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How Do Firms Manage Their Foreign Exchange Exposure?

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Abstract: We examine how firms manage their foreign exchange (FX) exposure using publicly reported data on FX exposure before and after hedging with corresponding hedging instruments. Based on calculated firm-, year-, and currency-specific hedge ratios, we find that about 80 (20) percent of FX firm exposure is managed using risk-decreasing (risk-increasing/risk-constant) strategies. Further, we find that prior hedging outcomes affect the management of current FX exposure, where the exposure is reduced and management adjusts the hedge ratio closer to its benchmark average hedge ratio following prior benchmark losses. When separately evaluating risk-decreasing and risk-increasing positions, we find that prior benchmark losses are only relevant for risk-increasing but not for risk-decreasing positions, i.e., hedging decisions are independent of prior benchmark losses if the intention is to reduce FX exposure.

Keywords: foreign exchange; corporate risk management; selective hedging; speculation

JEL Classification: G11; G32; G39

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1. Introduction

The literature provides substantial evidence on the relevance of foreign exchange (FX) derivative instruments for the management of corporate FX exposure, either related to the structure of an FX risk management program (Brown 2001), the optimal derivative hedging strategies (Brown and Toft 2002), or generally, the importance of derivative instruments (Guay and Kothari 2003). Further, the survey of Bodnar et al. (2011) illustrates that FX risk is commonly managed with financial contracts.[1] In general, the purpose of risk management or hedging is the reduction of risk that results from future movements in market variables, where Hentschel and Kothari (2001) investigate, based on stock returns as central risk measure, whether corporations reduce or take risks with derivative instruments. Similarly, Allayannis and Ofek (2001) evaluate whether non-financial firms use FX derivatives for hedging or speculative purposes, i.e., reduce or increase FX exposure, based on the sensitivity of a firm's stock return to unanticipated FX rate changes as a proxy for FX exposure.

Using a new dataset that contains actual firm-, year-, and currency-specific exposure before and after hedging of a firm, we relate to the latter topic and evaluate how firms manage FX exposure and whether firms decrease or increase FX exposure using derivatives. The latter question is of particular interest given that a line of research illustrates that individual views on future market developments influence corporate risk management activities (Adam et al. 2015; Beber and Fabbri 2012; Bodnar et al. 1998; Brown et al. 2006; Faulkender 2005; Glaum 2002; Hecht 2019; Hecht 2021a; Tufano 1996), where the terms selective hedging, market timing, and speculation are used interchangeably (Adam et al. 2017). In this context, the selective hedging literature also documents the relevance of previous hedging outcomes and indicates that management refers to prior outcomes in present hedge decisions when managing FX exposure (Adam et al. 2015; Beber and Fabbri 2012).

In this paper, we evaluate a hand-collected dataset from publicly available sources containing data from French firms with unprecedented FX-data granularity. The reported data provide information on the composition of the firms' exposure before hedging, the utilized hedging instruments, as well as the resulting exposure after hedging. This granularity allows us to determine firm-, year-, and currency-specific hedge ratios and to classify currency positions as risk-decreasing (risk-increasing) (risk-constant) if they reduce (increase) (keep constant) the firm's FX exposure per year and currency. This differentiation is in line with the recent survey in France of Gumb et al. (2018) that indicates that corporate treasurers differ in risk appetite: some are willing to increase volatility, while others refuse to do so. Further, this differentiation allows for an in-depth analysis of the influence of prior hedging outcomes when managing FX exposure and enables us to provide unique new evidence on the management of the FX exposure of non-financial firms.

We find that the FX exposure of our sample firms before hedging is on average (median) hedged to about 90 (49) percent with predominantly short derivative instruments. Our findings reveal that approximately 20 percent of total firm exposure is managed using risk-increasing/risk-constant strategies and 80 percent of total FX exposure is managed using risk-decreasing strategies. Various theories explain why firms might pursue risk-increasing, speculative strategies. Apart from the personal intentions of the managers involved, the literature refers to the possible existence of special (market) knowledge or private information that would give firms a comparative advantage (e.g., Stulz 1996). In addition, the convexity theories of Campbell and Kracaw (1999) and Adam et al. (2007), for which Hecht (2021b) provides empirical evidence in an FX environment, describe why speculation can be beneficial: the incentive to speculate arises from the convexity of a firm's investment opportunities, according to which positive speculative outcomes enable profitable investments that would otherwise not be made.

Further, we address the documented impact of prior outcomes on hedging decisions and test whether management considers prior hedging outcomes when managing its current exposure. Following Brown et al. (2006), we evaluate past performance relative to a benchmark scenario defined as the firm- and currency-specific average hedge ratio and denominate positive (negative) deviations as benchmark gains (losses). This approach is in line with the methodology used in the selective hedging literature, who attribute deviations from a benchmark scenario to selective hedging (Adam et al. 2015; Brown et al. 2006). We find evidence that supports the hypothesis that management is impacted by prior outcomes when managing FX exposure. In particular, we observe a significant exposure reduction following prior benchmark losses, where the adjustment results in a hedge ratio that is closer to the benchmark of the average hedge ratio. Further, we complement the literature by analyzing the impact of prior outcomes separately for risk-decreasing and risk-increasing strategies. We find that prior benchmark losses are only relevant for risk-increasing strategies, where the exposure is decreased in response to previous benchmark losses, but not for risk-decreasing strategies. Thus, if the managerial focus is on decreasing risk, we find that prior hedging outcomes are not incorporated in current hedge decisions.

We contribute to the literature on corporate risk management in three ways. First, based on the granularity of the dataset, we contribute to the understanding of how firms manage their FX exposures. Second, the data allow for the calculation of a hedge ratio and subsequently, a classification of derivative positions into risk-decreasing, risk-increasing, and risk-constant strategies, where we illustrate their respective relevance in FX risk management. Third, we complement the literature with our analysis of the impact of prior hedging outcomes on present hedge decisions, where we find that prior benchmark losses are only relevant for risk-increasing but not for risk-decreasing strategies.

The paper is organized as follows. Section 2 presents the structure and format of the reported data on FX exposure and corresponding hedging instruments and introduces the hedge ratio measure. Section 3 describes our sample, discusses descriptive statistics, and provides an analysis of the hedge ratio. Section 4 investigates the influence of prior outcomes on hedging decisions, and Section 5 concludes the article.

2. Information Provided in the Registration Document

2.1. Registration Document

We utilize a sample of French firms, since the unique regulatory recommendations in France facilitate the publication of detailed information regarding risk management of foreign exchange exposure. Here, the Autorité des Marchés Financiers (AMF), supervisor of the French financial markets, has established a so-called 'registration document'. As an optional supplement, this registration document provides additional information for various stakeholders. In position paper n°2009–16, the AMF supplies detailed guidelines regarding corporate disclosures on the management of FX risks (Hecht (2021a); for advanced disclosures on interest rate risk, refer to Hecht (2019)). These guidelines by far exceed the requirements of IFRS 7.33 and 7.34 (Autorité des Marchés Financiers 2009), as they advise firms to state their actual FX exposure before and after management by year and currency at the reporting date. Table 1 provides a template of the recommended format of the data with regard to FX exposure and its management provided by the AMF with a proxy currency to illustrate a potential outcome.

Table 1. Template of Information Requested in the Registration Document. This table presents the recommendations, including a numerical example currency position, detailed by the supervisor of the French financial markets, Autorité des Marchés Financiers (AMF), in position paper n°2009–16. In this guideline document, the AMF has established a so-called 'registration document', which as an optional supplement, aims at providing additional information regarding risk management of foreign exchange exposure for various stakeholders. The original document is in the French language and is not available in English.

Year	Assets * [a]	Liabilities * [b]	Forecasted Exposure (Sales (+) and Purchases (−)) [c]	Exposure Before Hedging [d] = [a] − [b] + [c]	Hedging Instruments (Long (+) and Short (−)) [e]	Exposure After Hedging [f] = [d] + [e]
Currency 1 Currency 2 Currency n	120	30	10	100	−50	50
Total	…	…	…	…	…	…

* Mostly in the form of FX-trade receivables and FX-trade payable, respectively.

In the registration document, firms typically specify their FX exposure of assets (column a) and liabilities (column b), mostly in the form of FX-receivables and FX-payables, together with the forecasted FX exposures (column c), which some firms further divide into forecasts of FX-sales and FX-purchases, as illustrated in Table 1. In the aggregate, these figures add up to the net position of exposure before hedging (column d), where all data are firm-, year-, and currency-specific and also include information on outstanding FX debt as well as the data of the exposure of foreign subsidiaries. In addition, the registration document provides information on the employed hedging instruments (column e) and the resulting exposure after hedging (column f). Overall, the reported data in the registration document cover existing and estimated FX exposure and associated hedging positions at the reporting date and, thus, provide a new level of granularity so far unrevealed to the public, which allows for a novel evaluation of how firms manage their FX exposure.

2.2. Hedge Ratio Definition

To evaluate how firms manage their FX exposure we are interested in whether firms decrease or increase their FX risk when employing FX hedging strategies, where we utilize the information on positions before and after hedging provided in the registration document.

In line with Zhang (2009), who analyzes firms that reduce their risk exposure with derivative instruments and those who fail to do so, a hedge ratio allows one to separate strategies that are risk-decreasing from those that are risk-increasing or from those that do not affect risk exposure. Similarly, others have evaluated this distinction in the context of corporate risk management activities (Allayannis and Ofek 2001; Hentschel and Kothari 2001; Zhang 2009), where Allayannis and Ofek (2001) and Hentschel and Kothari (2001) use the term 'hedging' and 'speculation' for risk-decreasing and risk-increasing strategies, respectively. Zhang (2009) employs similar expressions, given that firms that reduce their risk exposure are classified as 'effective hedgers' and firms that increase their risk exposure as 'ineffective hedgers/speculators'.

Based on the new level of granularity, we can evaluate FX activities based on firm-, year-, and currency-specific hedge ratios (HR) that denote the percentage of FX exposure covered by derivative instruments. Thus, a hedge ratio in t (HR_t) is defined as $HR_t = H_t/E_t^b$, where H_t denotes the hedging instruments and E_t^b, the exposure before hedging in t. In general, the exposure before hedging, as reported in the registration document, can either be long (positive), or short (negative). For the utilized hedging instruments, we identify a long (short) position through a positive (negative) sign. Consequently, the hedge ratio is either positive or negative, in dependence on the FX exposure and utilized hedging instruments, where a positive (negative) FX exposure combined with a short position in a FX hedging instrument results in a negative (positive) hedge ratio. On the other hand, a long position in an FX hedging instrument in combination with a positive (negative) exposure defines a positive (negative) hedge ratio. To illustrate the concept, we include the following numerical example that demonstrates the combination of FX exposure before hedging (denominator) and the hedging instruments (numerator) in the hedge ratio. Imagine a firm with an assumed exposure before hedging in a particular currency of 100 units, i.e., $E^b = 100$. That firm can now take one out of six exemplarily, fundamentally different positions, as illustrated numerically in Table 2, that differ in the amount of hedging instruments (H) utilized and the resulting exposure after hedging (E^a). Here, two of the six positions result in a decrease in risk: hedging short e.g., 50 units with derivative instruments ($H = -50$, $HR = -0.5$) implies that the hedging instruments lower the firm's FX exposure from 100 to 50 units[2], and hedging short, e.g., 150 units ($H = -150$, $HR = -1.5$), implies that the hedging instruments lower the firm's FX exposure from 100 to -50 units, which is now a short exposure.[3] Further, two positions result in an increase in risk: hedging short, e.g., 250 units using derivative instruments ($H = -250$, $HR = -2.5$), indicates that the hedging instruments 'increase' the firm's FX exposure from 100 to -150 units, and hedging long, e.g., 50 units ($H = 50$, $HR = 0.5$) indicates that the hedging instruments increase the firm's FX exposure from 100 to 150 units. Finally, two positions change the direction of the exposure, while the size of the risk position of the firm remains constant: doing nothing ($H = 0$, $HR = 0.0$) and hedging short, e.g., 200 units using derivative instruments ($H = -200$, $HR = -2.0$). Overall, Table 2 demonstrates the different positions, including the discontinuous nature of the hedge ratio when interpreted according to the categories of risk increasing and risk decreasing. Consequently, the hedge ratio has to be interpreted with care, given that the interpretation is range dependent.

In summary, a hedge ratio of -1.5 decreases the exposure (risk-decreasing strategy), while a hedge ratio of -2.5 increases the exposure (risk-increasing strategy), where the hedge ratio of -2 marks the lower limit between the strategies and the hedge ratio of 0 marks the upper limit. Thus, all positive hedge ratios ($HR > 0$) as well as hedge ratios below -2 ($HR < -2$) increase risk, while negative hedge ratios bigger than -2 and smaller than 0 ($-2 < HR < 0$) decrease risk. Overall, the utilized classification scheme of risk-increasing, risk-decreasing, and risk-constant positions sets us apart from prior studies.

Table 2. Hedge Ratio Properties. This table illustrates properties of the hedge ratio (HR) and contains a numerical illustration to demonstrate the combination of FX exposure before hedging (denominator) and the hedging instruments (numerator) in the hedge ratio using the column references introduced in Table 1. For illustrative purposes, we assume as base scenario a firm with an exposure before hedging in a particular currency of 100 units, i.e., $E^b = 100$. That firm can now take one out of six fundamentally different positions that differ in the amount of hedging instruments (H) and the resulting exposure after hedging (E^a), where two of the six positions result in a decrease in risk, two in an increase in risk, and two keep the risk at a constant level. Further, it illustrates the hedge ratio range given the six fundamentally different positions.

Hedge Ratio Range:						
	Risk-Increasing Strategy	**Risk-Decreasing Strategy**	**Risk-Decreasing Strategy**	**Risk-Increasing Strategy**	**Risk-Constant Strategy**	**Risk-Constant Strategy**
Exposure Before Hedging [d]	100	100	100	100	100	100
Hedging Instruments [e]	−250	−150	−50	50	−200	0
Exposure After Hedging [f]	−150	−50	50	150	−100	100
Hedge Ratio (HR = [e]/[d])	−2.5	−1.5	−0.5	0.5	−2	0
HR:	−∞ **−2**	**−1**	**0**	∞		

3. Sample Description and Analysis

3.1. Sample Selection

Our dataset contains panel data of listed firms in France for the period 2010 to 2015. The initial sample contains all 333 French firms quoted in the CAC All-Tradable index as of April 2016. Given that the position paper on the elaboration of the registration document was made public on 10 December 2009, the initial year of our sample is 2010. We drop 18 firms from the financial industry, provided their unique business model. For the remaining 315 firms, we hand-collect the reported annual disclosures on FX exposure and hedging activities from the registration document separately for year, currency, exposure, and hedging activity. In total, 183 firms voluntary report that they are not facing any (or no significant) FX exposure; a plausible number of firms since the CAC-All-Tradable index consists of a significant amount of small and medium sized enterprises (SME) that might not be exposed to FX risks. Seventy firms do not follow the recommendations of the AMF and do not disclose information on FX exposure. Thus, we are not able to collect the relevant data, and our results are subject to a potential selection bias due to the voluntary disclosure of these items. However, as the direct cost of compliance with the guidelines of the registration document of the French financial markets' supervisor seem to be high[4], we believe that some firms are not willing to pay these high cost of reporting even if they manage exposures similarly. In line with Adam et al. (2015), we include only active hedgers in the analysis to avoid a bias towards firms that simply 'do nothing' about their FX risks, i.e., we exclude firms that are exposed to FX risk but do not use FX derivatives. Our final sample consists of 1814 firm–year observations across 62 firms from 53 industries (according to the four-digit SIC code) that voluntarily disclose information on FX risks. Each year, a firm has an average FX exposure in approximately 4.9 currencies, where we in total observe 48 different foreign currencies in the sample.

3.2. Hedge Ratio Analysis

To answer the question as to how firms manage their FX exposure, we summarize descriptive statistics of the hedge ratios in Table 3.

Table 3. Descriptive Statistics of Hedge Ratio. This table presents descriptive statistics of the hedge ratios (HR), defined as the percentage of FX exposure before hedging covered by hedging instruments, separately based on risk-decreasing, risk-increasing, and risk-constant strategies.

Strategy	Hedge Ratio	No. obs.	Cum. obs.	Mean	SD	Min	P25	P50	P75	Max
Risk-decreasing	$-2 < HR < -1$	260	260	−1.188	0.250	−1.956	−1.270	−1.075	−1.016	−1.000
	$HR = -1$	82	342	−1.000	0.000	−1.000	−1.000	−1.000	−1.000	−1.000
	$-1 < HR < 0$	759	1101	−0.626	0.314	−1.000	−0.919	−0.714	−0.365	−0.001
Risk-increasing	$HR < -2$	65	1166	−16.320	65.960	−521.000	−5.551	−3.680	−2.924	−2.007
	$0 < HR$	159	1325	1.796	4.856	0.000	0.083	0.358	1.200	42.000
Risk-constant	$HR = -2$	3	1328	−2.000	0.000	−2.000	−2.000	−2.000	−2.000	−2.000
	$HR = 0$	486	1814	0.000	0.000	0.000	0.000	0.000	0.000	0.000

According to the six fundamental and empirically observed positions, the hedge ratio captures (a) risk-decreasing strategies that lower the FX exposure with $-2 < HR < 0$; (b) risk-increasing strategies that increase the FX exposure with $HR < -2$ or $HR > 0$; and (c) risk-constant strategies that keep the FX exposure on a constant level with $HR = -2$ or $HR = 0$. Further, a position with $HR = -1$ is not necessarily identical to a full hedge position as known from the literature, e.g., Hull (2015), given that we do not exactly know the time to maturity of the derivatives. When evaluating the data in Table 3, we find that in approximately 61 percent (1101 observations) of all aggregate currency positions (1814 observations), firms pursue a risk-decreasing strategy, of which less than 5 percent (82 observations) represent a full hedge. Further, a risk-increasing strategy accounts for approximately 12 percent (224 observations) of the sample and a risk-constant strategy accounts for approximately 27 percent (489 observations) of the sample.

Overall, these findings are in line with the survey outcome of Gumb et al. (2018), who indicate that some treasury officials are willing to increase volatility, while other refuse to do so. Further, our findings relate to Zhang (2009), who distinguishes between effective hedgers and ineffective hedgers/speculators according to the development of their risk exposures compared to an expected level in the area of interest rate, foreign exchange rate, and commodity risk management. Out of 225 sample firms, Zhang (2009) classifies 125 firms (55 percent) as effective hedgers and 87 firms (39 percent) as ineffective hedgers/speculators. The remaining 13 firms (6 percent) are categorized as neutral, which leads to an overall 55 percent to 45 percent proportion of risk-decreasing vs. risk-increasing/neutral. Evaluating our sample with exclusively FX risk based on hedge ratios, we find that about 61 percent of all currency positions can be classified as risk-decreasing and around 39 percent as risk-increasing/-constant. To account for the possibility that various risk-increasing positions in different currencies could aggregate to an overall hedged position, we combine all risk-increasing positions per firm and year. We find no evidence of the existence of an overall hedged position. Further, solely evaluating the number of occurrences of risk-increasing or decreasing positions does not provide a detailed picture of the FX exposure of a firm given that a position with an exposure of 0.1 million euros should not be treated as equally important as a position with an exposure of 100 million euros. Thus, we evaluate the exposure before hedging per position to overall firm exposure and find that approximately 20 percent of firm exposure relates to risk-increasing/-constant and 80 percent relate to risk-decreasing strategies.

Across all observations, we find an average hedge ratio of about −0.90 that indicates that on average, 90 percent of the FX exposure is hedged using a risk-decreasing strategy. The median hedge ratio of −0.49 indicates that in the median, about 50 percent of the exposure is hedged. When evaluating the descriptive statistics, we find that few very extreme outliers across our 1814 hedge ratio observations affect particularly the standard deviation of the hedge ratio, i.e., lead to an overall standard deviation of 12.85, while for the subsample of risk-decreasing positions, the standard deviation ranges from 0.25 to 0.31. In general, the standard deviation for risk-increasing positions is by definition higher than for risk-decreasing positions, given that the range for risk-increasing positions potentially covers +/− infinity whereas the range for risk-decreasing positions is limited to a range of $-2 < HR < 0$. However, when evaluating the 25th and 75th percentile, it is visible that the majority of hedge ratios are within plausible ranges. Further, it should be noted that the few very extreme outliers are predominantly denoted in euros or unspecified 'other currencies'. Thus, they are excluded in the reduced sample of 880 observations for the regression analysis, as benchmark gains or losses cannot be determined (see Section 4.2 for details).

Further, we evaluate whether firms hedge differently in specific years or in specific currencies. When breaking down the hedge ratio on a year-by-year basis, we find that, with the exception of the average hedge ratio in 2014, the average and median hedge ratios imply risk-decreasing strategies each year. Similarly, in terms of currencies, we note that the average and median hedge ratios per currency during the entire sample period display risk-decreasing strategies, with minor exceptions for a few currency averages. On a firm level, we observe that overall, 47 of our 62 sample firms (76 percent) are responsible for the risk-increasing positions. Further, we find that 11 of our 62 (18 percent) sample firms have an average hedge ratio that indicates a risk-increasing strategy, i.e., these firms—on average—increase their exposure using derivative instruments. These 11 firms account for almost 16 percent of our total observations, but for 41 percent of the total risk-increasing positions. In terms of industry classification, we find that the 11 firms belong mainly to business service (4 firms, two-digit SIC Code 73) and manufacturing (4 firms, two-digit SIC Code 23 and 36–38).

In conclusion, we identify that the predominantly long FX exposure is hedged—on average (median)—to 90 (49) percent using predominately short derivative instruments. Further, we find that the majority of the taken positions decrease FX exposure with derivative instruments, but a non-negligible part of positions led to an increase in FX exposure, with a very few extreme positions. We do not observe that firms hedge their FX exposure differently in specific years or in specific currencies.

4. Influence of Prior Outcomes on Hedging Decisions

4.1. Hypothesis

Thus far, the paper has provided evidence that firms pursue both risk-decreasing and risk-increasing strategies with derivative instruments when managing the FX exposure. In evaluating extant literature, it has been documented that individual market views are incorporated into corporate risk management activities in the context of selective hedging (Adam et al. 2015; Beber and Fabbri 2012; Bodnar et al. 1998; Brown et al. 2006; Faulkender 2005; Glaum 2002; Tufano 1996), where Adam and Fernando (2006) and Brown et al. (2006) compare cash flows from derivative transactions with benchmark cash flows to investigate whether firms gain or lose money from selective hedging. Moreover, the literature also documents the relevance of these prior outcomes on risk attitudes and decision-making. While Thaler and Johnson (1990) and Weber and Zuchel (2005) provide evidence from experimental settings, Adam et al. (2015) and Beber and Fabbri (2012) substantiate this evidence with empirical analyses on the impact of prior outcomes in an FX and commodity context. Beber and Fabbri (2012) focus on the influence of prior outcomes on corporate FX risk management practices and find that managers adjust FX derivative holdings in response to prior foreign exchange returns. Adam et al. (2015) evaluate the impact of prior selective hedging gains and losses in the context of commodity (gold) risk management and document that managers alter their FX hedging behavior in response to prior outcomes.

Overall, the above findings suggest that management considers prior hedging outcomes when managing its current exposure. Thus, using our unique FX-dataset, we re-evaluate the hypothesis that prior outcomes influence present FX hedge decisions. Since the data granularity allows for the calculation of firm-, currency-, and year-specific hedge ratios and, hence, the differentiation of risk-decreasing and risk-increasing strategies, we also evaluate the impact of prior outcomes on present FX hedge decisions for risk-decreasing and risk-increasing strategies separately and, thus, complement the work of Adam et al. (2015) and Beber and Fabbri (2012).

4.2. Definition of Benchmark Gains and Losses and Methodology

To test whether FX hedging decisions are affected by prior outcomes, we develop a measure to quantify the past performance of hedging activities. In analogy to Brown et al. (2006), we measure past performance relative to a benchmark scenario based on the average hedge ratio, which is interpreted as a proxy for a firm's hedging policy. In our case, this benchmark value is calculated using a firm- and currency-specific average hedge ratio for the sample period. Similar to Adam et al. (2015) and Brown et al. (2006), we attribute deviations from the firm's hedging policy to the incorporation of market views, i.e., selective hedging, and determine based on this deviation the benchmark gains and losses. To determine benchmark gains and losses, we rely on the mechanism of currency forwards given that the recent study of Albouy and Dupuy (2017) indicates that for French non-financial firms, FX forwards are by far the most utilized hedging instruments. Further, we are not able to determine maturities of the FX derivative contracts and assume an average of one-year maturities, given that most firms report times to maturity that approximately correspond to this time frame in the registration document.

The following numerical illustration describes the calculation of these benchmark gains or losses. Assume that a firm reports its USD exposure before hedging with 100 USD in t and hedges 80 USD short. The corresponding hedge ratio for this USD exposure in t equals $HR_t = H_t/E_t^b = 80/100 = 0.8$. Further, assume that the firm's average hedge ratio ($\overline{HR}$) for the USD for the entire sample period is 50 percent ($HR_t = 0.5$), where we attribute the deviation of 30 percentage points (80 percent minus 50 percent) to selective hedging. This difference between the average hedged amount and the actual hedged amount, here 30 USD (100 USD $\cdot$ 0.30), is used to determine benchmark gains or losses. The amount of 30 USD could be converted to EUR by either hedging the entire 30 USD, i.e., an application of the actual hedge ratio of the transaction ($HR_t = 0.8$), or leaving the amount unhedged, i.e., implicitly assuming the application of the average hedge ratio of the firm ($HR_t = 0.5$) and leaving 30 USD unhedged. Thus, if the forward rate of USD to EUR in t is 1.5 and the spot rate in $t+1$ is 1.2, the cash flow resulting from hedging 30 USD equals 20 EUR (30/1.5 = 20), and the cash flow from not hedging the 30 USD results in 25 EUR (30/1.2 = 25). Thus, the decision to deviate from the hedging policy and hedge not only 50 but 80 USD yields a benchmark loss of -5 EUR (20 EUR–25 EUR). Generally speaking, benchmark gains and losses depend on the deviation in hedge ratios (actual hedge ratio vs. benchmark hedge ratio) and the currency development. To determine benchmark gains and losses, we match our sample with the FX spot and one-year forward rates corresponding to the particular reporting dates in the appropriate currency, obtained from Bloomberg. Further, we match firm characteristics as controls, obtained from the Compustat Global Vantage database.

To evaluate the impact of prior outcomes, i.e., benchmark gains and losses, on FX hedge decisions, we rescale the hedge ratio (HR) according to

$$HR_t^* = |1 + HR_t|. \tag{1}$$

Rescaling converts the discontinuous scale, in terms of risk-increasing and risk-decreasing, to a continuous and interpretable scale with a minimum of zero and a maximum of infinity. Now, an increase (decrease) in HR_t^* implies an unambiguous increase (decrease) in FX risk exposure, unlike for the raw hedge ratio detailed in Table 2. Further, the range between 0 and 1 of HR_t^* is associated with risk-decreasing and the range between 1 and ∞ represents risk-increasing positions. Exemplarily, an FX position resulting in $HR_t^* = 0$ relates to a full hedge (according to our definition of full hedge), $HR_t^* = 1$ is equal to a zero hedge, i.e., FX exposure remains constant, and $HR_t^* = 1.5$ denotes a 50 percent increase in the FX exposure.

To evaluate the impact of prior benchmark gains and losses on FX hedging decisions, we evaluate the change in HR_t^* according to

$$\Delta HR_t^* = HR_t^* - HR_{t-1}^*. \tag{2}$$

We estimate OLS regression with and without fixed effects on firm and firm-currency level. The regression model is specified according to

$$\Delta HR_t^* = \alpha + \beta_1 \cdot I_1 \cdot BGL_{t-1} + \beta_2 \cdot I_2 \cdot BGL_{t-1} + \beta_3 \cdot FXEvo_t + Controls_t + \varepsilon_t, \tag{3}$$

where t identifies time and we omit firm and currency specific identifiers to increase readability. Following Adam et al. (2015), we include dummy variables (I_1 and I_2) to separately evaluate the impact of prior benchmark gains and losses (BGL_{t-1}) in t, where I_1 (I_2) is equal to one if the benchmark gain/loss in the prior period was positive (negative) and zero otherwise. Benchmark gains and losses are scaled with the absolute value of the exposure before hedging to control for size effects and converted to positive values to allow for easy interpretation of the estimated regression coefficients. We include a lagged dummy variable ($FXEvo_t$) that takes the value of 0 (1) if the FX rate developed in favor of (against) the FX position of the firm, where we define a positive (negative) exposure in a currency that depreciates (appreciates) as being against (in) a firm's favor. Further, we include in $Controls_t$ several variables to control for alternative explanations. We control for financial distress using the *Debt Ratio*, given that that firms in financial distress are more prone to speculate on financial markets (Campbell and Kracaw 1999; Stulz 1996). We define the *Debt Ratio* as total liabilities over total assets, similar to Beber and Fabbri (2012). In addition, firms with fewer growth opportunities might be inclined to speculate since they are supposed to suffer less from speculative losses, whereas firms with multiple investment opportunities might be better off with hedging to prevent becoming financially constrained and, as a consequence, suffer from underinvestment (Campbell and Kracaw 1999; Froot et al. 1993). In line with the arguments of Géczy et al. (2007), we do not use the book-to-market ratio as a measure for growth opportunities but follow Beber and Fabbri (2012) and use the ratio of capital expenditures over total revenues (*Growth*). Finally, financial strength might endow firms with excess cash that could be used for speculative purposes if appropriate control mechanisms are missing (Jensen 1986). In addition, possessing a cash cushion generates higher tolerance for volatility in results (Stulz 1996). Thus, we control for firm liquidity using the *Quick Ratio*, defined as cash, short-term investments, and total receivables over total current liabilities, similar to other studies (Beber and Fabbri 2012; Géczy et al. 2007). All variables are defined in Appendix A. We winsorize *Debt Ratio*, *Quick Ratio*, and *Growth* to the 1st and 99th percentile to eliminate the effect of outliers. All other variables are not winsorized given that that these data are hand-collected and all data points are meaningful. Finally, we drop risk-constant positions to avoid a 'do-nothing' bias and drop all observations where control variables are missing, as well as all currency positions originally denoted in euros and unspecified 'Other Currencies', where benchmark gains or losses cannot be determined, which leaves a sample of 880 observations across 57 firms and 35 currencies.

4.3. Empirical Results

4.3.1. Main Regression Findings

Table 4 illustrates descriptive statistics of the variables used in the regression for the reduced sample and the subsamples of risk-increasing (RI subsample) and risk-decreasing (RD subsample) positions, where the difference between the means in HR_t^* of the two subsamples is highly significant with RD − RI = −5.089 (t-statistic = −10.084). The standard deviation, minimum, and maximum values of HR_t^*, especially for the RI subsample, indicate that some decision-makers attempt to take advantage of individual market views and that a few extreme views exist. Further, we find that average benchmark gains and losses differ between the subsamples. Risk-increasing strategies on average yield a benchmark gain (loss) of 0.103 (0.159), compared to a benchmark gain (loss) of 0.018 (0.023) for risk-decreasing. The maximum benchmark gain (loss) in risk-increasing positions amounts to 1.926 (5.513) and is substantially higher than the maximum benchmark gain (loss) of risk-decreasing positions with 0.828 (1.119). Further, the standard deviation of both benchmark gains and losses is substantially higher for the risk-increasing than for the risk-decreasing sample.

Table 4. Descriptive Statistics of Regression Variables. This table reports summary statistics for the regression model across our reduced sample with a total of 880 observations for the dependent and independent variables separately for the overall sample (ALL), risk-increasing (RI), and risk-decreasing (RD). HR is defined as $HR_t = H_t/E_t^b$, where H_t denotes hedging instruments and E_t^b denotes the exposure before hedging in t. The dependent variable HR^* is the result of the standardization $HR_t^* = |1 + HR_t|$, where now, HR_t^* can only take positive values from 0 to ∞ and the range between 0 and 1 is associated with risk-decreasing and range 1 to ∞ represents risk-increasing strategies. Benchmark gains and losses are defined in Section 4.2. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level, respectively, with t-statistics in parentheses. All variables are defined in Appendix A.

		N	Mean	SD	Min	p25	p50	p75	Max
ALL	HR^*	880	0.979	5.424	0.000	0.042	0.247	0.701	128.375
	Benchmark Gains	441	0.030	0.122	0.000	0.001	0.004	0.014	1.926
	Benchmark Losses	439	0.042	0.278	0.000	0.000	0.005	0.023	5.513
	Debt Ratio	880	0.142	0.104	0.000	0.070	0.133	0.214	0.448
	Quick Ratio	880	1.031	0.446	0.349	0.750	0.946	1.216	2.965
	Growth	880	0.045	0.026	0.006	0.026	0.041	0.058	0.124
	FXEvo	880	0.470	0.499	0.000	0.000	0.000	1.000	1.000
RI	HR^*	120	5.374	13.936	1.001	1.169	1.739	3.020	128.375
	Benchmark Gains	60	0.103	0.293	0.000	0.001	0.008	0.053	1.926
	Benchmark Losses	60	0.159	0.723	0.000	0.001	0.014	0.060	5.513
	Debt Ratio	120	0.137	0.087	0.000	0.082	0.120	0.214	0.379
	Quick Ratio	120	0.923	0.320	0.349	0.773	0.879	1.008	1.905
	Growth	120	0.041	0.028	0.006	0.019	0.035	0.058	0.124
	FXEvo	120	0.492	0.502	0.000	0.000	0.000	1.000	1.000
RD	HR^*	760	0.285	0.301	0.000	0.026	0.165	0.500	0.999
	Benchmark Gains	381	0.018	0.055	0.000	0.001	0.003	0.013	0.828
	Benchmark Losses	379	0.023	0.073	0.000	0.000	0.004	0.018	1.119
	Debt Ratio	760	0.143	0.106	0.000	0.058	0.135	0.214	0.448
	Quick Ratio	760	1.048	0.461	0.349	0.746	0.953	1.278	2.965
	Growth	760	0.045	0.026	0.006	0.026	0.041	0.058	0.124
	FXEvo	760	0.467	0.499	0.000	0.000	0.000	1.000	1.000
	Difference HR^*(t-Statistic): RD − RI: −5.089 *** (−10.084)								

Following our hypothesis, we test whether management refers to prior hedging outcomes when managing its current exposure, i.e., we examine the relationship between prior hedging outcomes and subsequent hedge ratio variation. Our main findings are detailed in Table 5, where we evaluate our hypothesis based on OLS regression models (models (1) to (3)) with and without firm fixed effects (models (4) to (6)) and firm-currency fixed effects (models (7) to (9)) with cluster-robust standard errors. We focus on the impact of prior benchmark gains and losses on ΔHR_t^*. Models (1), (4), and (7) report the results for the overall sample (ALL-sample), consisting of 880 firm-year currency observations without a distinction between risk-decreasing and risk-increasing strategies. For the ALL-sample, we find that ΔHR_t^* decreases, i.e., HR^* decreases, following prior benchmark losses. Thus, after benchmark losses, management hedges more of its exposure. Further, when focusing on the RI-subsample, i.e., model (2), (5), and (8), we observe very similar results, where prior benchmark losses decrease ΔHR_t^* and the magnitudes of the estimates for the RI subsample are similar to the estimates of the ALL sample. However, when evaluating the RD subsample, i.e., models (3), (6), and (9), we find that prior benchmark losses have no significant influence on ΔHR_t^*. With regard to prior benchmark gains, we observe weak significant reactions for models (7) to (9) on a 10 percent significance level, where we control for firm-currency fixed effects. Overall, we only find a reaction following prior benchmark losses for the ALL- and RI-subsample.

Table 5. Effect of Prior Outcomes on the Hedge Ratio Variation. This table reports the estimation results of the OLS regression (models (1) to (3)) with and without firm fixed effects (models (4) to (6)) and firm-currency fixed effects (models (7) to (9)). The dependent variable is the difference in standardized hedge ratios ($\Delta HR_t^* = HR_t^* - HR_{t-1}^*$) with standardization $HR_t^* = |1 + HR_t|$. As a result of the standardization, HR_t^* can only take positive values from 0 to ∞, where the range between 0 and 1 is associated with risk-decreasing and range 1 to ∞ represents risk-increasing strategies. Independent variables include prior benchmark gains and losses defined in Section 4.2. Models (1), (4), and (7) refer to the results for the entire sample (ALL); models (2), (5), and (8) and (3), (6), and (9) separately evaluate risk-increasing (RI) and risk-decreasing (RD) strategies. All models are estimated using cluster-robust standard errors, where we cluster on a firm level. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level, respectively, with t-statistics in parentheses. All variables are defined in Appendix A.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
	ALL	**RI**	**RD**	**ALL**	**RI**	**RD**	**ALL**	**RI**	**RD**
VARIABLES	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*
Benchmark Gains	10.159	12.071	−7.507	9.035	12.150	−7.057	−14.436 *	−11.474 *	−17.588 *
	(0.742)	(0.690)	(−1.490)	(0.681)	(0.648)	(−1.446)	(−1.790)	(−1.669)	(−1.786)
Benchmark Losses	−13.273 ***	−14.357 ***	−8.550	−13.876 ***	−15.712 ***	−7.916	−28.517 ***	−27.979 ***	−17.139 *
	(−3.526)	(−4.409)	(−1.251)	(−3.773)	(−7.493)	(−1.077)	(−7.268)	(−7.920)	(−1.870)
Debt Ratio	0.525	2.166	0.211	0.741	20.924	2.291	4.286	31.044	3.165
	(0.404)	(0.158)	(0.272)	(0.180)	(1.016)	(0.831)	(1.474)	(1.287)	(1.545)
Quick Ratio	0.366	6.953	0.122	0.048	9.102	0.088	−0.167	9.687	0.175
	(1.292)	(1.665)	(1.227)	(0.063)	(1.257)	(1.054)	(−0.375)	(1.228)	(1.116)
Growth	−5.155	−29.599	−0.239	0.752	−9.646	8.261	0.650	−19.479	8.219
	(−1.056)	(−0.827)	(−0.095)	(0.064)	(−0.186)	(1.304)	(0.073)	(−0.358)	(1.053)
FXEvo	0.073	0.584	−0.004	−0.008	1.683	0.028	0.124	3.777	0.074
	(0.310)	(0.355)	(−0.071)	(−0.031)	(0.951)	(0.675)	(0.375)	(1.530)	(0.725)
No. obs.	880	120	760	880	120	760	880	120	760
Adjusted R^2	0.197	0.218	0.107	0.207	0.278	0.093	0.513	0.594	0.143
Firm FE	NO	NO	NO	YES	YES	YES	NO	NO	NO
Firm-Currency FE	NO	NO	NO	NO	NO	NO	YES	YES	YES
Number of Groups				57	36	54	246	66	235

In line with the extant literature, our overall results indicate that management is impacted by prior outcomes when managing its FX exposure. In detail, we find that previous benchmark losses induce a subsequent exposure reduction. Further, the granularity of our dataset allows for a differentiation of risk-decreasing and risk-increasing strategies (RD- and RI-subsample). Evaluating these subsamples separately, we provide evidence that prior outcomes are only relevant for risk-increasing, but not for risk-decreasing strategies. While we find that the FX exposure is decreased following prior benchmark losses for risk-increasing strategies, prior benchmark gains and losses have no impact on the hedging decision when evaluating risk-decreasing strategies. One possible explanation is that previous benchmark losses are simply not considered when a firm pursues hedging (risk-decreasing) motives only.

In addition to the evidence that previous benchmark losses induce a subsequent exposure reduction for the ALL- and RI-sample, we evaluate whether management adjusts the hedge ratio closer to the average hedge ratio ($\overline{HR}$) in response to benchmark gains and losses, i.e., reverts back to the hedging policy. We construct a dependent variable that captures the change of the deviation of the absolute difference of the actual hedge ratio to the average hedge ratio per firm and currency from $t-1$ to t according to

$$\Delta Benchmark_t = \left|HR_t - \overline{HR}\right| - \left|HR_{t-1} - \overline{HR}\right| \tag{4}$$

Thus, an increase in $\Delta Benchmark_t$ implies a larger deviation from the average hedge ratio in the current period than in the prior period; a decrease implies a smaller deviation from the average hedge ratio in the current period than in the prior period. The estimates are presented in Table 6, where we estimate OLS regression models with cluster-robust standard errors in analogy to the main analysis from Table 5. We find that prior benchmark gains and losses are significant for the ALL-sample and RI-subsample and that the estimated coefficients are negative. Our results indicate that after benchmark losses the difference to the average hedge ratio is smaller compared to the previous period. Thus, in response to benchmark losses, management adjusts the hedge ratio to a value closer to the average benchmark hedge ratio for the RI subsample. When evaluating the risk-decreasing subsample, however, we find that prior benchmark losses have no impact on $\Delta Benchmark_t$ except for model (9), where we find a weak significant impact for prior gains and losses. Overall, we find evidence that in response to benchmark losses management adjusts the hedge ratio to a value closer to the average benchmark hedge ratio for the RI subsample; this is not the case for the RD subsample.

4.3.2. Robustness of Results

Our main finding that management is influenced by prior outcomes when managing its exposure, where these prior outcomes seem to be only relevant for risk-increasing strategies, hinges on two specifications: first, on the specification of prior benchmark gains and losses, and second, on the separation of the sample into the RD subsample and the RI subsample. To illustrate the robustness of our main finding, we alter the parameters for both specifications.

First, we modify the calculation of prior benchmark gains and losses by adjusting the calculation of the benchmark hedge ratio: it can be argued that the average hedge ratio includes information from $t+1$ at decision time t since the average hedge ratio is defined as the average across all sample periods independent of the period where benchmark gains and losses are calculated. Now, benchmark gains and losses are calculated based on an average hedge ratio that is the average of all past hedge ratios, i.e., it is time-dependent and includes only hedge ratios from prior periods in the calculation of the average hedge ratio. The estimations in Table 7 illustrate that this modification of determining prior benchmark gains and losses does not affect our main findings. We still observe statistically significant reactions to prior benchmark losses for the ALL sample and RI subsample, whereas estimated coefficients of prior benchmark losses in the RD subsample are statistically not significant. Thus, results in Table 7 support our main findings and we conclude that our results do not depend on the particular specification of gains and losses.

Table 6. Effect of Prior Outcomes on the Deviation from the Average Hedge Ratio. This table reports the estimation results of the OLS regression (models (1) to (3)) with and without firm fixed effects (models (4) to (6)) and firm-currency fixed effects (models (7) to (9)). The dependent variable $\Delta Benchmark_t$ captures the absolute deviation of the actual hedge ratio to the average hedge ratio per firm and currency in t minus the absolute deviation in $t-1$ and it is defined in (4). Independent variables include prior benchmark gains and losses defined in Section 4.2. Model (1), (4), and (7) refer to the results for the entire sample (ALL), model (2), (5), and (8) and (3), (6), and (9) separately evaluate risk-increasing (RI) and risk-decreasing (RD) strategies. All models are estimated using cluster-robust standard errors, where we cluster on firm level. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level, respectively, with t-statistics in parentheses. All variables are defined in Appendix A.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
	ALL	**RI**	**RD**	**ALL**	**RI**	**RD**	**ALL**	**RI**	**RD**
VARIABLES	$\Delta Benchmark_t$	$\Delta Benchmark_t$	$\Delta Benchmark_t$	$\Delta Benchmark_t$	$\Delta Benchmark_t$	$\Delta Benchmark_t$	$\Delta Benchmark_t$	$\Delta Benchmark_t$	$\Delta Benchmark_t$
Benchmark Gains	−0.378	−0.756	−3.165	−0.906	−1.184	−2.961	−11.158 *	−9.836	−18.488 *
	(0.11)	(0.17)	(0.71)	(0.28)	(0.25)	(0.67)	(2.09)	(1.84)	(2.03)
Benchmark Losses	−13.940 **	−14.847 **	−7.315	−14.194 **	−15.475 **	−7.290	−20.259 **	−19.660 **	−19.309 *
	(4.81)	(6.60)	(1.17)	(5.01)	(9.90)	(1.05)	(8.19)	(8.18)	(2.40)
Debt Ratio	−0.074	−1.571	0.236	1.573	13.071	2.170	3.597	21.715	2.742
	(0.08)	(0.18)	(0.34)	(0.52)	(1.01)	(0.90)	(1.49)	(1.25)	(1.50)
Quick Ratio	0.127	3.539	0.075	0.017	6.080	0.081	−0.215	5.515	0.202
	(0.66)	(1.28)	(0.88)	(0.03)	(1.18)	(0.98)	(0.61)	(0.99)	(1.40)
Growth	−1.410	1.120	−0.908	1.658	−7.842	8.961	2.206	−12.497	8.753
	(0.50)	(0.04)	(0.44)	(0.21)	(0.23)	(1.88)	(0.39)	(0.36)	(1.46)
FXEvo	−0.027	−0.230	−0.050	−0.081	0.600	−0.045	−0.001	2.620	−0.016
	(0.17)	(0.21)	(0.87)	(0.41)	(0.46)	(0.78)	(0.00)	(1.62)	(0.18)
No. obs.	880	120	760	880	120	760	880	120	760
Adjusted R^2	0.363	0.427	0.088	0.367	0.478	0.087	0.480	0.586	0.227
Firm FE	NO	NO	NO	YES	YES	YES	NO	NO	NO
Firm-Currency FE	NO	NO	NO	NO	NO	NO	YES	YES	YES
Number of Groups				57	36	54	246	66	235

Table 7. Alternative Specification of Benchmark Gains and Losses. This table reports the estimation results for an alternative specification of prior benchmark gains and losses for OLS regression (models (1) to (3)) with and without firm fixed effects (models (4) to (6)) and firm-currency fixed effects (models (7) to (9)) based on an average hedge ratio that is the average of all past hedge ratios, i.e., the average hedge ratio used to determine benchmark gains and losses only includes past hedge ratios. The dependent variable is the difference in standardized hedge ratios ($\Delta HR_t^* = HR_t^* - HR_{t-1}^*$) with standardization $HR_t^* = |1 + HR_t|$. As a result of the standardization, HR_t^* can only take positive values from 0 to ∞, where the range between 0 and 1 is associated with risk management (0 refers to a full hedge where the entire exposure is hedged) and range 1 to ∞ represents speculation. Independent variables include prior benchmark gains and losses defined in Section 4.2. Models (1), (4), and (7) refer to the results for the entire sample (ALL), and models (2), (5), and (8) and (3), (6), and (9) separately evaluate risk-increasing (RI) and risk-decreasing (RD) strategies. All models are estimated using cluster-robust standard errors, where we cluster on firm level. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level, respectively, with t-statistics in parentheses. All variables are defined in Appendix A.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
	ALL	**RI**	**RD**	**ALL**	**RI**	**RD**	**ALL**	**RI**	**RD**
VARIABLES	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*	ΔHR_t^*
Benchmark Gains	−1.074	−0.484	−8.151	−1.127	−0.338	−8.304 **	−5.578 ***	−9.254 ***	−2.776
	(−0.371)	(−0.110)	(−1.941)	(−0.349)	(−0.063)	(−2.020)	(−4.458)	(−3.355)	(−0.467)
Benchmark Losses	−12.259 ***	−12.623 ***	−12.752	−12.227 ***	−12.289 ***	−13.564	−15.909 ***	−15.444 ***	−13.217
	(−69.899)	(−84.532)	(−1.960)	(−77.478)	(−44.042)	(−1.609)	(−40.431)	(−47.133)	(−1.488)
Debt Ratio	0.476	1.056	0.920	4.084	31.327	3.562	6.114	47.219	2.545
	(0.338)	(0.090)	(1.033)	(0.770)	(1.383)	(1.005)	(1.428)	(1.526)	(0.932)
Quick Ratio	0.273	4.672	0.160	−0.099	8.734	0.316	−0.335	14.708	0.534
	(0.944)	(1.219)	(1.280)	(−0.126)	(0.771)	(1.566)	(−0.661)	(1.087)	(1.664)
Growth	−0.714	−10.931	0.909	−2.812	−81.689	15.532	−5.490	−167.084	18.441
	(−0.238)	(−0.379)	(0.313)	(−0.150)	(−0.562)	(1.334)	(−0.328)	(−1.118)	(1.272)
FXEvo	−0.037	−0.194	−0.011	0.013	2.077	0.043	0.087	6.565	0.076
	(−0.136)	(−0.116)	(−0.125)	(0.039)	(0.816)	(0.606)	(0.214)	(1.597)	(0.602)
No. obs.	662	92	570	662	92	570	662	92	570
Adjusted R^2	0.479	0.543	0.145	0.476	0.609	0.135	0.491	0.692	0.109
Firm FE	NO	NO	NO	YES	YES	YES	NO	NO	NO
Firm-Currency FE	NO	NO	NO	NO	NO	NO	YES	YES	YES
Number of Groups				56	32	53	204	59	193

Further, the result that prior outcomes are only relevant for risk-increasing strategies may be dependent on the utilized classification strategy when separating the FX positions into risk-increasing or risk-decreasing. To test for robustness, we introduce three alternative approaches. First, we want to ensure that reclassification on a periodical basis does not induce a bias and, hence, eliminate positions that switch classification between two periods, i.e., we eliminate positions that are classified as risk-increasing in t and as risk-decreasing in $t+1$, or vice versa. Second, we introduce two different classification strategies to classify FX positions as RD- and RI-subsample. Here, we first assume that extreme benchmark gains or losses (1st and 4th quartile of the distribution of benchmark gains or losses) are the result of risk-increasing strategies while moderate outcomes—within the 25th and 75th percentile of the distribution of benchmark gains or losses—are the result of risk-decreasing strategies. Thus, we calculate for all firms and currencies the benchmark gains or losses using the average hedge ratio per firm and currency. Then, currency positions are classified as RD (RI) subsample if firm benchmark gains or losses are between (outside) the 25th and 75th percentile of the distribution. Third, we base the classification strategy on the firm-specific standard deviation of hedge ratios per year across all currencies. This classification strategy captures the magnitude of changes to the hedge ratio of each firm. All standard deviation values across all years and firms are then ordered and firms are classified in the RD (RI) subsample if the standard deviation is in the lower (upper) half of the scale. Based on these three different classification schemes, we estimate the OLS-models in analogy to the main findings.

The unreported results are robust to an adjustment of the classification strategy of our subsamples. Dropping aggregate currency positions that switch between the RD and RI subsample across time, does not alter our main findings, where the results are very similar to those reported in Table 5. The adjustment of the classification strategy to relate to benchmark gains or losses and the adjustment of the classification strategy to relate to above-median (below-median) standard deviation of firm hedge ratios both support our main findings, where we find that the reaction to prior benchmark losses is statistically significant for the RI but not for the RD subsample. Overall, our estimations for modified classification strategies regarding the RD and RI subsample support our main findings and we infer that our findings are not the consequence of a specific sample classification strategy.

5. Conclusions

Based on a unique hand-collected dataset with unprecedented data granularity, we evaluate how firms manage their FX exposures. Based on publicly reported FX exposures before and after hedging we determine firm-, year-, and currency-specific hedge ratios that allow for a separation of risk-decreasing from risk-increasing/risk-constant positions. Our findings indicate that about 20 (80) percent of FX firm exposures are managed using risk-increasing/risk-constant (risk-decreasing) strategies. In addition, we evaluate the impact of prior benchmark outcomes in the context of FX exposure management. We find that prior outcomes have an impact on present hedge decisions, where following prior benchmark losses, the exposure is reduced and the hedge ratio is adjusted closer to the benchmark. Further, when separating risk-decreasing from risk-increasing positions, we find that prior benchmark losses are only relevant in the risk-increasing subsample but are irrelevant for the risk-decreasing subsample; thus, hedging decisions are independent of prior benchmark losses if the intention is to reduce FX exposure.

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Data Availability Statement: Data are openly available.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Definition of Variables.

Variables	Description of Variables
BGL	Benchmark gains and losses, defined in Section 4.2
$\Delta Benchmark$	Deviation of the actual hedge ratio to the average hedge ratio per firm and currency defined in (4)
$Debt\ Ratio$	Total Liabilities/Total Assets
I_1	Dummy variable that is equal to one if the benchmark gain/loss in the prior period was positive and zero otherwise
I_2	Dummy variable that is equal to one if the benchmark gain/loss in the prior period was negative and zero otherwise
$E_t^a(\cdot)$	Net exposure in t after hedging
$E_t^b(\cdot)$	Net exposure in t before hedging
$FXEvo$	Dummy variable to measure exchange rate evolution: takes the value of 1 (0) if the FX rate develops in favor of (against) the taken position
$Growth$	Capital Expenditures/Total Revenues
H_t	Hedging instruments in t
HR_t	Hedge ratio in t with $HR_t = H_t/E_t^b$; percentage of FX exposure covered by hedging instruments
$\overline{HR}$	Average of all hedge ratios across years by firm and currency
HR^*	$HR_t^* = \lvert 1 + HR_t \rvert$
ΔHR^*	$\Delta HR_t^* = HR_t^* - HR_{t-1}^*$
$Quick\ Ratio$	(Cash + Short-Term Investments + Total Receivables)/Total Current Liabilities

Notes

1 Following Bodnar et al. (2011), all other examined risk categories, such as interest rates, commodities, or energy, are more commonly managed with operational risk measures as opposed to derivatives/financial contracts.

2 Similarly, if a firm reports a short (negative sign) exposure of −100 units that is hedged long (positive sign) with 50 units, the hedge ratio also equals 50/−100 = −0.5 and indicates a risk-decreasing strategy.

3 In the latter case, the overhedging changes the sign of the exposure, which could indicate underlying speculative intentions. However, the descriptive statistics in Table 3 show that firms are only slightly overhedging with a HR mean of −1.18, which can rather be attributed to imperfect hedge conditions in the real world (Hull 2015), and hence we can classify such positions as risk-decreasing.

4 In accordance with French regulations, the registration document is an additional document to be filed with the AMF. Exemplary, one group illustrates as difference between its annual report and registration document that the registration document provides further details on the activity, financial situation and prospects of the company.

References

Adam, Tim, and Chitru Fernando. 2006. Hedging, Speculation and Shareholder Value. *Journal of Financial Economics* 81: 283–309. [CrossRef]

Adam, Tim, Chitru Fernando, and Evgenia Golubeva. 2015. Managerial Overconfidence and Corporate Risk Management. *Journal of Banking and Finance* 60: 195–208. [CrossRef]

Adam, Tim, Chitru Fernando, and Jesus Salas. 2017. Why Do Firms Engage in Selective Hedging? Evidence from the Gold Mining Industry. *Journal of Banking and Finance* 77: 269–82. [CrossRef]

Adam, Tim, Sudipto Dasgupta, and Sheridan Titman. 2007. Financial constraints, competition, and hedging in industry equilibrium. *Journal of Finance* 62: 2445–73. [CrossRef]

Albouy, Michel, and Philippe Dupuy. 2017. Selective Hedging of Foreign Exchange Risk: New Evidence from French Non-Financial Firms. *Management International* 21: 76–88. [CrossRef]

Allayannis, George, and Eli Ofek. 2001. Exchange Rate Exposure Hedging and the Use of Foreign Currency Derivatives. *Journal of International Money and Finance* 20: 273–96. [CrossRef]

Autorité des Marchés Financiers. 2009. *Position—Recommandation AMF n ° 2009–16: Guide d'élaboration Des Documents de Référence*. Available online: http://www.amf-france.org/technique/multimedia?docId=workspace://SpacesStore/0781ea1e-6eef-495e-ae23-7dbac9e435c4_fr_4.0_rendition (accessed on 16 June 2018).

Beber, Alessandro, and Daniela Fabbri. 2012. Who Times the Foreign Exchange Market? Corporate Speculation and CEO Characteristics. *Journal of Corporate Finance* 18: 1065–87. [CrossRef]

Bodnar, Gordon M., Erasmo Giambona, John R. Graham, Campbell R. Harvey, and Richard C. Marston. 2011. Managing Risk Management. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1787144 (accessed on 25 June 2023).

Bodnar, Gordon M., Richard C. Marston, and Greg Hayt. 1998. Survey of Financial Risk Management by U.S. Non-Financial Firms. *Financial Management* 4: 70–91. [CrossRef]
Brown, Gregory W. 2001. Managing Foreign Exchange Risk with Derivatives. *Journal of Financial Economics* 60: 401–48. [CrossRef]
Brown, Gregory W., and Klaus Bjerre Toft. 2002. How Firms Should Hedge. *Review of Financial Studies* 15: 1283–324. [CrossRef]
Brown, Gregory W., Peter R. Crabb, and David Haushalter. 2006. Are Firms Successful at Selective Hedging? *Journal of Business* 79: 2925–49. [CrossRef]
Campbell, Tim S., and William A. Kracaw. 1999. Optimal Speculation in the Presence of Costly External Financing. In *Corporate Risk Management*. Edited by Gregory W. Brown and Donald H. Chew. London: Risk Books, pp. 131–39.
Faulkender, Michael. 2005. Hedging or Market Timing? Selecting the Interest Rate Exposure of Corporate Debt. *Journal of Finance* 60: 931–62. [CrossRef]
Froot, Kenneth A., David S. Scharfstein, and Jeremy C. Stein. 1993. Risk Management: Coordinating Corporate Investment and Financing Policies. *Journal of Finance* 48: 1629–58. [CrossRef]
Géczy, Christopher C., Bernadette A. Minton, and Catherine Schrand. 2007. Taking a View: Corporate Speculation, Governance, and Compensation. *Journal of Finance* LXII: 2405–44. [CrossRef]
Glaum, Martin. 2002. The Determinants of Selective Hedging—Evidence from German Non-Financial Corporations. *Journal of Applied Corporate Finance* 14: 108–21. [CrossRef]
Guay, Wayne, and Sri Prakash Kothari. 2003. How Much Do Firms Hedge with Derivatives? *Journal of Financial Economics* 70: 423–61. [CrossRef]
Gumb, Bernard, Philippe Dupuy, Charles Richard Baker, and Véronique Blum. 2018. The Impact of Accounting Standards on Hedging Decisions. *Accounting, Auditing & Accountability Journal* 31: 193–213. [CrossRef]
Hecht, Andreas. 2019. How Do Firms Manage Their Interest Rate Exposure? *Journal of Risk Finance* 20: 501–19. [CrossRef]
Hecht, Andreas. 2021a. The Role of Managerial Characteristics in FX Risk Management: Who Increases Risk? *Review of Managerial Science* 15: 2377–406. [CrossRef]
Hecht, Andreas. 2021b. The determinants of corporate FX speculation—Why firms increase risk. *Journal of Risk Finance* 22: 363–83. [CrossRef]
Hentschel, Ludger, and Sri Prakash Kothari. 2001. Are Corporations Reducing or Taking Risks with Derivatives? *The Journal of Financial and Quantitative Analysis* 36: 93–118. [CrossRef]
Hull, John C. 2015. *Options, Futures and Other Derivatives*. London: Pearson, vol. 9. [CrossRef]
Jensen, Michael C. 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review* 76: 323–29.
Stulz, René M. 1996. Rethinking Risk Management. *Journal of Applied Corporate Finance* 9: 8–24. [CrossRef]
Thaler, Richard H., and Eric J. Johnson. 1990. Gambling with the House Money and Trying to Break Even: The Effects of Prior Outcomes on Risky Choice. *Management Science* 36: 643–60. [CrossRef]
Tufano, Peter. 1996. Who Manages Risk? An Empirical Examination of Risk Management Practices in the Gold Mining Industry. *Journal of Finance* 51: 1097–137. [CrossRef]
Weber, Martin, and Heiko Zuchel. 2005. How Do Prior Outcomes Affect Risk Attitude? Comparing Escalation of Commitment and the House-Money Effect. *Decision Analysis* 2: 30–43. [CrossRef]
Zhang, Haiwen. 2009. Effect of Derivative Accounting Rules on Corporate Risk-Management Behavior. *Journal of Accounting and Economics* 47: 244–64. [CrossRef]