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On the determinants of speculation - a case for extended disclosures in corporate risk management

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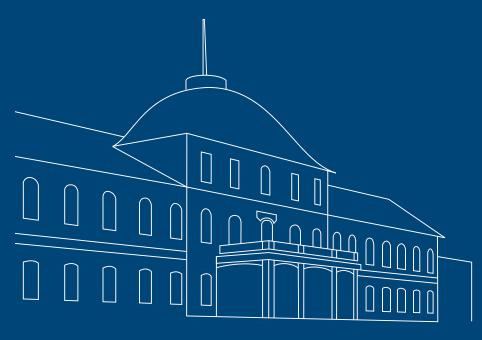
Institute of Financial Management

DISCUSSION PAPER 15-2017

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On the Determinants of Speculation – a Case for Extended Disclosures in Corporate Risk Management¹

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Abstract:

We examine the determinants of corporate speculation and challenge the extant, conflicting evidence. Separating risk management (reducing currency-specific FX exposure) from speculation (increasing or holding currency-specific FX exposure constant), we provide unprecedented evidence that speculators are smaller, have more growth opportunities and possess lower internal resources than risk-managing firms. The refined granularity of our dataset stems from a unique regulatory environment, where a regulating authority recommends additional disclosures for FX risk management in excess of governing accounting standards. Our findings enable investors, henceforth, to identify speculation from public available sources, where our results substantiate the significance of such an extended reporting. Thus, this case of optional disclosures might serve as blueprint for further regulatory refinements in other settings.

Keywords: Foreign Exchange, Risk Management, Selective Hedging,

Speculation, Disclosure, Reporting

JEL: G32, G38, G39

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1. Introduction

Corporates do not use derivatives exclusively for hedging purposes. Sufficient theoretical and empirical evidence of speculative activities² has found its way into literature (Adam, Fernando, & Golubeva, 2015; Adam, Fernando, & Salas, 2017; Bodnar et al. 2011; Bodnar, Marston, & Hayt, 1998; Brown, Crabb, & Haushalter, 2006; Faulkender, 2005; Glaum, 2002). The determinants of corporate speculation remain nevertheless inconsistent. Literature on financial risk management offers various theoretical solutions to explain why companies might have an incentive to speculate as opposed to hedge (T. Adam, Dasgupta, & Titman, 2007; Campbell & Kracaw, 1999; Froot, Scharfstein, & Stein, 1993; Stulz, 1996). Empirical evidence, however, is ambiguous, where Glaum (2002) summarizes in 2002 that most studies up to this date are at variance.

Two potential explanations for this disagreement arise. First, the exclusion of potential speculation with derivative financial instruments was a weak point in terms of methodology of earlier research (Glaum, 2002). Nonetheless, including most recent evidence of studies that incorporate speculation (Adam et al., 2017; Brown et al., 2006; Géczy, Minton, & Schrand, 2007) reveals a similar picture. With regard to firms size, growth opportunities and corporate liquidity indicators, inconsistency on the determinants on speculation is once more prevailing (Adam et al., 2017; Brown et al., 2006; Géczy et al., 2007). A second potential clarification for the ambiguous empirical evidence originates from Judge (2007). With his comprehensive review of corporate hedging literature, Judge (2007) argues that a mixed outcome might be the result of potential sample biases, referring to deviating hedging definition among the studies. Comparing most recent research on speculation (Adam et al., 2017; Brown et al., 2006; Géczy et al., 2007), we detect that the results of Brown et al. (2006) and Adam et al. (2017) do not concur despite the mutual usage of the gold industry dataset.³ Since their approach on measuring speculation, which serves in both regression models as dependent variable, deviates, we assume that the nonuniform outcomes on the determinants of speculation may be explained by different methodologies and definitions of speculation. We address this matter and investigate the determining factors of speculation using the additional disclosures of our unique dataset to apply an innovative methodology in an FX context.

The terms speculation and "selective hedging" have been used interchangeably (T. R. Adam et al., 2017), where "selective hedging" describes the sizing, positioning, and timing of derivative transactions (Stulz, 1996).

While Brown et al. (2006)'s analysis covers the years of 1993 to 1998 across 44 gold producers, Adam et al. (2017) involves 92 firms from 1989 to 1998.

This publicly available data of French companies listed in the country's superordinate stock market index provides unique FX information on a firm-currency level. Thanks to the granularity incited by the supervisor of the French financial markets with their recommendations that exceed IFRS requirements, we are able to calculate firm-, currency-, and year-specific hedge ratios and hence categorize aggregate currency positions as either risk management (reducing currency-specific FX exposure) or speculative (increasing or holding currency-specific FX exposure constant). We subsequently classify companies as risk managers, frequent speculators or temporary speculators according to their speculative share relative to total firm exposure. The separation of risk management from speculative activities is affirmed by a recent interview study among French firms that indicates that some treasury officials reject while others accept any speculative activity (Gumb, Dupuy, Baker, & Blum, 2017).

The results indicate that frequent speculators are lower in size, possess more investment possibilities and dispose of lower internal funds than risk managers, which taken together provide unprecedented empirical evidence for the convexity theories in an FX environment.⁴ In addition, our findings illustrate that speculation can be determined reading public corporate disclosures. Up to present, literature was in agreement that investors are, most probably, not capable to detect speculation by examining publicly accessible data (Géczy et al., 2007; Judge, 2007). Using the extended disclosures from our dataset, however, allows investors and further stakeholders henceforward to identify speculation using data from publicly available sources. Further, our findings illustrate the significance of the additionally disclosed information. It fosters the understanding of a firm's FX risk management strategy and execution as well as enables the examination of corporate risk management activities from new analytic angles. This informational advantage might be beneficial for diverse interest groups in various respects: e.g. for financial analysts [investors] to provide [use] more relevant evaluations including the aspect of potential speculation, for the corporate environment to benchmark and improve their own currency risk management activities, which might, in turn, lead to more stability in a broader sense. (Hecht & Lampenius, 2017) further document the importance of the extended disclosures. Using the same dataset, they provide evidence for the necessity to separate between risk management and speculative positions in the context of prior hedging outcomes.

We contribute to the literature on the determinants of speculation in two ways. First, by means of company-, year- and currency-specific hedge ratios, we introduce an innovative methodology to

In line with this outcome of our quantitative analysis, Albouy & Dupuy (2017) find, by means of an e-mail and interview survey between 2010 and 2015, that smaller and highly leveraged firms tend to speculate more among French non-financial firms.

define speculation and hence separate it from risk management on a firm-currency level. Consequently, we can provide unprecedented empirical evidence on the determinants of speculation in corporate FX management. Second, it is, henceforth, possible to uncover speculation using our publicly available corporate disclosures and methodology. In addition, our unparalleled results illustrate the significance of this informational advantage that involves manifold potential benefits. This case of voluntary, supplementary recommendations from a regulating authority might hence serve as a blueprint for regulatory disclosure improvements in suitable areas.

The paper is structured as follows. Section 2 reviews the relevant literature and develops the hypothesis. Section 3 provides the sample description, the definition of our employed measures as well as our methodology. Section 4 presents the results and section 5 concludes.

2. Hypothesis development

Deviating from Modigliani-Miller ideals in which risk management does not increase shareholder value, diverse theoretical considerations justify why firms could engage in hedging or speculative activities. In terms of hedging, apart from classical managerial motives such as information asymmetry considerations, tax reasons or debt capacity coupled with financial distress costs (Froot et al., 1993; Judge, 2007; Smith & Stulz, 1985), Froot et al. (1993) mention the aspect of underinvestment when external financing is more expensive than internal financing. Easing the variability of cash flows through risk management measures can prevent underinvestment and increased external financing requirements that might be costly to firms.

As regards speculation, Stulz (1996) argues that from a theoretical point of view, particular companies might be inclined to speculation. That is, companies having both private information combined with an adequate financial resilience might benefit from speculative transactions. Making use of superior market or industry knowledge such as specialized information on e.g. future FX-rates, might lend these firms a comparative advantage leading to extraordinary profits in derivative transactions. These, according to Stulz (1996), typically bigger firms should have the financial capabilities to withstand losses from erroneous market views, which in turn prevents a firm from the underinvestment problem due high costs of external funds. In an FX-environment, however, Stulz (1996) states that most FX dealers do not possess specialized information about the future development of foreign currencies. Consequently, non-financial firms most likely also lack this expertise. In addition, they are supposedly not endowed with an enhanced ability to cope with FX risks and possible severe losses (Stulz, 1996).

Alternatively, Stulz (1996) illustrates a rationale in favor of speculation for firms in financial distress. Having have nothing lose, such firms might be motivated to speculate even without superior knowledge in order to generate exceptional, rescuing outcomes.

This alternative explanation builds a bridge to the convexity theories of Adam et al. (2007) and Campbell & Kracaw (1999). Based on a profit function convex in investment, the authors build upon the model of Froot et al. (1993) and argue that under certain circumstances, firms might perceive speculation, rather than hedging, as optimal strategy. This incentive to not hedge but gamble arises from the convexity of their investment opportunities leading to the argument that positive speculative outcomes allow for profitable investments that elsewise would not be carried out. Campbell & Kracaw (1999) expect that this effect might be empirically verifiable with firms that demonstrate the following features: substantial growth opportunities [growth], modest internal funds [liquidity] as well as high cost of asymmetric information [size]. Following Adam et al. (2017) and Graham et al. (2001), we assume that smaller firms suffer more from the market imperfection of informational asymmetry and are hence financially more constrained in raising external funds.

Provided that non-financial firms do not exhibit a comparative advantage in an FX-context, we adhere to the theoretical foundations of Adam et al. (2007) and Campbell & Kracaw (1999) and test the hypothesis that the convexity theories are empirically supported in FX risk management. In detail, we expect a negative relation between firm size and speculation, a positive relation between corporate growth opportunities and speculation, as well as a negative relation between corporate liquidity and speculation. We test the hypothesis by means of a new methodology to define speculation and separate it from risk management. Our dataset provides access to company-, year-, and currency-specific hedge ratios that enable us to separate risk-managing (reducing currency-specific FX exposure) from speculative positions (increasing or holding currency-specific FX exposure constant) and classify firms accordingly as risk manager or frequent [temporary] speculator (for details, refer to section 3).

3. Data and Methodology

We use publicly available accounting data from France for the period of 2010 to 2015. The so-called 'registration document' advocated by the Autorité des Marchés Financiers (AMF), supervisor of the French financial markets, provides information on foreign currency risk management of unprecedented data granularity. Going far beyond the specifications of IFRS 7, \$33 and 34 (Autorité des Marchés Financiers (AMF), 2009), this dataset is the result of the unique regulatory environment that supports extended disclosures via an optional supplement. Hecht & Lampenius (2017) provide further details about this database.

Starting with 333 French firms in the CAC All-Tradable index as of April 2016, we drop financial firms (17), firms without (significant) FX exposure (183) and firms that do not follow the recommendations of the AMF (70). For our final sample of 63 firms, we hand-collect the reported FX-risk management information and match it with firm characteristics obtained from the Compustat Global Vantage database. The resulting 1,835 firm-year observations are the basis for the firm classification detailed below. Further, we drop four firms due to unavailability of firm characteristics and we drop all duplicated values to rely on one observation per company and year (resulting in a sample of 59 companies and 337 observations). This necessary step arises, since for one company and one year, the firm characteristics do not change for the several employed currencies. Further, we winsorize all firm characteristics to the 1st and 99th percentile to eliminate data outliers. The company-specific FX data is not winsorized, given that this data is hand-collected and all data points are meaningful.

Consistent with literature on FX risk management, forward contracts are by far the most important hedging instrument (Bodnar et al., 2011, 1998) and our sample firms mainly report the utilization of forward or future contracts; options and swaps are mentioned less frequently. In line with Allayannis and Ofek (2001) and Beber and Fabbri (2012) we exclude foreign currency swaps from the analysis whenever explicitly referred to in the registration document. If a differentiation of FX instruments is not undertaken and hence swaps cannot be separated from other FX instruments, we rely on the combined figure. The aggregation practice of swaps with forward or future contracts of a few firms should not lead to a systematic bias, since FX forward contracts, as indicated above, account for approximately 64% of the FX risk management routine (Bodnar et al., 2011, 1998). We ignore all transaction costs related to hedging activities.

Following Hecht & Lampenius (2017) and the variance-minimization model (Aabo, 2015; Stulz, 1996), we assume that the intention of risk management is to reduce the expected volatility

resulting from future movements in market variables (Hull, 2015), in our case FX rates⁵. In contrast, speculation refers to an intentional increase of the expected future volatility to enhance future profits. To analyze a firm's FX activities, we calculate hedge ratios (HR), defined as the percentage of FX exposure covered by financial instruments. The hedge ratio in t (HR_t) is defined as $HR_t = H_t / E_t^b$, where H_t denotes the hedged amount in t and E_t^b the exposure before hedging in t. Given that our data record contains actual FX exposure that can be positive or negative, which is combined with short or long hedged nominal amounts, HR can be both positive and negative. Note that a short [long] derivative position is identified through a negative [positive] sign. Table 1 classifies aggregate currency positions according to HR and the implied impact on volatility in three parts: risk management positions seek a reduction in volatility with -2 < HR < 0, where e.g. HR = -.5 and HR = -1.5 result in the same volatility, active speculative positions increase volatility with HR < -2 or HR > 0, and passive speculative positions keep volatility constant with HR = -2 or HR = 0.

Insert Table 1 about here

According to this analytical approach, we can identify aggregate currency positions that either decrease, increase or keep currency-specific FX exposure constant. In a next step, we classify each of our sample firms as either risk managers or frequent or temporary speculators. We do so by calculating the value-weighted proportions of hedging and speculation⁶ per firm, i.e, we evaluate the exposure prior to hedging per aggregate currency position to overall firm exposure. Firms are then labeled risk managers (RM) when they speculate with less than 20% of their exposure, whereas with more than 80% of speculative, value-weighted activities, firms are labeled frequent speculators (FS). Further, we term the group of firms between 20 and 80 percent temporary speculators (TS). The classification scheme reveals 54% of our sample firms as RM, 17% as FS and the remaining 29% as TS. The thresholds of 20 and 80 percent are not arbitrarily chosen, but originate from the analysis of Hecht & Lampenius (2017) Using the same dataset and sample firms, they show that – in the aggregate – firms hedge with about 80 percent of their FX exposure and speculate with the remaining 20 percent, again value-weighted with the total exposure before hedging per firm.

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We assume that FX markets are efficient in the weak sense of informational efficiency (Fama, 1970).

⁶ Speculation comprises now both active and passive speculation.

Following the implications of the convexity theories, we group the firm characteristics into the three categories *size*, *growth* and *liquidity*. In our multinomial logit model with the firm classification as response variable, the following firm characteristics serve as predictor variables. We measure firm size by the logarithm of total assets (size) and alternatively by the logarithm of market capitalization (size II). Growth opportunities are approximated by the ratio of research and development expenses over total revenue (R&D ratio) and as secondary proxy by capital expenditures to total revenues (capex ratio).⁷ Our approach to model the corporate liquidity situation is twofold. First, we calculate the liquidity indicators cash ratio (cash and short-term investments to total current liabilities), interest coverage ((pretax income + interest expense) / interest expense) as well operating (total) cash flow, standardized by total revenues. The first two ratios represent static balance sheet information, whereas the cash flow illustrates a dynamic flow figure. Second, we investigate corporate liquidity by analyzing the levels of indebtedness. We use the debt ratio (total liabilities to total assets) and since we are particularly interested in near-term settings, where profitable investments can only be realized due to positive speculative outcomes, we further employ the short-term debt ratio with total current liabilities to total assets.

4. Empirical Results

4.1. Univariate Analysis

Table 2 presents univariate statistics of firm characteristics of our sample firms. The financial characteristics are chosen corresponding to the theoretical basis of the convexity theories (Adam et al., 2007; Campbell & Kracaw, 1999). Further, we report the results of a t-test that compares the means values of the risk managers with frequent speculators (risk managers with temporary speculators) [frequent speculators with temporary speculators]. We rely on the Welch's t-test due to (potential) unequal variances as well as sample sizes.

Insert Table 2 about here

Focusing on the differences between firms that frequently speculate and those that follow risk management motive, we observe that, according to both measurements of *size*, frequent speculators are significantly smaller than risk managers.

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Please note that we do not employ the book-to-market-ratio due to potential misinterpretations. Géczy et al. (2007) state off-balance sheet correlations with speculation as one potential explanation.

As regards *growth* potential measured by R&D expenditures to total revenues, frequent speculators exhibit significantly more investment opportunities compared to firms that follow risk management motives. Alternatively, using capital expenditures instead of R&D investments, confirms the results, where the differences between the groups are not significant.

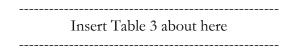
The two static as well as two dynamic short-term *liquidity* measures indicate that risk-managing firms possess more internal funds than frequent speculators. Statistically significant is, however, only the difference for interest coverage. Comparing indebtedness levels reveals that frequent speculators have significantly higher debt proportions than risk managers. In line with Campbell & Kracaw (1999), who expect low internal resources to finance current growth opportunities, we find the same relationship with even stronger significances for the short-term debt ratio.

Consistent with this evidence, the *size* of firms that temporarily speculate falls in between these thresholds, i.e. being significantly smaller than risk managers and significantly bigger than companies that often speculate. For the firm characteristics categorized in *growth* and *liquidity*, Table 2 illustrates that the values for temporary speculators are always logically interjacent to risk managers and frequent speculators, with significant differences for e.g. the R&D ratio, interest coverage and the short-term debt ratio.

4.2. Multinomial Logistic Regression

Following the univariate analysis, we examine the relationship between the firm characteristics and speculation in a multinomial logistic regression. According to our company classification, the nominally scaled dependent variable can take the three categories 1) risk manager, 2) frequent speculator or 3) temporary speculator. The independent variables are (a selection of) the financial firm characteristics detailed in Table 2.

Table 3 presents the descriptive statistics of the dependent and independent variables of the multinomial logit analysis for our total sample⁸. The dependent variable counts 337 hand-collected observations from the balance sheets of our sample firms. Differing observation numbers for the firm characteristics are explained by data availabilities in Compustat Global Vantage database.



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For the respective mean values and standard deviations of the divided sample into RM, FS and TS, please refer to Table 2.

Table 4 reports the results of the multinomial logistic regression with robust standard errors and with the risk manager class always as base category. The evidence provided is consistent with the univariate analysis. Table 4, Panel A presents our main regression model with one financial characteristic per category *size* and *growth*, as well as one short-term *liquidity* indicator and one debt measure. A one-unit increase in the variable size is associated with a reduction of -.43 in the relative log odds of being a frequent speculator compared to a risk manager. In other words, frequent speculators are more likely to be smaller than risk managers, a finding that confirms our expected negative relation between firm size and speculation.

Insert Table 4 about here

Similarly, companies that often speculate exhibit a much a higher probability, significant at the 1% level, to have more growth opportunities than companies that follow risk management motives. This positive relationship between corporate growth opportunities and speculation is in line with our hypothesis.

As regards internal funds, we find that frequent speculators are more likely to have lower operating cash flows and higher debt levels than risk managers, significant at the 1% and 5% level, respectively. The observed negative relation between a firm's liquidity situation and speculative activities contributes to our overall finding of empirical evidence for the convexity theories in a currency risk context.

Table 4, Panel B reports an alternative regression model in dependence on our main regression model in Panel A with one firm characteristic per category, but in Panel B we substitute each variable to examine consistency. We observe the same relationships between frequent speculators and speculation as in Panel A, with the exception that interest coverage is not significant. Looking at temporary speculators where the interest coverage variable is significant at the 1% level with a very similar coefficient, however, mitigates this shortcoming.

4.3. Robustness

Up to present, empirical evidence on the determinants of speculation was conflicting. We assume that heterogeneous definitions of speculative activities and heterogeneous analytic methodologies have a stake in this disagreement. Our findings are the result of these two specifications, (i) of a new definition of speculation and (ii) of a new methodology to separate our sample into risk

managers or frequent or temporary speculators. To illustrate the robustness of our results, we apply the above multinomial logit analysis to a range of specifications of (i) and (ii).

First, we detail two alternative specifications of (i), where we change the definition of speculation. Up to this point, the classification into RM, FS and TS was based on the limits of 20% and 80% (section 3). We alter these thresholds in a sensitivity analysis to the extent of \pm 10%. Table 5 reports the resulting evidence, Panel A [B] for our main [alternative] regression model. Focusing on the differences of risk managers and frequent (temporary) speculators, we find overall robust evidence for both specifications, i.e. with the limits of 30%/70% as well as 10%/90% for both the main and alternative regression model (Table 5, Panel A and B, respectively). In both cases, speculation remains to be negatively correlated to size, positively correlated to growth and negatively to liquidity, where a higher debt ratio confirms the lower operating cash flow for frequent speculators in relation to risk managers. For the limits of 30%/70%, all stated relationships are statistically significant at the 1%, 5% or 10% level. The same applies to the limits of 10%/90%, with few exceptions. Furthermore, in a second specification of (i), we reduce the number of categories from three to two. In detail, we divide our sample in merely two homogeneous parts, where we attribute speculation with less [more] than 50% of a firm's exposure to a risk manager [speculator]. The unreported results prove robust for all three categories size, growth and liquidity (FOR REVIEWER ONLY: RESULTS ARE REPORTED IN Table 6). Overall, the results in Table 5, Panel A and B, confirm our main results and we deduce that they are not subject to a particular definition of speculation.

Insert Table 5 about here

Second, we detail a different specification of (ii), where we evaluate the effect of an alternative separation of the sample into risk-managing and speculating firms. Building up on our hedge ratio classification from Table 1, we perform this robustness check directly on an aggregate currency level (a priori 1,835 firm-year observations, due to data availabilities of the firm characteristics in Compustat, the observation numbers in the regressions decrease) without our company classification. This implies that, contrary to before, we rely on our aggregate currency position distribution of risk management and speculative activities⁹ without value-weighing this distribution to the overall firm exposure. As a result, we do not obtain a company-wide homogeneous classification. This focus on the aggregate currency position level keeps an

Similar to section 3, we group active and passive speculation together.

unblended perspective without forcing a sum of positions into stiff structures with fixed thresholds. A point of criticism for this robustness check is that one company might be attributed for one currency to the risk-managing category and for another currency to the speculative category within the same year. The results presented in Table 5, Panel C [D] for our main [alternative] regression model, confirm our main findings between all three categories size, growth and liquidity of firm characteristics and speculation. For speculation, we still observe a negative correlation to size, a positive correlation to growth and again a negative correlation to liquidity. The positive coefficient of the debt ratio reveals once more that frequent speculators have higher degrees of debt compared to risk managers, which confirms the negative relationship for *liquidity*. All stated correlations are statistically significant at the 1% level, with the exception of the debt ratio in Panel C and the capex ratio in Panel D (10%). In the aggregate, our estimation for an alternative classification into risk-managing and speculating firms in Table 5, Panel C and D, confirm our main findings and we conclude that they do not depend on a particular methodology to separate risk-managing motives from speculative considerations in our sample.

Finally, we test for a potential bias originating from our sample period. We observed diverging results using the same dataset but different subperiods (and different definitions of speculation) for Adam et al. (2017) and Brown et al. (2006). Consequently, we alter our sample period to check for robustness of our results. We observe (unreported) robust evidence when limiting our sample period to the years of 2010-2013 as well as 2012-2015 (FOR REVIEWER ONLY: RESULTS ARE REPORTED IN Table 7)

5. Conclusion

Empirical literature is still in disagreement concerning the determinants of corporate speculation. Analysing most recent empirical evidence, we assume that the heterogenous findings on the determinants of speculation may be the result of different methodologies in defining and determining speculation. Our unique dataset enables us to calculate firm-, currency-, and year-specific hedge ratios that allow for a new separation of risk management (reducing currency-specific FX exposure) and speculative (increasing or holding currency-specific FX exposure constant) positions. We provide unprecedented evidence that speculators are smaller, have more growth potential and are endowed with lower internal resources compared to risk managers – findings that confirm the convexity theories (Adam et al., 2007; Campbell & Kracaw, 1999) in a corporate FX context.

The refined granularity of our dataset originates from additional recommendations that exceed existing accounting requirements, advocated by the financial markets' regulating authority. As these sources are publicly available, our findings enable readers and analysts of financial statements from now on to use public data in order to identify speculation. Further, our results underline the significance of such an informational advantage that entails various benefits for diverse stakeholders. This concept of voluntary suggestions for continuative disclosures in an FX context might consequently be a potential draft for regulatory enhancements in relevant environments.

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7. Tables

Table 1: Hedge Ratio Classification

This table reports the hedge ratio (HR) classification, defined as the percentage of FX exposure covered by financial instruments ($HR_t = H_t/E_t^b$), where H_t and E_t^b denote the hedged amount in t and the exposure before hedging in t, respectively. HR captures risk management, as well as, speculative positions, where we define a positive [negative] FX exposure combined with a short position in a FX-forward contract to result in a negative [positive] HR, since a short derivative position is identified using a negative sign. On the other hand, a positive [negative] exposure in combination with a long position in a FX-forward contract is defined as positive [negative] HR. Based on this nomenclature, HR separates risk management from speculation, where we introduce the following classification: (a) risk management, seeking a reduction in volatility with -2 < HR < 0; (b) active speculative, seeking additional profits by increasing volatility with HR < -2 or HR > 0; (c) passive speculative, seeking constant volatility with HR = -2 or HR = 0.

Position	Hedge Ratio	Impact on Volatility
	−2 < HR < −1	Decrease
Risk Management	HR = -1 (Full Hedge *)	Decrease
	-1 < HR < 0	Decrease
A ative Consolition	HR < -2	Increase
Active Speculation	0 < HR	Increase
Dassira Completion	HR = -2	None
Passive Speculation	HR = 0	None

^{*} We do not know time-to-maturity of the derivatives, thus, a full hedge is not identical to a perfect hedge, as known from the literature (Hull, 2015).

Table 2: Univariate Statistics of Firm Characteristics

This table reports univariate statistics for the firm characteristics of our sample firms. The "RM vs. FS" column reports the significance level of a t-test comparing the mean values for the respective groups. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. Size is the logarithm of total assets, size II the logarithm of market capitalization, the R&D [Capex] ratio divides the R&D Expense [capital expenditures] by total revenues and the cash ratio captures the sum of cash plus short-term investments divided by total current liabilities. Interest coverage is measured by the sum of pretax income plus interest expense, divided by interest expense. Total [operating] cash flow is standardized by total revenues and the [short-term] debt ratio captures total [current] liabilities in relation to total assets.

	Risk Ma	nager	Frequent S	peculator		Temporary	Speculato1	<u>:</u>	
	Mean	SD	Mean	SD	RM vs. FS	Mean	SD	RM vs. TS	FS vs. TS
Size	8.24	1.52	6.89	1.63	***	7.71	1.47	**	***
Size II	7.76	1.51	6.13	1.92	***	7.18	1.73	**	***
R&D Ratio	0.04	0.04	0.18	0.18	***	0.10	0.11	***	**
Capex Ratio	0.04	0.03	0.05	0.06		0.04	0.02	**	
Cash Ratio	0.41	0.36	0.34	0.46		0.40	0.39		
Interest Coverage	158.76	472.29	14.15	33.69	***	17.74	31.47	***	
Total CF	0.01	0.08	-0.01	0.09		0.01	0.08		
Operating CF	0.12	0.07	0.10	0.11		0.11	0.08		
Debt Ratio	0.59	0.17	0.64	0.17	*	0.59	0.15		
Debt Ratio short term	0.34	0.14	0.45	0.14	***	0.38	0.16	**	***

Table 3: Descriptive Statistics of Sample

This table reports descriptive statistics of the dependent (firm classification) and independent (firm characteristics) variables of the multinomial logit analysis for the total sample. Firm classification can take the values 0 [1] (3) for firms classified as risk managers [frequent speculators] (temporary speculators) according to their speculative share relative to total firm exposure. Size is the logarithm of total assets, size II the logarithm of market capitalization, the R&D [Capex] ratio divides the R&D Expense [capital expenditures] by total revenues and the cash ratio captures the sum of cash plus short-term investments divided by total current liabilities. Interest coverage is measured by the sum of pretax income plus interest expense, divided by interest expense. Total [operating] cash flow is standardized by total revenues and the [short-term] debt ratio captures total [current] liabilities in relation to total assets.

	N	Mean	SD	Min	p25	p50	p75	Max
Firm classification	337	1.04	1.31	0.00	0.00	0.00	3.00	3.00
Size	336	7.86	1.60	4.09	6.83	7.93	8.92	11.13
Size II	330	7.32	1.74	3.18	6.19	7.58	8.59	10.39
R&D ratio	202	0.08	0.11	0.00	0.02	0.05	0.09	0.64
Capex ratio	335	0.04	0.04	0.00	0.02	0.03	0.05	0.28
Cash ratio	336	0.39	0.39	0.03	0.16	0.29	0.44	2.21
Interest coverage	334	92.74	353.22	-15.06	3.52	7.98	18.15	2234.25
Total CF	336	0.01	0.08	-0.33	-0.02	0.01	0.04	0.24
Operating CF	336	0.11	0.08	-0.07	0.06	0.10	0.15	0.39
Debt ratio	336	0.60	0.16	0.26	0.48	0.60	0.72	1.02
Debt ratio short-term	336	0.37	0.15	0.15	0.25	0.34	0.49	0.73

Table 4: Multinomial Logistic Regression

This table reports the multinomial logistic regression results of our firm classification as a function of firm characteristics with robust standard errors and the risk manager classification as base outcome. The dependent variable can take the values risk manager, frequent speculator or temporary speculator according to their speculative share relative to total firm exposure. Based on the limits of 20% and 80%, firms are labelled risk manager [frequent speculator] (temporary speculator) when speculating with less [more] (between) than 20% [80%] (20% and 80%) of their exposure. The independent variables are (a selection of) firm characteristics detailed in Table 3. Panel A details our main regression model with one financial characteristic per category size and growth, as well as one short-term liquidity indicator and one debt measure. In Panel B, we substitute each variable to examine consistency in an alternative regression model. Size is the logarithm of total assets, size II the logarithm of market capitalization, the R&D [Capex] ratio divides the R&D Expense [capital expenditures] by total revenues, the operating cash flow is standardized by total revenues and interest coverage is measured by the sum of pretax income plus interest expense, divided by interest expense. The [short-term] debt ratio captures total [current] liabilities in relation to total assets. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Panel A: Main regression model

Dependent Variable	Independent Variables	Coef.	p-value
Risk manager	Base Outcome		
Frequent speculator	Size	-0.427	0.027**
	R&D ratio	25.605	0.000***
	Operating CF	-17.415	0.000***
	Debt ratio	4.059	0.031**
	Constant	-0.553	0.791
Temporary speculator	Size	-0.367	0.012**
1 1	R&D ratio	15.980	0.000***
	Operating CF	-5.716	0.094*
	Debt ratio	1.196	0.439
	Constant	1.219	0.289
Observations		203	
Pseudo R-squared		0.253	

Panel B: Alternative regression model

Dependent Variable	Independent Variables	Coef.	p-value
Risk manager	Base Outcome		
Frequent speculator	Size II	-0.562	0.000***
	Capex ratio	10.500	0.006***
	Interest coverage	-0.004	0.129
	Debt ratio short-term	6.940	0.000***
	Constant	-0.278	0.774
Temporary speculator	Size II	-0.204	0.012**
	Capex ratio	-11.036	0.043**
	Interest coverage	-0.004	0.004***
	Debt ratio short-term	1.029	0.379
	Constant	1.126	0.142
Observations		327	
Pseudo R-squared		0.147	

Table 5: Robustness Checks

This table reports the (multinomial) logistic regression results of our firm classification as a function of firm characteristics with robust standard errors. The independent variables are (a selection of) firm characteristics detailed in Table 3. Panel A and C [B and D] refer to our main [alternative] regression model detailed in Table 4. In the robustness checks detailed in Panel A and B, the dependent variable can take the values risk manager, frequent speculator or temporary speculator according to their speculative share relative to total firm exposure, with the risk manager classification as base outcome. Further, Panel A and B present the outcome of the sensitivity analysis of the firm classification based on the limits of 20% and 80% to the extent of +/- 10%. In the robustness checks detailed in Panel C and D, the dependent variable is a binary dummy variable that can take the values risk manager (0) or speculator (1) on an aggregate currency position level, with the risk manager classification as base outcome. Size is the logarithm of total assets, size II the logarithm of market capitalization, the R&D [Capex] ratio divides the R&D Expense [capital expenditures] by total revenues, the operating cash flow is standardized by total revenues and interest coverage is measured by the sum of pretax income plus interest expense, divided by interest expense. The [short-term] debt ratio captures total [current] liabilities in relation to total assets. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Panel A: Robustness check "sensitivity analysis" for main regression model

		Limits of	30% and 70%	Limits of 10 th	% and 90%
Dependent Variable	Independent Variables	Coef.	p-value	Coef.	p-value
Risk manager	Base Outcome				
Frequent speculator	Size	-0.301	0.061*	-0.248	0.207
• •	R&D ratio	12.891	0.000***	21.484	0.000***
	Operating CF	-12.620	0.000***	-15.473	0.001***
	Debt ratio	2.397	0.131	4.186	0.047**
	Constant	-0.058	0.972	-2.168	0.347
Temporary speculator	Size	-0.418	0.006***	-0.404	0.003***
	R&D ratio	3.710	0.171	5.017	0.086*
	Operating CF	-5.461	0.076*	3.996	0.209
	Debt ratio	0.569	0.718	-1.616	0.319
	Constant	2.226	0.080*	3.553	0.001***
Observations			203		203
Pseudo R-squared			0.170		0.240

Panel B: Robustness check "sensitivity analysis" for alternative regression model

		Limits of	30% and 70%	Limits of 10%	% and 90%
Dependent Variable	Independent Variables	Coef.	p-value	Coef.	p-value
Risk manager	Base Outcome				
Frequent speculator	Size II	-0.467	0.000***	-0.454	0.000***
	Capex ratio	8.541	0.040**	2.954	0.612
	Interest coverage	-0.002	0.005***	-0.003	0.119
	Debt ratio short-term	5.365	0.000***	5.538	0.000***
	Constant	-0.188	0.828	-0.156	0.885
Temporary speculator	Size II	-0.274	0.001***	-0.106	0.146
1 , 1	Capex ratio	-3.282	0.448	-8.396	0.062*
	Interest coverage	-0.006	0.052*	-0.001	0.003***
	Debt ratio short-term	-0.246	0.838	-0.728	0.464
	Constant	1.370	0.091*	1.667	0.024**
Observations			327		327
Pseudo R-squared			0.121		0.092

Panel C: Robustness check "currency position level" for main regression model

Dependent	Independent	Coef.	p-value
Variable	Variables		
Firm classification	Size	-0.304	0.000***
	R&D ratio	5.428	0.000***
	Operating CF	-2.829	0.009***
	Debt ratio	0.275	0.614
	Constant	1.540	0.003***
Observations	1,097		
Pseudo R-squared	0.131		

Panel D: Robustness check "currency position level" for alternative regression model

Dependent Variable	Independent Variables	Coef.	p-value
Firm classification	Size II	-0.297	0.000***
	Capex ratio	2.371	0.087*
	Interest Coverage	-0.001	0.001***
	Debt ratio short-term	1.203	0.003***
	Constant	1.260	0.000***
Observations	1,725		
Pseudo R-squared	0.063		

8. Appendix

Definition of Variables

Variables	Description of variables
Size	Log (Total Assets)
Size II	Log (Com. Shares Outstanding * Price Close
	Monthly)
R&D ratio	R&D Expense / Total Revenues
Capex ratio	Capital Expenditures / Total Revenues
Cash ratio	(Cash + Short-Term Investments) / Total
	Current Liabilities)
$E_{t}^{b}(\cdot)$	Exposure before hedging in t
Interest coverage	(Pretax Income + Interest Expense) / Interest
_	Expense
Total CF	(Operating + Investing + Financing Cash
Total CI	Flow) / Total Revenues
Operating CF	Operating Cash Flow / Total Revenues
Debt ratio	Total Liabilities / Total Assets
Debt ratio short term	Total Current Liabilities / Total Assets
(HR)	Hedge ratio with $HR_t = H_t / E_t^b$ percentage of
	FX exposure covered by financial instruments
$(H_{\iota}(\cdot))$	Hedged amount in t indicated by derivative
. , (),	instruments reported

9. For Reviewer Only: Unreported Analysis

Table 6: Robustness Checks: Reduced Speculation Categories

This table reports the logistic regression results of our firm classification as a function of firm characteristics with robust standard errors. The dependent variable is a binary dummy variable that can, per firm, take the values risk manager (0) or speculator (1) according to their speculative share relative to total firm exposure, with the risk manager classification as base outcome. Based on a limit of 50%, firms are labelled risk manager [speculator] when speculating with less [more] than 50% of their exposure. The independent variables are (a selection of) firm characteristics detailed in Table 3. Panel A [B] refers to our main [alternative] regression model detailed in Table 4. Size is the logarithm of total assets, size II the logarithm of market capitalization, the R&D [Capex] ratio divides the R&D Expense [capital expenditures] by total revenues, the operating cash flow is standardized by total revenues and interest coverage is measured by the sum of pretax income plus interest expense, divided by interest expense. The [short-term] debt ratio captures total [current] liabilities in relation to total assets. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Panel A: Robustness check "reduced speculation categories" for main regression model

Dependent Variable	Independent Variables	Coef.	p-value
Firm classification	Size	-0.521	0.001***
	R&D ratio	10.043	0.000***
	Operating CF	-5.926	0.021**
	Debt ratio	2.493	0.083*
	Constant	1.333	0.354
Observations	203		
Pseudo R-squared	0.252		

Panel B: Robustness check "reduced speculation categories" for alternative regression model

Dependent	Independent	Coef.	p-value
Variable	Variables		_
Firm classification	Size II	-0.511	0.000***
	Capex ratio	3.609	0.374
	Interest Coverage	-0.002	0.001***
	Debt ratio short-term	3.519	0.001***
	Constant	1.246	0.097*
Observations	327		
Pseudo R-squared	0.177		

Table 7: Robustness Checks: Alternative Sample Period

This table reports the multinomial logistic regression results of our firm classification as a function of firm characteristics with robust standard errors. The dependent variable can take the values risk manager, frequent speculator or temporary speculator according to their speculative share relative to total firm exposure. The independent variables are (a selection of) firm characteristics detailed in Table 3. Panel A [B] refers to our main [alternative] regression model detailed in Table 4, but limits the sample period to the years 2010 to 2013 [2012 to 2015]. Size is the logarithm of total assets, size II the logarithm of market capitalization, the R&D [Capex] ratio divides the R&D Expense [capital expenditures] by total revenues, the operating cash flow is standardized by total revenues and interest coverage is measured by the sum of pretax income plus interest expense, divided by interest expense. The [short-term] debt ratio captures total [current] liabilities in relation to total assets. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Panel A: Robustness check "sample period" for main regression model

		Years 2	010 - 2013	Years 2	013 - 2015
Dependent Variable	Independent Variables	Coef.	p-value	Coef.	p-value
Risk manager	Base Outcome				
Frequent speculator	Size	-0.390	0.088*	-0.475	0.065*
• •	R&D ratio	25.322	0.000***	26.603	0.000***
	Operating CF	-18.007	0.002***	-16.371	0.001***
	Debt ratio	2.560	0.276	5.666	0.019**
	Constant	0.131	0.960	-1.456	0.599
Temporary speculator	Size	-0.422	0.022**	-0.271	0.127
	R&D ratio	15.736	0.000***	16.992	0.000***
	Operating CF	-2.815	0.555	-8.526	0.030*
	Debt ratio	2.921	0.172	-0.500	0.788
	Constant	0.230	0.886	1.801	0.178
Observations			131		142
Pseudo R-squared			0.256		0.265

Panel B: Robustness check "sample period" for alternative regression model

		Years 2	010 - 2013	Years 20	13 – 2015
Dependent Variable	Independent Variables	Coef.	p-value	Coef.	p-value
Risk manager	Base Outcome				
Frequent speculator	Size II	-0.540	0.000***	-0.577	0.000***
1 1	Capex ratio	10.279	0.026**	10.319	0.019**
	Interest coverage	-0.002	0.064*	-0.003	0.143
	Debt ratio short-term	5.984	0.000***	7.087	0.000***
	Constant	-0.139	0.907	-0.146	0.902
Temporary speculator	Size II	-0.190	0.053*	-0.187	0.059*
	Capex ratio	-7.291	0.230	-15.795	0.016**
	Interest coverage	-0.006	0.027**	-0.003	0.007***
	Debt ratio short-term	1.334	0.359	0.910	0.499
	Constant	0.747	0.456	1.277	0.151
Observations			216		225
Pseudo R-squared			0.131		0.161

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