"Measures of Global Uncertainty and Carry Trade Excess Returns"
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Appendix A

This appendix, which we do not intend for publication, describes construction of the GMM standard errors.

We have k factors, T time-series observations and n excess returns (assets). Vectors are underlined. Matrices are bolded. Scalars have no special designation. The objective is to estimate the k-factor 'beta-risk' model

$$E\left(re_{i,t}^{p}\right) = \underline{\beta}_i'\underline{\lambda} + \alpha_i, \tag{1}$$

where $\underline{\beta}_i$ is a k-dimensional vector of the factor betas for excess return i and $\underline{\lambda}$ is the $k-$dimensional vector of factor risk premia. The expectation is taken over t. The beta-risk model's answer to the question as to why average returns vary across assets is that returns with high betas (covariance with a factor) pay a high-risk premium ($\underline{\lambda}$). The cross-sectional test can be implemented with a two-pass procedure. Let $\underline{f}_t^U$ be the k-dimensional vector of the macro factors. In the first pass for each excess return $i = 1, ..., n$, estimate the factor betas in the time-series regression,

$$re_{i,t}^{p} = a_i + \underbrace{(\beta_{1,i}, ..., \beta_{k,i})}_{\underline{\beta}_i'} \begin{pmatrix} f_{1,t}^U \\ \vdots \\ f_{k,t}^U \end{pmatrix} + \epsilon_{i,t} = \underline{\tilde{\beta}}_i' \underline{F}_t^U + \epsilon_{i,t},$$

where

$$\underline{F}_t^U = \begin{pmatrix} 1 \\ \underline{f}_t^U \end{pmatrix}, \ \underline{f}_t^U = \begin{pmatrix} f_{1,t}^U \\ \vdots \\ f_{k,t}^U \end{pmatrix}, \ \underset{(k+1)\times 1}{\underline{\tilde{\beta}}_i} = \begin{pmatrix} a_i \\ \underline{\beta}_i \end{pmatrix}, \ \underset{(k\times 1)}{\underline{\beta}_i} = \begin{pmatrix} \beta_{1,i} \\ \vdots \\ \beta_{k,i} \end{pmatrix}.$$

In the second pass, we can run the cross-sectional regression of average returns $\overline{re}_i^p = (1/T)\sum_{t=1}^{T} re_{i,t}^p$, using the betas as data, to estimate the factor risk premia, $\underline{\lambda}$. If the excess return's covariance with the factor is systematic and undiversifiable, that covariance risk should be 'priced' into the return. The factor risk premium should not be zero. The second-pass regression run with a constant is

$$\overline{re}_i^p = \gamma + \underbrace{(\lambda_1, ..., \lambda_k)}_{\underline{\lambda}} \begin{pmatrix} \beta_{1,i} \\ \vdots \\ \beta_{k,i} \end{pmatrix} + \alpha_i = \gamma + \underline{\lambda}'\underline{\beta}_i + \alpha_i.$$

The α_i are the pricing errors. When the cross-sectional regression is run without a constant, set $\gamma = 0$.

$$\underline{\overline{re}}_i^p = \gamma + \underline{\beta}_i'\underline{\lambda} + \alpha_i.$$

OLS standard errors give asymptotically incorrect inference because the βs are not data but are generated regressors. Cochrane (2005) describes a procedure to obtain GMM standard errors that delivers an asymptotically valid inference that is robust to the generated regressors problem and robust to heteroskedasticity and autocorrelation in the errors. Cochrane's strategy is to use the standard errors from a GMM estimation problem that exactly reproduces the two-stage regression point estimates. We will need the following notation:

$$
\begin{aligned}
\underset{(k\times k)}{\mathbf{\Sigma}_f} &= E\left(\underline{f}_t^U - \underline{\mu}_f\right)\left(\underline{f}_t^U - \underline{\mu}_f\right)' \\
\underline{\epsilon}_t &= \left(\epsilon_{1,t}, \epsilon_{2,t}, ..., \epsilon_{n,t}\right)' \\
\underset{n\times n}{\mathbf{\Sigma}} &= E\left(\underline{\epsilon}_t\underline{\epsilon}_t'\right) \\
\underset{n\times k}{\mathbf{B}} &= \begin{pmatrix} \underline{\beta}_1' \\ \vdots \\ \underline{\beta}_n' \end{pmatrix} = \begin{pmatrix} \beta_{1,1} & \cdots & \beta_{k,1} \\ \vdots & & \vdots \\ \beta_{1,n} & \cdots & \beta_{k,n} \end{pmatrix} \\
\underset{k\times n}{\mathbf{A}} &= \underset{k\times k}{\left(\mathbf{B}'\mathbf{B}\right)^{-1}} \underset{k\times n}{\mathbf{B}'} \\
\underset{n\times n}{\mathbf{M}_\beta} &= \mathbf{I}_n - \underset{n\times k}{\mathbf{B}} \underset{k\times k}{\left(\mathbf{B}'\mathbf{B}\right)^{-1}} \underset{k\times n}{\mathbf{B}'} \\
\underset{n\times(k+1)}{\mathbf{X}} &= \left(\underline{\iota}_n \; \mathbf{B}'\right), \text{ where } \underline{\iota}_n = \begin{pmatrix} 1 \\ \vdots \\ 1 \end{pmatrix} \leftarrow n'\text{th row} \\
\underset{(k+1)\times n}{\mathbf{C}} &= \underset{(k+1)\times(k+1)}{\left(\mathbf{X}'\mathbf{X}\right)}^{-1} \underset{(k+1)\times n}{\mathbf{X}'} \\
\underset{n\times n}{\mathbf{M}_X} &= \mathbf{I}_n - \underset{n\times(k+1)}{\mathbf{X}} \underset{(k+1)\times(k+1)}{\left(\mathbf{X}'\mathbf{X}\right)^{-1}} \underset{(k+1)\times n}{\mathbf{X}'} \\
\underset{(k+1)\times(k+1)}{\tilde{\mathbf{\Sigma}}_f} &= \begin{pmatrix} \underset{\text{scalar}}{0} & \underset{1\times k}{\underline{0}} \\ \underset{k\times 1}{\underline{0}} & \underset{k\times k}{\mathbf{\Sigma}_f} \end{pmatrix}
\end{aligned}
$$

Estimation without the constant. When estimating without the constant in the second-pass regression, the parameter vector is

$$
\underset{[k(n+1)+k]\times 1}{\underline{\theta}} = \begin{pmatrix} \underline{\tilde{\beta}}_1 \\ \vdots \\ \underline{\tilde{\beta}}_n \\ \underline{\lambda} \end{pmatrix} = \begin{pmatrix} a_1 \\ \underline{\beta}_1 \\ \vdots \\ a_n \\ \underline{\beta}_n \\ \underline{\lambda} \end{pmatrix}.
$$

Let the second moment matrix of the factors be

$$
\underset{(k+1)\times(k+1)}{\mathbf{M}_F} = \frac{1}{T}\sum_{t=1}^{T} \underline{F}_t^U \left(\underline{F}_t^U\right)'.
$$

The moment conditions are built off of the error vector,

$$\underset{n(k+2)\times 1}{\underline{u}_t(\theta)} = \begin{pmatrix} \underline{F}_t^U\left(re_{1,t}^p - \left(\underline{F}_t^U\right)'\underline{\tilde{\beta}}_1\right) \\ \vdots \\ \underline{F}_t^U\left(re_{n,t}^p - \left(\underline{F}_t^U\right)'\underline{\tilde{\beta}}_n\right) \\ re_{1,t}^p - \underline{\beta}_1'\underline{\lambda} \\ \vdots \\ re_{n,t}^p - \underline{\beta}_n'\underline{\lambda} \end{pmatrix} = \begin{pmatrix} \underline{F}_t^U\left(re_{1,t}^p - \left(\underline{F}_t^U\right)'\underline{\tilde{\beta}}_1\right) \\ \vdots \\ \underline{F}_t^U\left(re_{n,t}^p - \left(\underline{F}_t^U\right)'\underline{\tilde{\beta}}_n\right) \\ \underline{RE}_t^p - \mathbf{B}\underline{\lambda} \end{pmatrix} \begin{matrix} \\ \\ \leftarrow \text{row } n(k+1) \\ \leftarrow (n\times 1) \end{matrix}$$

where

$$\underline{re}_t^p = \begin{pmatrix} re_{1,t}^p \\ \vdots \\ re_{n,t}^p \end{pmatrix}.$$

Let

$$\underline{g}_T(\underline{\theta}) = \frac{1}{T}\sum_{t=1}^T \underline{u}_t(\theta)$$

$$\underset{[n(k+1)]\times[n(k+1)+k]}{\mathbf{d}_T} = \frac{\partial \mathbf{g}_T(\underline{\theta})}{\partial \underline{\theta}'} = \begin{pmatrix} \underset{[n(k+1)]\times[n(k+1)]}{-\mathbf{I}_n \otimes \mathbf{M}_F} & \underset{[n(k+1)]\times k}{\mathbf{0}} \\ \underset{n\times[n(k+1)]}{-\mathbf{I}_n \otimes \begin{pmatrix} \underset{\text{scalar}}{0} & \underline{\lambda}' \end{pmatrix}} & \underset{n\times k}{-\mathbf{B}} \end{pmatrix}.$$

To replicate the estimates in the two-pass procedure, we need[1]

$$\underset{[n(k+1)+k]\times[n(k+2)]}{\mathbf{a}_T} = \begin{pmatrix} \mathbf{I}_{n(k+1)} & \underset{n(k+1)\times n}{\mathbf{0}} \\ \underset{k\times n(k+1)}{\mathbf{0}} & \underset{k\times n}{\mathbf{B}'} \end{pmatrix}, \tag{2}$$

[1] In the usual GMM problem, we minimize

$$\underline{g}_T(\underline{\theta})'\mathbf{S}_T^{-1}\underline{g}_T(\underline{\theta}),$$

where

$$\mathbf{S}_T \overset{a.s.}{\to} \mathbf{S} = \mathbf{E}\left(\sum_{j=-\infty}^{\infty} \underline{u}_t(\underline{\theta})\,\underline{u}_{t-j}(\theta)'\right).$$

We do Newey-West on $\underline{u}_t(\theta)$ to get $\mathbf{S}_T$. We will want to plug in our estimated λ and βs into $\mathbf{d}_T$. This problem chooses $\underline{\theta}$ to set

$$\mathbf{d}_T\mathbf{S}_T^{-1}\underline{g}_T(\underline{\theta}) = \underline{0}$$

and can be recast as having a weighting matrix on the moment conditions

$$\mathbf{a}_T\underline{g}_T(\underline{\theta}) = 0$$

where

$$\mathbf{a}_T = \mathbf{d}_T\mathbf{S}_T^{-1}$$

The covariance matrix of $\underline{\theta}$ for this problem is,

$$\mathbf{V}_\theta = \frac{1}{T}\left(\mathbf{d}_T\mathbf{S}_T\mathbf{d}_T\right)^{-1}$$

but this is not the covariance matrix for the two-pass estimation problem. The reason is that the last set of n moment conditions in $\underline{\mathbf{g}}_T(\underline{\theta})$ isn't the cross-sectional regression estimated by least squares (which is $\mathbf{B}'\left(\frac{1}{T}\sum_{t=1}^T \underline{RE}_t^p - \mathbf{B}\underline{\lambda}\right)$).

not $\mathbf{d}_T\mathbf{S}_T^{-1}$. The coefficient covariance matrix we want is

$$\mathbf{V}_\theta = \frac{1}{T}\left(\mathbf{a}_T\mathbf{d}_T\right)^{-1}\left(\mathbf{a}_T\mathbf{S}_T\mathbf{a}_T'\right)\left[\left(\mathbf{a}_T\mathbf{d}_T\right)^{-1}\right]'. \tag{3}$$

To test if the pricing errors are zero, use the covariance matrix of the moment conditions,

$$\mathbf{V}_g = \frac{1}{T}\left(\mathbf{I}_{(n(k+1))} - \mathbf{d}_T\left(\mathbf{a}_T\mathbf{d}_T\right)^{-1}\mathbf{a}_T\right)\mathbf{S}_T\left(\mathbf{I}_{(n(k+2))} - \mathbf{d}_T\left(\mathbf{a}_T\mathbf{d}_T\right)^{-1}\mathbf{a}_T\right). \tag{4}$$

We want to get $\mathbf{V}_\theta$ and $\mathbf{V}_g$ by plugging in.

GMM standard errors when estimating with a constant. The cross-sectional regression is now

$$\frac{1}{T}\sum_{t=1}^{T} re_{i,t}^p = \gamma + \underline{\beta}_i'\underline{\lambda} + \alpha_i,$$

where γ is the constant. We have to add γ to the coefficient vector θ. Place it according to

$$\underset{(n+1)(k+1)\times 1}{\underline{\theta}} = \begin{pmatrix} a_1 \\ \underline{\beta}_1 \\ \vdots \\ a_n \\ \underline{\beta}_n \\ \gamma \\ \underline{\lambda} \end{pmatrix} = \begin{pmatrix} \underline{\tilde{\beta}}_1 \\ \vdots \\ \underline{\tilde{\beta}}_n \\ \gamma \\ \underline{\lambda} \end{pmatrix}.$$

Define

$$\mathbf{X} = \begin{pmatrix} \underset{n\times 1}{\underline{\iota}} & \underset{n\times k}{\mathbf{B}} \end{pmatrix}.$$

The error vector that defines the model is

$$\underline{u}_t\left(\underline{\theta}\right) = \begin{pmatrix} \underline{F}_t^U\left(re_{1,t}^p - \left(\underline{F}_t^U\right)'\underline{\tilde{\beta}}_1\right) \\ \vdots \\ \underline{F}_t^U\left(re_{n,t}^p - \left(\underline{F}_t^U\right)'\underline{\tilde{\beta}}_n\right) \\ re_{1,t}^p - \gamma - \underline{\beta}_1'\underline{\lambda} \\ \vdots \\ re_{n,t}^p - \gamma - \underline{\beta}_n'\underline{\lambda} \end{pmatrix} = \begin{pmatrix} \underline{F}_t^U\left(re_{1,t}^p - \left(\underline{F}_t^U\right)'\underline{\tilde{\beta}}_1\right) \\ \vdots \\ \underline{F}_t^U\left(re_{n,t}^p - \left(\underline{F}_t^U\right)'\underline{\tilde{\beta}}_n\right) \\ \underline{RE}_t^p - \mathbf{X}\begin{pmatrix}\gamma \\ \underline{\lambda}\end{pmatrix} \end{pmatrix}.$$

Do Newey-West on $\underline{u}_t\left(\theta\right)$ to get $\mathbf{S}_T$. Use

$$\underset{[(n+1)(k+1)]\times[n(k+2)]}{\mathbf{a}_T} = \begin{pmatrix} \mathbf{I}_{n(k+1)} & \underset{[n(k+1)]\times n}{\mathbf{0}} \\ \underset{(k+1)\times[n(k+1)]}{\mathbf{0}} & \underset{(k+1)\times n}{\mathbf{X}'} \end{pmatrix}$$

$$\underset{[n(k+1)]\times[(k+1)(n+1)]}{\mathbf{d}_T} = \frac{\partial \mathbf{g}_T\left(\underline{\theta}\right)}{\partial \underline{\theta}'} = \begin{pmatrix} \underset{[n(k+1)]\times[n(k+1)]}{-\mathbf{I}_n\otimes\mathbf{M}_F} & \underset{[n(k+1)]\times(k+1)}{\mathbf{0}} \\ \underset{n\times[n(k+1)]}{-\mathbf{I}_n\otimes\begin{pmatrix}\underset{\text{scalar}}{0} & \underline{\lambda}'\end{pmatrix}} & \underset{n\times(k+1)}{-\mathbf{X}} \end{pmatrix}$$

to plug into (3) and (4).

We do not use GMM to estimate the model. We use the two-step procedure to get the point estimates for the betas and lambdas and plug those estimates into the GMM formulae to get standard errors.

Appendix B

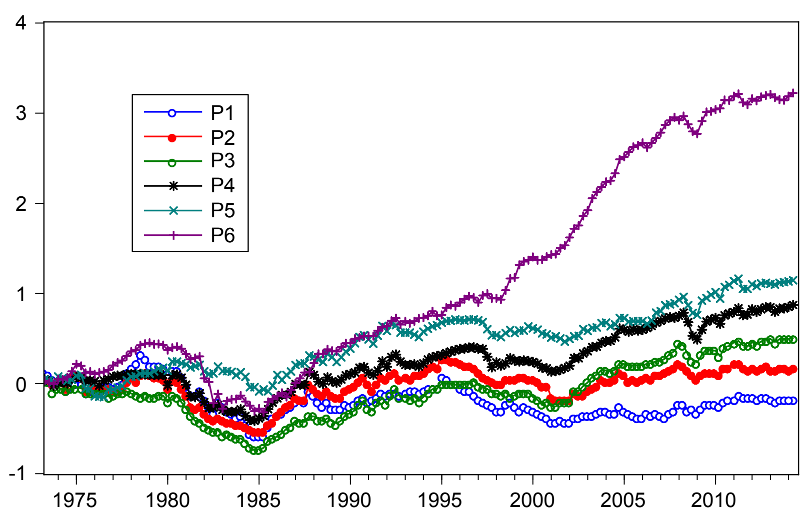
This appendix, which we do not intend for publication, includes additional robustness checks where we consider quarterly data.

Table 1: Quarterly Currency Excess Return Summary Statistics (1973Q1–2014Q4)

	P_1	P_2	P_3	P_4	P_5	P_6
Mean Currency Excess Return	-1.161	-0.367	0.645	1.317	1.936	6.941
Sharpe Ratio	-0.064	-0.020	0.039	0.072	0.104	0.286
Mean Interest Rate Differential	-2.916	-1.055	0.669	2.326	4.871	16.464
Mean Exchange Rate Return	1.755	0.688	-0.024	-1.008	-2.934	-9.523

Notes: To form the portfolio returns, we sort by the nominal interest rate for each country from low to high. The rank ordering is divided into six categories, into which the currency returns are assigned. P_6 is the portfolio of returns associated with the highest interest rate quantile and P_1 is the portfolio of returns associated with the lowest interest rate quantile. The excess returns are the average of the USD returns in each category minus the US nominal interest rate and are stated in percent per annum. These are log-approximated excess returns and exchange rate returns. The mean currency excess return is $\overline{re}_i^p = \frac{1}{T}\sum_{t=1}^{T} re_{i,t}^p$. The mean interest rate differential is $\frac{1}{T}\sum_{t=1}^{T}\left(r_t^{P_j} - r_{0,t}\right)$, where $r_t^{P_j} \equiv \frac{1}{n_{j,t}}\sum_{i\in P_j} r_{j,t}$. The mean exchange rate return is $\frac{1}{T}\sum_{t=1}^{T}\left(\frac{1}{n_{i,t}}\sum_{j\in P_i}\Delta\ln(S_{j,t+1})\right)$ and is positive when the dollar falls in value.

Figure 1: Cumulated Quarterly Excess Returns on Six Carry Portfolios



The figure shows cumulated excess return from shorting one USD and going long each quarter in each of the interest rate sorted carry portfolios.

Table 2: Two-Pass Estimation of the Single-Factor Beta-Risk Model on Quarterly Carry Excess Returns

	Single-Factor Model							
Factor	λ	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
BBD US Equity	-1.196	**-2.086**	8.071	**2.729**	0.496	6.030	0.303	85Q1–14Q2
BBD US EPU	-0.524	**-2.201**	3.079	0.960	0.954	0.632	0.986	73Q2–14Q2
BBD Global	-0.501	**-2.422**	0.933	0.441	0.991	0.479	0.993	73Q2–14Q2
CI GeoPol	0.864	**2.869**	0.000	0.000	0.574	4.020	0.547	85Q1–14Q2
HRS MPU	-0.321	**-2.280**	6.198	**3.245**	0.131	6.583	0.254	85Q1–14Q2
JLN Macro	-0.121	-1.609	-1.842	-0.785	0.365	6.723	0.242	73Q2–14Q2
JLN Fin	0.056	0.661	2.615	1.614	0.008	11.522	0.042	73Q2–14Q2
S-RTA Global	-0.003	-1.697*	1.859	0.472	0.349	3.897	0.564	03Q2–14Q2
OZ Global	11.176	**5.577**	10.153	**6.823**	0.441	15.204	0.010	89Q4–14Q2
RSS-U	-1.852	-1.287	-3.680	-0.558	0.357	2.037	0.844	82Q3–14Q2
RSS Ex Ante	-0.335	-1.612	4.722	1.208	0.678	3.889	0.566	82Q3–14Q2
RSS Knightian	-0.340	-0.853	1.664	0.697	0.028	8.447	0.133	82Q3–14Q2

Notes: The raw data are quarterly and are end-of-month and point-sampled. To form the portfolio returns, we sort by the nominal interest rate (carry) for each country from low to high. The rank ordering is divided into six portfolios, into which the currency returns are assigned. P_6 is the portfolio of returns associated with the highest nominal interest rate countries and P_1 is the portfolio of returns associated with the lowest nominal interest rate countries. This table reports the two-pass procedure estimation results from a one-factor model. In the first pass, we run $N = 6$ individual time-series regressions of the excess returns on the K factors to estimate the factor 'betas,' $re^p_{i,t} = a_i + \sum_{k=1}^{K} \beta_{i,k} f^U_{k,t} + \epsilon_{i,t}$, where $re^p_{i,t}$ is the excess return, $\beta_{i,k}$ is the factor beta, and $f^U_{k,t}$ is the uncertainty factor. The factors considered include BBD US Equity, BBD US EPU, BBD Global, CI GeoPol, HRS MPU, JLN Macro, JLN Fin, S-RTA Global, OZ Global, RSS-U, RSS Ex Ante, and RSS Knightian. In the second pass, we run a single cross-sectional regression of the (time-series) mean excess returns on the estimated betas, $\overline{re}^p_i = \gamma + \sum_{k=1}^{K} \lambda_k \beta_{i,k} + \alpha_i$, where $\overline{re}^p_i$ is the average excess return, γ is the intercept, λ_k is the risk premia, and α_i is the pricing error. The table reports the price of risk (λ) and its associated t-ratio (using GMM standard errors), the estimated intercept (γ) and its associate t-ratio, R^2 and the Wald test on the pricing errors (Test-stat), and its associated p-value (p-val.). * indicates significance at the 10% level. Bold indicates significance at the 5% level.

Table 3: Two-Pass Estimation of Two-Factor Beta-Risk Model on Quarterly Carry Excess Returns

		Two-Factor Model (First Factor is BBD Global)								
λ_1	t-ratio	2^{nd} Factor	λ_2	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
-0.613	**-2.866**	BBD US Equity	0.000	0.002	2.612	0.957	0.936	2.741	0.740	85Q1–14Q2
-0.475	-1.893*	BBD US EPU	-0.427	**-2.408**	1.391	0.468	0.994	0.198	0.999	78Q1–14Q2
-0.438	**-2.595**	CI-GeoPol	0.224	1.093	1.797	0.674	0.979	1.088	0.955	78Q1–14Q2
-0.590	**-3.062**	HRS MPU	0.030	0.222	2.280	0.929	0.960	2.074	0.839	82Q3–14Q2
-0.518	**-2.628**	JLN Macro	-0.012	-0.220	1.392	0.534	0.994	0.251	0.998	78Q1–14Q2
-0.499	**-1.965**	JLN Fin	-0.045	-0.296	0.945	0.447	0.991	0.474	0.993	78Q1–14Q2
-0.448	-1.796*	S-RTA Global	0.000	-0.117	0.382	0.178	0.900	4.522	0.477	85Q1–14Q2
-0.532	**-2.413**	OZ Global	3.850	1.760*	4.061	**1.974**	0.906	5.589	0.348	89Q4–14Q2
-0.479	**-2.502**	RSS-U	-0.493	-0.763	0.837	0.251	0.977	0.905	0.970	82Q3–14Q2
-0.410	**-2.160**	RSS Ex Ante	-0.081	-0.636	2.999	1.375	0.985	0.443	0.994	82Q3–14Q2
-0.501	**-2.750**	RSS Knightian	-0.060	-0.140	2.112	0.782	0.962	1.130	0.951	82Q3–14Q2
-0.454	-1.468	First PC	-1.662	-0.424	0.581	0.213	0.994	0.386	0.996	73Q2–14Q2

Notes: See notes to Table 2. First PC is the first principal component of all of the uncertainty measures excluding BBD Global.

Figure 2: Quarterly Average Excess Returns and BBD Global Betas

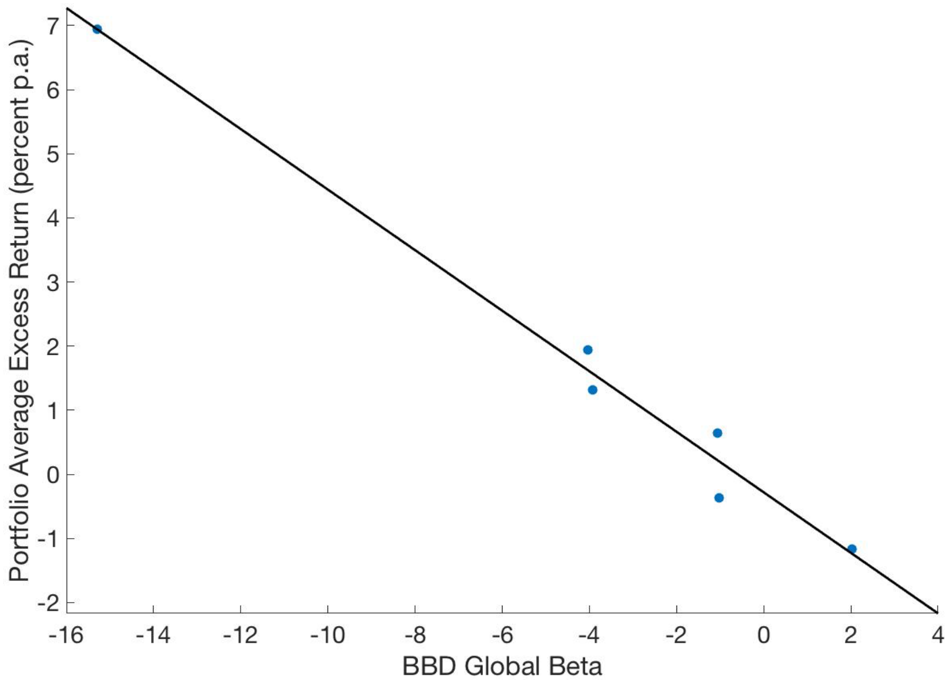


Table 4: Beta Decomposition on Quarterly Currency Excess Returns

	P_1	P_2	P_3	P_4	P_5	P_6
Total Excess Return Beta	2.034	-1.022	-1.053	-3.927	-4.041	-15.290
t-ratio	0.632	-0.257	-0.288	-0.692	-0.819	**-2.654**
Interest Rate Beta	2.125	1.481	1.197	0.814	0.035	-10.130
t-ratio	**3.818**	**4.784**	**4.145**	**2.124**	0.060	**-3.118**
Exchange Rate Beta	-0.091	-2.503	-2.250	-4.741	-4.076	-5.160
t-ratio	-0.028	-0.634	-0.626	-0.834	-0.793	-0.817

Notes: These are log-approximated excess returns and exchange rate returns. The excess return beta is from regressing $re^p_{i,t}$ on the BBD Global factor f^U_t. The interest rate differential beta is from regressing $\frac{1}{n_{i,t}}\sum_{j\in P_i}(r_{j,t-1} - r_{0,t-1})$ on f^U_t. The exchange rate return beta is from regressing $\frac{1}{n_{i,t}}\sum_{j\in P_i}\Delta\ln(S_{j,t})$ on f^U_t. * indicates significance at the 10% level. Bold indicates significance at the 5% level.

Table 5: Two-Pass Estimation of the Single-Factor Beta-Risk Model on Quarterly Carry Excess Returns: Developed Countries

			Single-Factor Model					
Factor	λ	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
BBD US Equity	-1.058	-1.717*	7.852	1.894*	0.728	5.176	0.395	85Q1–14Q2
BBD US EPU	-0.513	-1.569	3.461	0.952	0.874	3.299	0.654	73Q2–14Q2
BBD Global	-0.472	-1.803*	1.528	0.723	0.777	3.442	0.632	73Q2–14Q2
CI GeoPol	0.609	**2.029**	0.393	0.133	0.490	3.838	0.573	85Q1–14Q2
HRS MPU	0.024	0.189	3.655	**2.183**	0.001	9.538	0.089	85Q1–14Q2
JLN Macro	-0.103	-1.739*	-1.526	-0.715	0.239	4.243	0.515	73Q2–14Q2
JLN Fin	-0.179	-1.385	0.835	0.345	0.317	4.331	0.503	73Q2–14Q2
S-RTA Global	-0.001	-1.232	2.716	1.285	0.287	1.361	0.929	02Q2–14Q2
OZ Global	2.961	**2.089**	4.591	**2.772**	0.119	8.367	0.137	89Q2–14Q2
RSS-U	-0.923	-1.571	-1.114	-0.350	0.544	4.084	0.537	82Q3–14Q2
RSS Ex Ante	0.017	0.223	2.784	1.724*	0.001	9.865	0.079	82Q3–14Q2
RSS Knightian	-0.657	-1.104	-1.502	-0.444	0.793	5.816	0.325	82Q3–14Q2

Notes: See notes to Table 2. Developed countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, United Kingdom, and United States.

Table 6: Two-Pass Estimation of Two-Factor Beta-Risk Model on Quarterly Carry Excess Returns: Developed Countries

				Two-Factor Model (First Factor is BBD Global)						
λ_1	t-ratio	2^{nd} Factor	λ_2	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
-0.500	**-2.604**	BBD US Equity	-0.002	-0.003	2.981	0.749	0.942	1.128	0.952	85Q1–14Q2
-0.358	-1.336	BBD US EPU	-0.510	-1.582	3.394	0.973	0.874	3.259	0.660	73Q2–14Q2
-0.390	**-1.962**	CI-GeoPol	0.074	0.265	2.753	1.136	0.958	1.687	0.891	85Q1–14Q2
-0.444	-1.736*	HRS MPU	-0.042	-0.293	3.178	1.489	0.947	1.803	0.876	85Q1–14Q2
-0.637	-1.654*	JLN Macro	0.073	0.844	4.916	1.132	0.881	1.513	0.912	73Q2–14Q2
-0.475	**-2.026**	JLN Fin	-0.040	-0.351	1.551	0.730	0.778	3.401	0.638	73Q2–14Q2
-0.427	-0.910	S-RTA Global	0.000	-0.630	0.671	0.360	0.958	0.538	0.991	02Q2–14Q2
-0.471	-1.639	OZ Global	0.869	0.595	2.608	1.149	0.969	0.510	0.992	89Q2–14Q2
-0.640	-1.469	RSS-U	0.527	0.765	5.364	1.314	0.981	0.228	0.999	82Q3–14Q2
-0.490	-1.529	RSS Ex Ante	0.132	0.898	2.178	0.843	0.976	0.471	0.993	82Q3–14Q2
-0.436	**-1.999**	RSS Knightian	-0.030	-0.067	2.566	0.742	0.929	1.307	0.934	82Q3–14Q2
-0.463	-1.822*	First PC	-1.666	-0.343	1.623	0.752	0.781	3.477	0.627	73Q2–14Q2

Notes: See notes to Table 2. First PC is the first principal component of all of the uncertainty measures excluding BBD Global. Developed countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, United Kingdom, and United States.

Table 7: Two-Pass Estimation of the Single-Factor Beta-Risk Model on Quarterly Carry Excess Returns: Emerging Market Countries

	Single-Factor Model							
Factor	λ	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
BBD US Equity	1.124	**2.295**	5.929	1.311	0.762	3.018	0.697	92Q3–14Q2
BBD US EPU	-0.861	-1.842*	0.388	0.100	0.640	4.330	0.503	92Q3–14Q2
BBD Global	-0.745	**-2.858**	0.930	0.357	0.879	4.062	0.541	92Q3–14Q2
CI GeoPol	0.758	**1.960**	-1.571	-0.514	0.420	3.212	0.667	92Q3–14Q2
HRS MPU	0.278	1.465	3.266	1.343	0.054	10.072	0.073	92Q3–14Q2
JLN Macro	0.090	0.806	4.806	1.640	0.022	6.506	0.260	92Q3–14Q2
JLN Fin	0.512	1.092	6.682	0.908	0.938	0.831	0.975	92Q3–14Q2
S-RTA Global	-0.003	**-3.755**	3.484	0.713	0.568	3.082	0.687	02Q2–14Q2
OZ Global	0.075	1.138	5.230	**2.672**	0.013	7.815	0.167	92Q3–14Q2
RSS-U	0.221	0.462	4.623	**2.290**	0.006	8.118	0.150	92Q3–14Q2
RSS Ex Ante	0.157	1.109	0.826	0.328	0.111	4.634	0.462	92Q3–14Q2
RSS Knightian	0.762	1.166	9.809	1.234	0.127	2.481	0.779	92Q3–14Q2

Notes: See notes to Table 2. Emerging market countries include Brazil, Chile, Colombia, Czech Republic, Hungary, India, Indonesia, Malaysia, Mexico, Philippines, Romania, South Africa, Thailand, and Turkey.

Table 8: Two-Pass Estimation of Two-Factor Beta-Risk Model on Quarterly Carry Excess Returns: Emerging Market Countries

		Two-Factor Model (First Factor is BBD Global)								
λ_1	t-ratio	2^{nd} Factor	λ_2	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
-0.394	**-2.266**	BBD US Equity	0.356	1.067	2.782	1.361	0.972	2.473	0.781	92Q3–14Q2
-0.621	**-2.905**	BBD US EPU	-0.142	-0.433	2.448	0.922	0.976	0.825	0.975	92Q3–14Q2
-0.633	**-2.702**	CI-GeoPol	0.166	0.608	-0.610	-0.241	0.912	3.203	0.669	92Q3–14Q2
-0.690	**-3.711**	HRS MPU	0.197	0.914	-0.320	-0.148	0.947	2.355	0.798	92Q3–14Q2
-0.783	**-2.678**	JLN Macro	-0.072	-0.636	0.603	0.182	0.886	2.601	0.761	92Q3–14Q2
-0.195	-0.521	JLN Fin	0.303	0.875	4.322	0.946	0.986	0.508	0.992	92Q3–14Q2
-0.531	**-3.056**	S-RTA Global	-0.002	-1.708*	0.286	0.118	0.886	3.707	0.592	02Q2–14Q2
-0.738	**-2.711**	OZ Global	-0.091	-0.827	-0.692	-0.251	0.910	3.143	0.678	92Q3–14Q2
-0.783	**-2.837**	RSS-U	-0.475	-1.070	0.252	0.073	0.904	1.788	0.878	92Q3–14Q2
-0.694	**-2.876**	RSS Ex Ante	0.021	0.200	-0.157	-0.052	0.891	3.472	0.628	92Q3–14Q2
-0.755	**-2.806**	RSS Knightian	-0.065	-0.141	0.228	0.049	0.881	3.089	0.686	92Q3–14Q2
-0.656	**-3.046**	First PC	-0.082	-1.022	-0.552	-0.208	0.923	3.306	0.653	92Q3–14Q2

Notes: See notes to Table 2. First PC is the first principal component of all of the uncertainty measures excluding BBD Global. Emerging market countries include Brazil, Chile, Colombia, Czech Republic, Hungary, India, Indonesia, Malaysia, Mexico, Philippines, Romania, South Africa, Thailand, and Turkey.

Table 9: Two-Pass Estimation of the Single-Factor Beta-Risk Model on Quarterly Carry Excess Returns: All Countries, Common Sample 1

Single-Factor Model								
Factor	λ	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
BBD US Equity	-0.179	-1.586	1.624	0.841	0.372	6.929	0.226	02Q2–14Q2
BBD US EPU	-0.384	**-1.991**	0.610	0.257	0.803	7.036	0.218	02Q2–14Q2
BBD Global	-0.483	**-2.182**	0.147	0.082	0.890	6.332	0.275	02Q2–14Q2
CI GeoPol	0.304	**2.017**	1.948	0.777	0.792	3.221	0.666	02Q2–14Q2
HRS MPU	-0.399	-1.746*	6.261	1.456	0.339	3.512	0.622	02Q2–14Q2
JLN Macro	-0.086	-1.061	1.996	1.092	0.198	5.613	0.346	02Q2–14Q2
JLN Fin	-0.173	-1.392	1.003	0.433	0.477	5.636	0.343	02Q2–14Q2
S-RTA Global	-0.003	-1.697*	1.859	0.472	0.349	3.897	0.564	02Q2–14Q2
OZ Global	-0.173	-1.326	2.950	0.901	0.318	5.798	0.326	02Q2–14Q2
RSS-U	-0.645	-1.097	3.435	1.271	0.096	6.055	0.301	02Q2–14Q2
RSS Ex Ante	0.204	1.537	2.167	0.736	0.207	3.419	0.636	02Q2–14Q2
RSS Knightian	-0.373	-1.371	0.120	0.082	0.334	6.823	0.234	02Q2–14Q2

Notes: See notes to Table 2.

Table 10: Two-Pass Estimation of Two-Factor Beta-Risk Model on Quarterly Carry Excess Returns: All Countries, Common Sample 1

Two-Factor Model (First Factor is BBD Global)										
λ_1	t-ratio	2^{nd} Factor	λ_2	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
-0.542	**-2.958**	BBD US Equity	-0.106	-1.532	0.595	0.355	0.927	5.703	0.336	02Q2–14Q2
-0.694	**-2.730**	BBD US EPU	-0.351	**-2.021**	-0.230	-0.153	0.961	2.723	0.743	02Q2–14Q2
-0.473	**-2.301**	CI-GeoPol	0.145	1.290	0.223	0.118	0.890	6.187	0.288	02Q2–14Q2
-0.471	-1.907*	HRS MPU	-0.058	-0.512	0.431	0.208	0.891	6.017	0.305	02Q2–14Q2
-0.534	**-2.704**	JLN Macro	0.034	0.621	0.743	0.342	0.908	5.766	0.330	02Q2–14Q2
-0.505	**-2.632**	JLN Fin	-0.031	-0.332	0.448	0.243	0.902	6.170	0.290	02Q2–14Q2
-0.448	-1.796*	S-RTA Global	0.000	-0.117	0.382	0.178	0.900	4.522	0.477	02Q2–14Q2
-0.558	**-2.701**	OZ Global	0.073	0.654	0.143	0.089	0.904	5.816	0.325	02Q2–14Q2
-0.491	**-2.416**	RSS-U	0.087	0.187	0.348	0.188	0.894	6.262	0.282	02Q2–14Q2
-0.523	**-2.224**	RSS Ex Ante	-0.058	-0.831	0.440	0.235	0.895	5.534	0.354	02Q2–14Q2
-0.492	**-2.589**	RSS Knightian	-0.012	-0.066	0.313	0.133	0.890	4.643	0.461	02Q2–14Q2
-0.556	**-2.685**	First PC	0.062	0.556	0.269	0.163	0.904	6.068	0.300	02Q2–14Q2

Notes: See notes to Table 2. First PC is the first principal component of all of the uncertainty measures excluding BBD Global.

Table 11: Two-Pass Estimation of the Single-Factor Beta-Risk Model on Quarterly Carry Excess Returns: All Countries, Common Sample 2

Single-Factor Model								
Factor	λ	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
BBD US Equity	-0.146	-0.850	3.791	**2.358**	0.011	11.818	0.037	89Q2–14Q2
BBD US EPU	-0.584	**-2.187**	1.731	0.636	0.703	5.525	0.355	89Q2–14Q2
BBD Global	-0.637	**-2.619**	1.457	0.628	0.864	7.262	0.202	89Q2–14Q2
CI GeoPol	0.906	**2.879**	-1.488	-0.398	0.651	3.380	0.642	89Q2–14Q2
HRS MPU	0.060	0.682	3.752	**2.394**	0.004	12.103	0.033	89Q2–14Q2
JLN Macro	-0.054	-1.030	2.816	1.916*	0.028	11.688	0.039	89Q2–14Q2
JLN Fin	0.168	**2.328**	5.530	**3.070**	0.081	9.707	0.084	89Q2–14Q2
OZ Global	11.176	**5.577**	10.153	**6.823**	0.441	15.204	0.010	89Q2–14Q2
RSS-U	0.255	1.291	4.704	**3.208**	0.012	10.512	0.062	89Q2–14Q2
RSS Ex Ante	-0.246	-1.732*	8.534	**3.463**	0.123	12.591	0.028	89Q2–14Q2
RSS Knightian	-0.204	-1.158	1.814	1.031	0.036	9.689	0.085	89Q2–14Q2

Notes: See notes to Table 2.

Table 12: Two-Pass Estimation of Two-Factor Beta-Risk Model on Quarterly Carry Excess Returns: All Countries, Common Sample 2

Two-Factor Model (First Factor is BBD Global)										
λ_1	t-ratio	2^{nd} Factor	λ_2	t-ratio	γ	t-ratio	R^2	Test-stat	p-val.	sample
-0.639	**-3.079**	BBD US Equity	0.150	0.651	1.495	0.746	0.943	4.006	0.549	89Q2–14Q2
-0.762	**-3.101**	BBD US EPU	-0.357	-1.429	1.499	0.605	0.938	2.184	0.823	89Q2–14Q2
-0.440	**-2.178**	CI-GeoPol	0.329	1.662*	-0.351	-0.151	0.941	3.729	0.589	89Q2–14Q2
-0.621	**-2.968**	HRS MPU	0.118	0.924	0.707	0.329	0.922	4.704	0.453	89Q2–14Q2
-0.640	**-2.775**	JLN Macro	0.012	0.197	1.981	0.880	0.872	4.423	0.490	89Q2–14Q2
-0.586	**-2.215**	JLN Fin	0.033	0.359	2.419	1.094	0.889	4.522	0.477	89Q2–14Q2
-0.532	**-2.413**	OZ Global	3.850	1.760*	4.061	**1.974**	0.906	5.589	0.348	89Q2–14Q2
-0.635	**-2.489**	RSS-U	0.016	0.042	1.599	0.755	0.864	4.705	0.453	89Q2–14Q2
-0.656	**-2.739**	RSS Ex Ante	-0.197	-1.112	4.881	1.394	0.928	3.303	0.653	89Q2–14Q2
-0.636	**-2.919**	RSS Knightian	0.010	0.047	1.390	0.492	0.864	7.079	0.215	89Q2–14Q2
-0.533	**-2.410**	First PC	3.818	1.741*	4.046	1.963	0.905	5.564	0.351	89Q2–14Q2

Notes: See notes to Table 2. First PC is the first principal component of all of the uncertainty measures excluding BBD Global.

Table 13: Low and High Beta Currencies (Quarterly)

	First Quartile			Fourth Quartile	
Country	Beta	Excess Return	Country	Beta	Excess Return
Spain	-44.107	3.380	Chile	5.965	3.327
Finland	-34.858	3.609	Indonesia	6.087	4.754
Italy	-28.148	1.381	South Africa	6.447	1.775
Austria	-17.035	5.795	Belgium	6.574	6.397
Brazil	-13.743	11.562	Mexico	7.472	3.484
Romania	-9.965	10.795	Philippines	7.989	2.983
Colombia	-9.764	17.646	Korea	9.241	3.025
Denmark	-8.612	5.414	Netherlands	10.030	3.059
France	-5.962	4.916	Germany	15.572	1.265
Portugal	-5.549	0.915	Greece	16.457	1.250
Average	-17.774	6.541	Average	9.183	3.132

The country beta is from a regression of $re_{i,t}$ on the BBD Global factor f_t^U. The excess return is $\overline{re}_i = \frac{1}{T}\sum_{t=1}^{T} re_{i,t}$.

Figure 3: Individual Average Excess Returns and Betas (Quarterly)