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Currency Hedgers' Abnormal Returns and the Fama -French Five-Factor Model

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Abstract

We use the new Fama and French (2015, 2017) five-factor model to reexamine the seemingly anomalous result of Nelson, Moffitt, and Affleck-Graves (2005), who document significant abnormal returns for firms that hedge currencies. Applying the five-factor model we observe significant monthly abnormal returns of 0.63%, an amount roughly one third less than the returns reported in the original study. Additional analysis shows mixed results regarding the economies of scale and managerial sophistication hypotheses that predict any abnormal returns from hedging should be confined to large firms.

Keywords: Hedging, currency derivatives, multifactor models, return anomalies
JEL classification: G12; G14; G32

1. Introduction

Fama and French (2015) introduce a five-factor asset pricing model that is more robust in explaining stock returns than the Fama and French (1993) three-factor model. Regarding their three-factor model, they contend that the value / growth factor (HML - constructed using book to market) is a noisy proxy for expected returns since the market value also responds to forecasts of earnings and investment. Their five-factor model adds factors based on the level of profitability (RMW) and investment (CMA) and they suggest that these two new factors capture the exposure of the value / growth factor, making HML redundant. While they concede that their five-factor model has difficulty capturing the returns on small stocks whose returns act like those of firms that invest a lot despite being unprofitable, overall their five-factor model outperforms the three-factor model. Fama and French (2016) contend the five-factor model's success results from its ability to capture the effects of profitable firms that invest conservatively and unprofitable firms that invest aggressively. Based on this ability, they show their five-factor model helps explain several important return anomalies (share repurchases, large share issuances, low/high beta stocks, low/high volatility stocks) that have plagued their three-factor model. The recent finance literature has shown interest in the five-factor model, with numerous studies examining the model as well as its application to pricing anomalies.[1]

One such potential anomaly can be found in Nelson, Moffitt, and Affleck-Graves (2005), who find significant abnormal returns in a sample of U.S. firms that hedged currencies. Specifically, using the Fama and French four-factor model (Carhart 1997), they document significant monthly abnormal returns of 0.42% (5.1% annually) for all currency hedgers and 0.96% (12.2% annually) for firms that hedge only currencies and not interest rates or commodities. This result was shown to be robust across multiple asset pricing models and methodologies. Consistent with the economies of scale and managerial sophistication hypotheses (Nance et al. 1993, Dolde 1993), the abnormal returns for currency hedgers were shown to be primarily driven by larger firms.

[1] See for example Fletcher (In press), Zhang, Xie, Zhai, and Wang (2018), Grobys and Haga (2016), Huynh (2018), Zaremba and Czapkiewicz (2017), and Chiah, Chai, Zhong, and Li (2017).

Fama (1998) contends that such apparent anomalies can result from the methodology employed and that most long-term return anomalies vanish with reasonable changes in technique. While the results of Nelson et al. (2005) are robust across multiple methods, the five-factor model was not yet available and there are several reasons why using the five-factor model may help to explain their results. First, Nelson et al. report relatively large negative loadings on the value/growth (HML) factor in their currency hedging regressions. These loadings are always significantly negative when they examine "pure" currency hedgers. As noted above, HML is a noisy proxy whose effect is now believed to be more accurately captured using the profitability (RMW) and Investment (CMA) factors. Second, since the apparent anomaly occurs in firms hedging currencies, it is reasonable to assume these firms have some global presence, and therefore are subject to global risk factors not captured by models based solely on U.S. firms. This issue is addressed using the Fama and French (2017) international five-factor model that has been shown to better explain returns in four global regions (North America, Europe, Japan, and Asia Pacific). Finally, while Fama and French (2015) admit the five-factor model has difficulty with small firms that invest a lot despite being unprofitable, Nelson et al. show their results are driven by larger firms, a sample where the five-factor model appears to perform well.

2. Sample

In this study we use Nelson, Moffitt, and Affleck-Graves' (2005) sample of 2,997 firm / year observations from 1,308 U.S. firms that were identified as using derivatives over the period from 1995 to 2000. Their sample was collected during the short window where the Financial Accounting Standard Board's (FASB) Statement of Financial Accounting Standard (SFAS) No. 119 – *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments* was in force. SFAS No. 119 required firms to disclose the amount, nature, and terms of derivative financial instruments and to differentiate between derivatives held for trading purposes or purposes other than trading. SFAS No. 119 was superseded by SFAS 133 – *Accounting for Derivative Instruments and Hedging Activities* which, for firms with "qualified" hedging activities, eliminated the detailed disclosures required under SFAS No. 119 that were necessary to construct the hedging sample.

In the sample, derivative usage is categorized into the broader classes of currency, interest rate, and commodity hedgers. The details of sample construction along with various descriptive statistics and summary data can be found in Nelson et al. Because their primary result was finding significant abnormal returns only for firms hedging currencies, in this study we limit our focus to only three of the hedging groups examined in their study. These are: (1) all hedgers [N = 2,997] – firms with currency, interest rate, or commodity derivatives; (2) currency hedgers [N = 1,772] – firms with currency derivatives; (3) "pure" currency hedgers [N = 1,040] – firms with currency, but not interest rate or commodity derivatives.

3. Methodology

Following Nelson et al., for each of these three groups, when the firm discloses an outstanding derivative position at the end of their fiscal year, we classify that firm as a hedger for the 12 months of that fiscal year and the 12 months of the following fiscal year. When a firm discloses derivative use during the fiscal year, but reports no outstanding year-end position, then we classify that firm as a hedger only for the 12 months of that fiscal year. We then use these classifications to construct monthly calendar-time portfolios that capture the value weighted return for a portfolio that invests in the stock of every company that engages in the desired hedging activity.

We compute the excess return on these monthly hedging portfolios by subtracting the risk-free rate, yielding $R_{P_t} - R_{f_t}$, which is then used as the dependent variables in the following regressions:

$$R_{P_t} - R_{f_t} = \alpha + \beta_{MKT}(R_{M_t} - R_{f_t}) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \varepsilon_t \quad [1]$$

$$R_{P_t} - R_{f_t} = \alpha + \beta_{MKT}(R_{M_t} - R_{f_t}) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{UMD}UMD_t + \varepsilon_t \quad [2]$$

$$R_{P_t} - R_{f_t} = \alpha + \beta_{MKT}(R_{M_t} - R_{f_t}) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{RMW}RMW_t + \beta_{CMA}CMA_t + \varepsilon_t \quad [3]$$

$$R_{P_t} - R_{f_t} = \alpha + \beta_{MKT}(R_{M_t} - R_{f_t}) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{RMW}RMW_t + \beta_{CMA}CMA_t + \beta_{UMD}UMD_t + \varepsilon_t \quad [4]$$

Where $R_{M_t} - R_{f_t}$ is the market excess return factor, SMB is a size factor calculated as the return on portfolios of **s**mall firms **m**inus **b**ig firms, HML is a value / growth factor calculated as the return on portfolios of **h**igh book-to-market firms **m**inus **l**ow book-to-market firms, RMW is a profitability factor calculated as the return on portfolios with **r**obust profitability **m**inus **w**eak profitability, CMA is an investment factor calculated as the return on portfolios of firms with **c**onservative levels of investment **m**inus **a**ggressive levels of investment, and UMD is a momentum factor calculated as the return on portfolios of firms with high prior returns (**u**p) **m**inus firms with low prior returns (**d**own). The intercept term (□) in each of these regressions is the primary variable of interest since it provides a measure of the monthly abnormal performance. All of the factors used in this study were downloaded from Ken French's website[2].

4. Results

In Table 1 we report the results of Fama and French (1993) three-factor [Model 1] and Carhart (1997) four-factor [model 2] regressions on the value weighted portfolio returns for hedging firms. To provide baseline results and ensure accurate replication methodology, in Panel A we report the results using the same "historical" factors as used by Nelson et al. Results from our four-factor regressions match those reported in Table 5 of Nelson et al. with significant positive abnormal returns of 0.352%, 0.416%, and 0.963% for all, currency, and "pure" currency hedgers respectively.

In Panel B of Table 1 we report the results of these same regressions using the current factors. Because of Compustat's practice of back filling data for smaller firms, the Fama and French factors are not constant over time as new firms get added to their portfolios. Overall, using the current factors results in a slight reduction in the magnitude of the intercepts. The "pure" currency result, however, remains significantly positive with monthly abnormal returns of 0.862% for the three-factor and 0.818% for the four-factor regressions. The significant negative coefficients on the HML factor in the "pure" currency regressions suggest using the Fama and French (2015) five-factor model since HML is a "noisy" and "redundant" proxy whose effect is believed to be more accurately captured using the profitability (RMW) and investment (CMA) factors.

[2] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html Current factors downloaded on October 10, 2018. Historical factors are from Nelson et al. (2005), but were originally downloaded from Ken French's website at the time of their study.

Table 1: Results of Fama and French three and four-factor regressions on hedging firms

Panel A - Fama and French regressions using historical factors and returns

Hedging Activity	Intercept						
	Coefficient	Std Error	$R_m - R_f$	SMB	HML	UMD	Adj R^2
	0.00337	0.00189	0.90273	-0.11586	-0.08063		0.8839
All types of	(0.0794)		(0.0001)	(0.0195)	(0.2384)		
Derivatives	0.00352	0.00208	0.90138	-0.11418	-0.08590	-0.00867	0.8822
	(0.0954)		(0.0001)	(0.0247)	(0.2523)	(0.8589)	
	0.00425	0.00201	0.88450	-0.15229	-0.12585		0.8718
Currency	(0.0384)		(0.0001)	(0.0043)	(0.0851)		
Derivatives	0.00416	0.00221	0.88528	-0.15326	-0.12282	0.00499	0.8699
	(0.0643)		(0.0001)	(0.0050)	(0.1250)	(0.9233)	
	0.00954	0.00314	0.83157	-0.13975	-0.40104		0.7836
"Pure" Currency	(0.0034)		(0.0001)	(0.0865)	(0.0007)		
Derivatives	0.00963	0.00345	0.83079	-0.13878	-0.40407	-0.00498	0.7803
	(0.0069)		(0.0001)	(0.0970)	(0.0017)	(0.9509)	

Panel B - Fama and French regressions using current factors and returns

Hedging Activity	Intercept						
	Coefficient	Std Error	$R_m - R_f$	SMB	HML	UMD	Adj R^2
	0.00277	0.00188	0.91445	-0.09491	-0.02414		0.8864
All types of	(0.1440)		(0.0001)	(0.0472)	(0.7007)		
Derivatives	0.00283	0.00206	0.91410	-0.09431	-0.02654	-0.00355	0.8850
	(0.1732)		(0.0001)	(0.0534)	(0.7081)	(0.9402)	
	0.00365	0.00199	0.89906	-0.13358	-0.06570		0.8745
Currency	(0.0714)		(0.0001)	(0.0092)	(0.3261)		
Derivatives	0.00350	0.00218	0.89992	-0.13506	-0.05983	0.00870	0.8727
	(0.1142)		(0.0001)	(0.0100)	(0.4275)	(0.8627)	
	0.00862	0.00322	0.90216	-0.09679	-0.29582		0.7735
"Pure" Currency	(0.0093)		(0.0001)	(0.2339)	(0.0075)		
Derivatives	0.00818	0.00353	0.90467	-0.10109	-0.27869	0.02539	0.7705
	(0.0235)		(0.0001)	(0.2235)	(0.0245)	(0.7546)	

Notes: The dependent variable in these regressions are the monthly value weighted excess portfolio returns from January 1995 through December 2000 for firms identified as using derivatives. For comparison with the original study, the regression results presented in Panel A use the same "historical" factors used by Nelson, et al. (2005). The Panel B results are reported using current factors downloaded from Ken French's website on October 10, 2018. The "all types of derivatives" category includes firms reporting the use of commodity, currency, or interest rate derivatives. The "pure" currency derivative category includes firms identified as using currency derivatives only, without commodity or interest rate derivatives. P-values are reported in parentheses under the parameter estimates

In Table 2 we report the results of Fama and French (2015, 2017) five-factor regressions [model 3] and five-factor regressions with an additional momentum factor [model 4]. In panel A the results of the Fama and French (2015) domestic (U.S.) five-factor regressions continue to show a significant abnormal return of 0.726% per month for "pure" currency hedgers. With the addition of the momentum factor the significant abnormal return drops to 0.626%, about one-third lower than the 0.963% reported in Nelson et al. In all regressions, the coefficients on both the old value / growth (HML) and the new profitability (RMW)

factors are significant, while the investment factor (CMA) remains insignificant, suggesting that HML may not be a redundant factor in this case[3].

Table 2: Results of Fama and French five-factor regressions on hedging firms

Panel A -Fama and French (2015) Domestic (U.S.) Five Factor Regressions

Hedging	Intercept								
Activity	Coefficient	Std Error	$R_m - R_f$	SMB	HML	RMW	CMA	UMD	Adj R^2
	0.00164	0.00173	0.96305	0.02403	-0.28933	0.37301	0.14742		0.9171
All types of	(0.3470)		(0.0001)	(0.6133)	(0.0015)	(0.0001)	(0.1869)		
Derivatives	0.00111	0.00184	0.97044	0.01137	-0.28832	0.40419	0.13692	0.04592	0.9170
	(0.5477)		(0.0001)	(0.8106)	(0.0024)	(0.0001)	(0.2250)	(0.2759)	
	0.00239	0.00188	0.95330	-0.01608	-0.34163	0.37532	0.16942		0.9046
Currency	(0.2079)		(0.0001)	(0.7550)	(0.0006)	(0.0001)	(0.1621)		
Derivatives	0.00168	0.00200	0.96030	-0.02863	-0.33276	0.41074	0.15387	0.05788	0.9046
	(0.4026)		(0.0001)	(0.5780)	(0.0013)	(0.0001)	(0.2083)	(0.2057)	
	0.00726	0.00334	0.96066	0.02227	-0.58338	0.38419	0.18524		0.7912
"Pure" Currency	(0.0331)		(0.0001)	(0.8080)	(0.0010)	(0.0070)	(0.3862)		
Derivatives	0.00632	0.00358	0.96558	0.00941	-0.56269	0.42594	0.15999	0.07623	0.7886
	(0.0822)		(0.0001)	(0.9186)	(0.0023)	(0.0040)	(0.4634)	(0.3507)	

Panel B - Fama and French (2017) International Five Factor Regressions

Hedging	Intercept								
Activity	Coefficient	Std Error	$R_m - R_f$	SMB	HML	RMW	CMA	UMD	Adj R^2
	0.00370	0.00271	1.13547	0.07247	-0.19092	0.67501	0.11881		0.7893
All types of	(0.1764)		(0.0001)	(0.5637)	(0.2315)	(0.0029)	(0.5850)		
Derivatives	0.00334	0.00293	1.13821	0.06817	-0.17133	0.67345	0.13731	0.02729	0.7864
	(0.2590)		(0.0001)	(0.5915)	(0.3168)	(0.0032)	(0.5439)	(0.7418)	
	0.00434	0.00285	1.12264	0.04062	-0.23178	0.69880	0.13044		0.7707
Currency	(0.1332)		(0.0001)	(0.7586)	(0.1690)	(0.0034)	(0.5696)		
Derivatives	0.00397	0.00309	1.12543	0.03623	-0.21180	0.69721	0.14930	0.02783	0.7675
	(0.2035)		(0.0001)	(0.7866)	(0.2412)	(0.0037)	(0.5314)	(0.7500)	
	0.00849	0.00402	1.20746	0.18397	-0.57740	0.85945	0.21042		0.6845
"Pure" Currency	(0.0387)		(0.0001)	(0.3237)	(0.0167)	(0.0101)	(0.5158)		
Derivatives	0.00877	0.00436	1.20531	0.18736	-0.59282	0.86068	0.19586	-0.02148	0.6798
	(0.0486)		(0.0001)	(0.3231)	(0.0221)	(0.0106)	(0.5608)	(0.8617)	

Notes: The dependent variable in these regressions are the monthly value weighted excess portfolio returns from January 1995 through December 2000 for firms identified as using derivatives. Both the domestic and international Fama and French factors were downloaded from Ken French's website on October 10, 2018. The "all types of derivatives" category includes firms reporting the use of commodity, currency, or interest rate derivatives. The "pure" currency derivative category includes firms identified as using currency derivatives only, without commodity or interest rate derivatives. P-values are reported in parentheses under the parameter estimates.

Since it is reasonable to assume our currency hedging firms have a global presence, and therefore subject to global risk factors, we repeat our analysis using the Fama and French (2017) international five-factor model, the results of which are reported in Panel B of Table 2. As evidenced by lower adjusted R^2 and higher standard errors on the intercept term, the international regressions have lower power compared to the domestic regressions. Despite having lower power, for pure currency hedgers, the international regression continues to show a significant alpha of 0.849% and when the international momentum factor is added the alpha increases to 0.877% and remains significant. Although the five-factor regressions partially explain some of the abnormal returns to currency hedgers, overall the result remains robust even using the Fama and French five-factor methodology.

[3] This result is consistent even when we replace HML with HMLO, an HML factor that is constructed to be orthogonal to the RMW and CMA factors as discussed in Fama and French (2015).

Nelson et al. find that "the over-performance is due entirely to larger firms that hedge currency." Since the five-factor model has difficulty explaining returns on smaller firms, it's possible that the five-factor model will perform differently on samples of small and large hedgers and therefore help explain this result for large hedgers. To examine this possibility, consistent with Nelson et al., we focus on "pure" currency hedgers, dividing the sample using the median of total assets and then perform Fama and French five-factor regressions, the results of which are reported in Panel A of Table 3[4].

Table 3: Fama and French regressions performed on pure currency hedging firms categorized by size

Panel A - Fama and French regressions on small and large firms based on total assets

Firm	Intercept								
Size	Coefficient	Std Error	$R_m - R_f$	SMB	HML	RMW	CMA	UMD	Adj R^2
	0.01031	0.00528	1.03454	1.19930	-0.62427	-0.35584	0.18342		0.8694
Small	(0.0554)		(0.0001)	(0.0001)	(0.0225)	(0.1084)	(0.5888)		
(lower half)	0.00638	0.00547	1.05507	1.18744	-0.49543	-0.24101	0.10841	0.25701	0.8770
	(0.2470)		(0.0001)	(0.0001)	(0.0722)	(0.2725)	(0.7445)	(0.0420)	
	0.00733	0.00344	0.95814	-0.02190	-0.59171	0.41783	0.19572		0.7760
Large	(0.0366)		(0.0001)	(0.8165)	(0.0011)	(0.0045)	(0.3760)		
(upper half)	0.00636	0.00368	0.96288	-0.03474	-0.56959	0.46028	0.16945	0.07833	0.7732
	(0.0891)		(0.0001)	(0.7141)	(0.0027)	(0.0026)	(0.4507)	(0.3517)	

Panel B - Fama and French regressions on small and large firms based on market value of equity

Firm	Intercept								
Size	Coefficient	Std Error	$R_m - R_f$	SMB	HML	RMW	CMA	UMD	Adj R^2
	-0.00442	0.00385	1.19511	1.03829	-0.22996	0.07670	0.24583		0.8719
Small	(0.2547)		(0.0001)	(0.0001)	(0.2415)	(0.6317)	(0.3212)		
(lower half)	-0.00342	0.00407	1.21006	1.02307	-0.30261	0.07398	0.28439	-0.05845	0.8736
	(0.4050)		(0.0001)	(0.0001)	(0.1390)	(0.6501)	(0.2536)	(0.5289)	
	0.00771	0.00341	0.95652	-0.00476	-0.59964	0.39061	0.19190		0.7829
Large	(0.0272)		(0.0001)	(0.9595)	(0.0009)	(0.0073)	(0.3820)		
(upper half)	0.00662	0.00365	0.96156	-0.01754	-0.57316	0.43574	0.16334	0.08531	0.7808
	(0.0745)		(0.0001)	(0.8520)	(0.0024)	(0.0039)	(0.4634)	(0.3067)	

Notes: The dependent variable in these regressions are the monthly value weighted excess portfolio returns from January 1995 through December 2000 of firms identified using currency derivatives only, without commodity or interest rate derivatives, and further classified by their size. The median of the book value of total assets and market value of equity are calculated by year and used to assign derivative users to sized based portfolios. This process provides for an equal number of observations in each portfolio for each year. P-values are reported in parentheses under the parameter estimates.

The results show the magnitude of the intercepts for regressions with the momentum factor are considerably smaller than their non-momentum counterparts, resulting from significant positive loadings on the UMD factor in these regressions. Contrary to the results of Nelson et al. and the economies of scale and managerial sophistication hypotheses, we observe nearly identical intercepts for both small and large pure currency hedgers in the five-factor regressions with momentum. While the large firm intercepts are significantly positive, the noticeably larger standard errors (low power) for the small firm regressions result in their intercepts being insignificant.

One potential issue with this result is that using total assets as a size proxy may miscategorize large firms that invest more in intangible rather than tangible assets. To examine this possibility, we divide our sample using the median of the market value of equity (MVE) and repeat our regressions, reporting these results in Panel B. Consistent with the economies of

[4] For brevity we exclude three and four-factor regressions since these models are nested within the five-factor and five-factor with momentum models respectively.

scale and managerial sophistication hypotheses, when using MVE as a proxy for size, the positive abnormal returns are confined to large firms, with smaller firms having a negative, although insignificant, intercept.

If the economies of scale and managerial sophistication hypotheses hold we should observe the abnormal returns decreasing with firm size. To better test these hypotheses, we divide the pure currency hedging firms into thirds using the 33rd and 67th percentiles of both total assets and MVE. The results of these regressions are reported in Table 4. Inconsistent with these hypotheses, the total asset results presented in Panel A show economically and statistically significant positive abnormal returns for both the largest and smallest third of hedgers, while showing economically and statistically insignificant abnormal returns for the middle third of hedgers. One potential explanation is the abnormal returns for the smallest third may be driven by the five-factor model's difficulty in capturing the returns of small stocks whose returns act like those who invest a lot (intangible assets) while being unprofitable. The large negative loadings on the RMW and HML factors in these regressions are consistent with this explanation. In examining the results segmented by MVE, reported in Panel B, we see the pattern predicted by the economies of scale and managerial sophistication hypotheses, with significant positive abnormal returns only for the largest third of hedgers and insignificant and declining negative intercepts for the middle and smallest third of firms. Together these results appear to support the economies of scale and managerial sophistication hypotheses and confirm the results for large currency hedging of Nelson et al. remains robust to using the Fama and French five-factor model.

5. Summary and Conclusions

In this paper we applied new methodologies in the form of both the domestic and international Fama and French five-factor models to the seemingly anomalous result of Nelson et al., who documented significant positive abnormal returns for firms that hedge currencies. While we still found a significant alpha of 0.632% using a five-factor regression with momentum, this new methodology was able to explain approximately one-third of the 0.963% abnormal return originally reported in Nelson et al. Our tests of the economies of scale and managerial sophistication hypotheses offered mixed results. Contrary to these hypotheses, when we segment the sample using total assets, we found significant positive alphas for both the largest and smallest third of firms. When we segment the sample using the market value of equity, however, we found support for these hypotheses, with only the largest third of firms showing significant alphas and the middle and smallest third showing declining insignificant negative alphas.

Table 4: Fama and French regressions performed on pure currency hedging firms categorized by size

Panel A - Fama and French regressions on small, medium, and large firms based on total assets

Firm	Intercept								
Size	Coefficient	Std Error	$R_m - R_f$	SMB	HML	RMW	CMA	UMD	Adj R^2
	0.01737	0.00651	0.98078	1.40596	-0.75761	-0.53432	0.17985		0.8548
Small	(0.0096)		(0.0001)	(0.0001)	(0.0245)	(0.0515)	(0.6670)		
(lower third)	0.01251	0.00676	0.99276	1.39399	-0.58132	-0.39650	0.06729	0.32706	0.8620
	(0.0690)		(0.0001)	(0.0001)	(0.0878)	(0.1461)	(0.8701)	(0.0367)	
	-0.00031	0.00452	1.28409	0.62757	-0.57261	-0.12172	0.32119		0.8526
Medium	(0.9454)		(0.0001)	(0.0001)	(0.0147)	(0.5174)	(0.2701)		
(middle third)	-0.00069	0.00480	1.30323	0.61170	-0.59277	-0.08890	0.33078	0.03038	0.8537
	(0.8857)		(0.0001)	(0.0001)	(0.0153)	(0.6434)	(0.2595)	(0.7808)	
	0.00815	0.00353	0.94443	-0.05907	-0.59101	0.42908	0.20222		0.7587
Large	(0.0243)		(0.0001)	(0.5433)	(0.0015)	(0.0046)	(0.3737)		
(upper third)	0.00690	0.00378	0.94907	-0.07171	-0.55724	0.47802	0.16899	0.09623	0.7570
	(0.0726)		(0.0001)	(0.4617)	(0.0041)	(0.0023)	(0.4632)	(0.2652)	

Panel B - Fama and French regressions on small, medium, and large firms based on market value of equity

Firm	Intercept								
Size	Coefficient	Std Error	$R_m - R_f$	SMB	HML	RMW	CMA	UMD	Adj R^2
	-0.00787	0.00560	1.11619	0.96591	0.26400	-0.77127	0.04858		0.8043
Small	(0.1641)		(0.0001)	(0.0001)	(0.3540)	(0.0014)	(0.8923)		
(lower third)	-0.00756	0.00596	1.13500	0.95229	0.21763	-0.75895	0.07696	-0.01868	0.8042
	(0.2097)		(0.0001)	(0.0001)	(0.4644)	(0.0022)	(0.8320)	(0.8905)	
	-0.00455	0.00489	1.28330	0.98671	-0.16563	0.50414	0.00540		0.7792
Medium	(0.3557)		(0.0001)	(0.0001)	(0.5053)	(0.0153)	(0.9863)		
(middle third)	-0.00109	0.00504	1.30058	0.97027	-0.34326	0.44257	0.10895	-0.22073	0.7933
	(0.8301)		(0.0001)	(0.0001)	(0.1747)	(0.0312)	(0.7227)	(0.0579)	
	0.00848	0.00348	0.94766	-0.04676	-0.63359	0.38719	0.22095		0.7742
Large	(0.0175)		(0.0001)	(0.6251)	(0.0006)	(0.0091)	(0.3242)		
(upper third)	0.00710	0.00371	0.95249	-0.05941	-0.59444	0.43950	0.18459	0.10500	0.7735
	(0.0605)		(0.0001)	(0.5348)	(0.0020)	(0.0042)	(0.4153)	(0.2168)	

Notes: The dependent variable in these regressions are the monthly value weighted excess portfolio returns from January 1995 through December 2000 of firms identified using currency derivatives only, without commodity or interest rate derivatives, and further classified by their size. The 33rd and 67th percentiles of the book value of total assets and market value of equity are calculated by year and used to assign derivative users to sized based portfolios. This process provides for an equal number of observations in each portfolio for each year. P-values are reported in parentheses under the parameter estimates.

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