-based standard errors for the monthly regression

$$R_t = \alpha^- + \beta^- \cdot R_{m,t} + \epsilon_t,$$

where $R_{m,t}$ is the CRSP value-weighted market return minus the one-month Treasury bill return. However, these regressions are only estimated for observations for which $R_{m,t}$ is below some cutoff level. In Panel A, the cutoff level is $\overline{R_{m,t}}$, the sample mean of $R_{m,t}$, and in Panel B the cutoff is zero. (Note that in Panel B of Table 8, the cutoff used is the same as in Lettau *et al.* (2014): the sample mean of $R_{m,t}$ minus the sample standard deviation of $R_{m,t}$.) In each panel, we also report the $\chi^2(1)$ statistic that tests the difference between β^- and β from the full sample regression (see Panel A of Table 8), and the p-value associated with that χ^2 statistic. The sample period is 1976:02-2013:08 (451 observations). The α^- estimates presented here are annualized, and GMM-based autocorrelation and heteroskedasticity consistent t-statistics are given in square brackets.

Strategy:	EQ	SPD	EQ-RR	SPD-RR	OPT	EQ-0$	EQ-$	EQ-D$
				Panel A: $R_{m,t} < \overline{R_{m,t}}$				
α^-	6.52	10.76	8.88	10.99	1.93	3.47	3.05	8.40
	(3.56)	(4.30)	(3.58)	(4.70)	(2.21)	(2.66)	(2.36)	(3.14)
β^-	0.06	0.12	0.09	0.11	0.02	0.10	-0.04	-0.02
	(1.79)	(2.32)	(1.77)	(2.47)	(0.90)	(3.76)	(-1.43)	(-0.37)
$\chi^2(1)$	1.11	1.60	1.92	4.62	0.04	3.75	0.34	0.05
p-value	0.29	0.21	0.17	0.03	0.83	0.05	0.56	0.82
				Panel B: $R_{m,t} < 0$				
α^-	6.49	10.62	8.41	9.83	1.76	3.05	3.44	8.92
	(3.33)	(3.76)	(3.03)	(3.72)	(1.77)	(2.14)	(2.37)	(2.82)
β^-	0.06	0.12	0.08	0.10	0.02	0.10	-0.03	-0.02
	(1.69)	(2.16)	(1.50)	(1.95)	(0.74)	(3.27)	(-1.14)	(-0.23)
$\chi^2(1)$	0.92	1.22	1.13	2.29	0.00	2.22	0.09	0.00
p-value	0.34	0.27	0.29	0.13	0.95	0.14	0.76	0.95

C The Role of Measurement Currency on Carry-Trade Returns in Continuous Time

C.1 Motivation

Casual intuition suggests that the rate of appreciation of the measurement currency—the currency in which carry-trade returns are measured—relative to that of other currencies should influence the measured performance of a given carry strategy: if all other currencies depreciate relative to a particular measurement currency over a particular sample period, this should cause the measured performance of the carry strategy to be lower in that sample period.

However, slightly more sophisticated intuition would lead one to conclude that the measurement currency shouldn't matter because the carry-trade is a zero investment portfolio. Putting this in the context of a simple example, suppose the AUD interest rate is 5%/year and the JPY interest rate is 0%/year. To take advantage of the carry (the disparity in interest rates), a US based investor could purchase $1 (ie., 1 USD) worth of the Australian Dollar (AUD) which she would deposit in an Australian bank earning 5%/year. To finance this purchase, she would borrow $1 worth of Japanese Yen at a 0% rate of interest. If, over the space of a year, the JPY doesn't appreciate relative to the AUD, she would earn $0.05 (5%), assuming the USD/JPY/AUD exchange rates all remain constant. Note also that this profit wouldn't be greatly affected by the relative appreciation or depreciation of the US dollar: if the USD were to depreciate by 5% relative to both the Yen and AUD, she would lose about $0.05 on the long position in the AUD, but would gain the same amount from her short position in the Yen.[1]

What if we instead consider a European investor who borrows and invests €1 instead of $1, and measures his return in Euros? Well, again this reasoning suggests it isn't going to make much difference. His profit is still going to be about €0.05 (i.e., a 5% return) if the AUD-JPY exchange rate remains unchanged. So by this (specious) argument, the measurement

[1]Note that this reasoning isn't exact, which is exactly what leads to the result in this section. Given the interest rate differential, if the JPY/AUD exchange rate remains constant over the year, and the USD appreciates by 5%, the USD return would be 4.76% ($= 1.05/1.05 - 1.00/1.05$). On the other hand, if the USD depreciates by 5%, your return will be 5.25%.($= 1.05 * 1.05 - 1.00 * 1.05$). This non-linearity that leads to the result in this section.

currency won't matter.

It turns out that both of these arguments are incorrect. What we show here is that, when currency returns follow a diffusion process, the rate of drift of the measurement currency relative to other currencies does not play a role in the measured performance of any given carry-trade strategy. Intuitively, the carry trade is a zero-investment (long-short) strategy, so appreciation of the measurement currency relative to all other currencies not only drives down the performance of the long-side of the strategy, but it also drives up the performance of the short-side of the strategy by an equal amount. Nevertheless, this does not mean that the choice of measurement currency has no effect on the measured performance of the carry trade. The covariance between carry-trade returns in a particular currency and the return of the measurement currency relative to that particular currency influences the measured return to the carry strategy.

C.2 Basic Assumptions

We assume that a standard stochastic process governs the evolution of the exchange rate between any two currencies. Specifically, let S_t^{ij} denote the currency i price of one unit of currency j at time t. The stochastic process for the exchange rate is assumed to follow

$$\frac{dS_t^{ij}}{S_t^{ij}} = \mu_t^{ij} dt + \sigma^{ij} dZ_t^{ij}, \tag{C1}$$

where dZ_t^{ij} represents a standard Brownian motion. When $\mu^{ij} > 0$, currency j appreciates on average relative to currency i.

We also assume the existence of a risk-free bond in each currency whose value evolves according to

$$\frac{dB_t^j}{B_t^j} = i_t^j dt, \tag{C2}$$

where i_t^j is the continuously compounded risk-free rate in currency j.

C.3 Calculating the Strategy Returns, Measured in Currency 1:

To provide a concrete example, we assume without loss of generality that there are four currencies: h (a high-interest-rate currency), l (a low-interest-rate currency), m_1 (measurement currency 1), and m_2 (measurement currency 2). We will compare the stochastic processes governing the evolution of the values of a carry trade implemented in the two measurement currencies. In each strategy, we go long the high-interest-rate currency and short the low-interest-rate currency. Thus, the carry trade positions are the same for the two strategies; only the measurement currency differs. Note that the analysis here is valid if one of the measurement currencies is the same as the high-interest-rate or low-interest-rate currency.

For each strategy, we construct a long-short portfolio with a leverage of 1. Specifically, at time 0 we invest 1 unit of capital in the risk-free asset of the measurement currency. We also finance a long position in the high-interest-rate currency equivalent to 1 unit of the measurement currency by borrowing an equal value of the low-interest-rate currency. Thus, at $t = 0$, the value of the strategy is $V_0^m = 1$. As the value of the portfolio moves up or down over time with gains or losses on the carry trade, we continuously rebalance the portfolio. Specifically, if the value of the portfolio at time t is V_t^m, we trade in or out of currency h and l so that both the amount invested in the high-interest-rate currency and the amount borrowed in the low-interest-rate currency are both equal to V_t^m. Note that this ensures that the amount invested in the measurement currency will also be V_t^m.

Given these assumptions, over the interval from t to $t + dt$, the value of the carry trade in measurement currency 1 evolves from $V_t^{m_1}$ to $V_{t+dt}^{m_1}$ according to

$$V_{t+dt}^{m_1} = V_t^{m_1}\left[(1 + i_t^{m_1} dt) + \frac{S_{t+dt}^{m_1 h}}{S_t^{m_1 h}}(1 + i_t^h dt) - \frac{S_{t+dt}^{m_1 l}}{S_t^{m_1 l}}(1 + i_t^l dt)\right], \quad \text{(C3)}$$

where the three terms reflect the following: the interest earned on the measurement currency; the interest earned on the high-interest-rate currency plus the appreciation in that currency relative to the measurement currency; and the cost of the interest on the low-interest-rate currency adjusted for the appreciation of that currency relative to the measurement currency.

Applying the stochastic processes in (C1) and (C2) to equation (C3) gives:

$$V_{t+dt}^{m_1} = V_t^{m_1}\Big[(1+i_t^{m_1}dt) + (1+\mu_t^{m_1h}dt+\sigma^{m_1h}dZ_t^{m_1h})(1+i_t^h dt) \\ -(1+\mu_t^{m_1l}dt+\sigma^{m_1l}dZ_t^{m_1l})(1+i_t^l dt)\Big]$$

Simplifying, dropping t subscripts, and eliminating $o(dt)$ terms gives

$$\frac{dV^{m_1}}{V^{m_1}} = \left[i^{m_1} + (i^h - i^l) + (\mu^{m_1h} - \mu^{m_1l})\right]dt + \sigma^{m_1h}dZ^{m_1h} - \sigma^{m_1l}dZ^{m_1l}. \tag{C4}$$

C.4 The Strategy Returns in Measurement Currency 2:

If we instead implement the carry strategy in measurement currency m_2, the evolution of the strategy obeys

$$V_{t+dt}^{m_2} = V_t^{m_2}\left[(1+i_t^{m_2}dt) + \frac{S_{t+dt}^{m_2h}}{S_t^{m_2h}}(1+i_t^h dt) - \frac{S_{t+dt}^{m_2l}}{S_t^{m_2l}}(1+i_t^l dt)\right]. \tag{C5}$$

However, by triangular arbitrage,

$$\frac{S_{t+dt}^{m_2h}}{S_t^{m_2h}} = \frac{S_{t+dt}^{m_2m_1}}{S_t^{m_2m_1}}\frac{S_{t+dt}^{m_1h}}{S_t^{m_1h}}. \tag{C6}$$

Substituting from equation (C6) into equation (C5) gives

$$V_{t+dt}^{m_2} = V_t^{m_2}\left[(1+i_t^{m_2}dt) + \frac{S_{t+dt}^{m_2m_1}}{S_t^{m_2m_1}}\frac{S_{t+dt}^{m_1h}}{S_t^{m_1h}}(1+i_t^h dt) - \frac{S_{t+dt}^{m_2m_1}}{S_t^{m_2m_1}}\frac{S_{t+dt}^{m_1l}}{S_t^{m_1l}}(1+i_t^l dt)\right] \tag{C7}$$

Comparing equation (C7) with equation (C3), we see that the profits on the long and short legs of the strategy are now each multiplied by a factor $\frac{S_{t+dt}^{m_2m_1}}{S_t^{m_2m_1}}$.

Substituting the stochastic processes in (C1) and (C2) into equation (C7) gives

$$V_{t+dt}^{m_2} = V_t^{m_2}\big[\,(1+i_t^{m_2}dt) \\ +(1+\mu_t^{m_2m_1}dt+\sigma^{m_2m_1}dZ_t^{m_2m_1})(1+\mu_t^{m_1h}dt+\sigma^{m_1h}dZ_t^{m_1h})(1+i_t^h dt) \\ -(1+\mu_t^{m_2m_1}dt+\sigma^{m_2m_1}dZ_t^{m_2m_1})(1+\mu_t^{m_1l}dt+\sigma^{m_1l}dZ_t^{m_1l})(1+i_t^l dt)\big].$$

Again, simplifying, dropping t subscripts, and eliminating $o(dt)$ terms gives

$$\begin{aligned}\frac{dV^{b2}}{V^{b2}} = & \left[i^{b2} + (i^h - i^l) + (\mu^{m_1h} - \mu^{m_1l}) + \sigma^c \sigma^{m_2m_1} \rho^{c,m_2b}\right] dt \\ & + \sigma^{m_1h} dZ^{m_1h} - \sigma^{m_1l} dZ^{m_1l}. \end{aligned} \tag{C8}$$

where

$$\sigma^c = \sqrt{\left(\sigma^{m_1h}\right)^2 + \left(\sigma^{m_1l}\right)^2 - 2\sigma^{m_1h}\sigma^{m_1l}\rho_{lh}}$$

$$\rho^{c,m_2m_1} = \frac{cov(\sigma^{m_1h} dZ_t^{m_1h} - \sigma^{m_1l} dZ_t^{m_1l}, \sigma^{m_2m_1} dZ_t^{m_2m_1})}{\sigma^c \sigma^{m_2m_1}}$$

That is, σ^c is the volatility of the carry trade (measured either in measurement currency 1 or 2—as noted above, the volatility is the same), and ρ^{c,m_2m_1} is the correlation of the carry trade return and the rate of appreciation of measurement currency 1 relative to measurement currency 2.

If we first convert equations (C4) and (C8) to excess return forms by subtracting the risk-free rates of interest, and then difference the two equations, we obtain

$$\begin{aligned}\left(\frac{dV^{m_2}}{V^{m_2}} - i^{m_2}\right) - \left(\frac{dV^{m_1}}{V^{m_1}} - i^{m_1}\right) &= \sigma^c \sigma^{m_2m_1} \rho^{c,m_2m_1} dt \\ &= cov(r^c, dS^{m_1m_2}/S_{m_1m_2}) dt. \end{aligned} \tag{C9}$$

Notice that, in both equation (C4) and (C8), the stochastic component of the carry-trade return is $\sigma^{m_1h} dZ_t^{m_1h} - \sigma^{m_1l} dZ_t^{m_1l}$. This means that *carry trade returns denominated in two-different measurement currencies will be (conditionally) perfectly correlated and have the same volatilities*. This result, of course, is only strictly true given our assumption that exchange rate movements follow diffusion processes. The result is reflected in equation (C9), which has no stochastic (dZ_t) component. However, the drift rates for the excess returns (i.e., the average excess returns) are different, and the difference is equal to the covariance between the carry return and rate of appreciation of measurement currency 1 relative to measurement currency 2. Thus, if measurement currency 1 appreciates relative to measurement currency 2 when the carry trade strategy does well, we should observe a higher average carry trade return when the strategy returns are measured in measurement currency 2 rather than in measurement currency 1.

Since the carry strategy does well when low-interest-rate currencies depreciate, equation (C9) will be positive when m_2 is a low-interest-rate currency and negative when m_2 is a high-interest-rate currency. Thus, the measured mean carry trade return should be higher when measured in JPY or CHF and lower when measured in NZD or AUD.

This is consistent with the evidence in Panel A of Table C3, which reports summary statistics on the USD base currency carry trade of Table 1 but measured in the other currencies listed in the column heads. There are only slight differences in the average returns and Sharpe ratios across the different measurement currencies, but the patterns line up with the model's predictions. Specifically, the average return is highest when measured in JPY, and lowest when measured in AUD. Note that the Sharpe ratios exhibit this same pattern.

Recall that Table 2 of the paper presents summary statistics for the returns to a set of EQ-carry strategies with different base currencies, but to make these comparable, the returns are all measured in USD. Panel B of Table C3 presents summary statistics for these same strategies, but the returns are now measured in the base currency. So, for example, the NOK column summarizes the returns that a Norwegian investors would have received in Norwegian krone, when implementing the strategy with the NOK as the base currency. Comparing the mean returns and the Sharpe ratios in Panel B with those in Table 2 shows again that the measurement currency has only a slight effect on the average returns.

Finally, Panel C examines the differences between the mean returns presented in Table 2 (which, for convenience, are reproduced in the first row of Panel C), and the mean returns calculated in Panel B of Table C3. Since the only difference between the two sets of returns is the measurement currency, we can see how well equation (C9) fits these differences. The row labeled "model" is the annualized covariance between the monthly exchange rate innovation and the carry-trade return, for the given base currency EQ strategy. Comparing the model prediction with actual mean return difference (in the row above) shows that the equation (C9) explains the difference in the average returns almost perfectly. The differences between the model and the average return, given in the final row of the table, show that the differences are generally on the order of 1%. We also note that the correlations between the monthly EQ-carry returns measured in USD and in the base currency are high: the average correlation is 0.9982, and the minimum is 0.9966.

Table C3: Summary Statistics of EQ Carry Trade Returns for Alternative Measurement Currencies and Base Currencies

Description: Panel A presents the summary statistics for the USD base currency EQ carry strategy as in Table 1, but the returns are measured in the different currencies at the top of each column. Panel B reports statistics for EQ strategy returns for different base currencies, as in Table 2, but now the returns are measured in that base currency rather than in USD. Panel C examines the differences between the mean returns in Panel B and in Table 2 (which are also reported in the first line of Panel C) as $\bar{r}_m - \bar{r}_{USD}$. The row labeled "model" reports $cov(r^c, dS^{m_1 m_2}/S_{m_1 m_2})$, estimated from the monthly returns. According to equation (C9), this should be equal to $(\bar{r}_m - \bar{r}_{USD})$ if the continuous time approximation holds. Finally, "diff ($\times$100)" is the difference between the preceding two lines of the table: that is, it tells us the error in the model forecast of the difference in mean returns $(\bar{r}_m - \bar{r}_{USD})$, multiplied by 100.

	Panel A: USD-based EQ Carry, by Measurement Currency									
	CAD	EUR	JPY	NOK	SEK	CHF	GBP	NZD	AUD	USD
Mean Ret. (% p.a.)	3.89	3.94	4.09	3.87	3.84	3.98	3.86	3.84	3.83	3.96
	(0.91)	(0.92)	(0.90)	(0.92)	(0.92)	(0.92)	(0.92)	(0.91)	(0.91)	(0.91)
Std. Dev.	5.07	5.11	5.06	5.12	5.12	5.10	5.11	5.09	5.08	5.06
	(0.28)	(0.30)	(0.28)	(0.30)	(0.30)	(0.30)	(0.30)	(0.29)	(0.28)	(0.28)
Skewness	-0.53	-0.59	-0.50	-0.63	-0.64	-0.59	-0.61	-0.57	-0.58	-0.49
	(0.20)	(0.24)	(0.23)	(0.24)	(0.23)	(0.24)	(0.24)	(0.20)	(0.20)	(0.21)
Excess Kurtosis	2.05	2.51	2.19	2.51	2.44	2.54	2.50	2.11	2.11	2.01
	(0.53)	(0.73)	(0.64)	(0.72)	(0.67)	(0.70)	(0.71)	(0.55)	(0.54)	(0.53)
Sharpe Ratio	0.77	0.77	0.81	0.76	0.75	0.78	0.76	0.76	0.75	0.78
	(0.19)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.19)
	Panel B: EQ-Carry, by Base Currency, Measured in Base Currency									
	CAD	EUR	JPY	NOK	SEK	CHF	GBP	NZD	AUD	USD
Mean Ret. (% p.a.)	3.02	2.69	3.40	2.67	2.33	3.05	3.09	3.92	3.23	3.96
	(0.73)	(0.90)	(1.70)	(0.84)	(1.02)	(1.21)	(0.97)	(1.50)	(1.41)	(0.91)
Std. Dev.	4.26	5.33	9.58	5.09	5.97	7.20	5.60	8.47	7.61	5.06
	(0.21)	(0.26)	(0.61)	(0.31)	(0.80)	(0.40)	(0.37)	(0.80)	(0.63)	(0.28)
Skewness	-0.11	0.14	-0.79	-0.64	-3.77	-0.34	-0.26	-0.90	-0.97	-0.49
	(0.20)	(0.19)	(0.38)	(0.38)	(0.92)	(0.31)	(0.45)	(0.36)	(0.32)	(0.21)
Excess Kurtosis	1.53	1.43	3.68	3.71	30.24	2.41	4.41	5.57	4.15	2.01
	(0.36)	(0.46)	(1.64)	(1.24)	(7.37)	(0.87)	(1.48)	(1.58)	(1.87)	(0.53)
Sharpe Ratio	0.71	0.50	0.36	0.52	0.39	0.42	0.55	0.46	0.42	0.08
	(0.18)	(0.17)	(0.19)	(0.18)	(0.21)	(0.17)	(0.18)	(0.19)	(0.20)	(0.07)
	Panel C: The Effect of Measurement Currency									
	CAD	EUR	JPY	NOK	SEK	CHF	GBP	NZD	AUD	USD
$\bar{r}_{m=USD}$	3.08	2.45	2.54	2.90	2.64	2.42	3.40	4.70	3.85	3.96
$\bar{r} - \bar{r}_{m=USD}$	0.06	-0.24	-0.86	0.23	0.31	-0.63	0.31	0.78	0.63	—
model	0.06	-0.24	-0.87	0.23	0.31	-0.64	0.31	0.77	0.62	—
diff ($\times$100)	-0.02	0.48	1.04	0.08	-0.10	0.88	-0.05	0.75	0.50	—

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