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Domain-specific risk-taking among finance professionals☆

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ABSTRACT

Risk-assessment and risk-taking in various forms are among the most important tasks financial professionals face in their daily work. A large body of experimental studies has shown a substantial effect of the decision domain (gain vs loss domain) on risk-taking, predominantly among students. In a series of experiments set in different contextual frameworks, we investigate whether this domain effect is also present among experienced employees in the finance industry and compare their decisions with people from the general population. Our results show that employees in the finance industry are equally prone to the domain effect in risk-taking than the general population. Interestingly, for domain-specific risk-taking in a finance context, we find that professionals are even more reluctant to sell loser stocks than non-professionals.

1. Introduction

Decision-making under risk is a crucial task for financial professionals. Across many roles, they face numerous decisions involving risk-assessment and risk-taking in their daily work. The extent to which they take risks may vary strongly, among others, across job functions (e.g., sales vs risk management vs compliance), across decision problems (e.g., decisions for customers vs decisions for the company), and across the stakes that are involved (e.g., high-stakes vs low-stakes). Moreover, other important dimensions of risk-taking center around the decision domain (gain vs loss domain) and the context (non-monetary vs explicit finance context) in which a risky decision presents itself. Experimental studies with predominantly student subjects have impressively shown that decisions are indeed strongly influenced by the decision domain. Most notably, subjects exhibited risk averse behavior in the gain domain, but risk seeking behavior in the loss domain Kahneman and Tversky (1979), Tversky and Kahneman (1992). However, it is conjectured that the behavior of individuals with real-world market experience would match predictions of neoclassical models more closely (e.g., List, 2003, 2004), leaving the above-cited findings as artifacts of inexperienced experimental subjects. In this paper, we investigate the proneness of experienced employees in the finance industry and people from the general population to domain-dependent risk-taking in various lab-in-the-field experiments. We find domain effects for both groups in a non-monetary decision problem, as professionals and non-professionals take markedly more risk in the loss domain than in the gain domain.[1] Importantly, professionals also exhibit a strong domain effect in an explicit finance context—they are even more prone to ride loser stocks in investment decisions than non-professionals.

Since the seminal studies of Kahneman and Tversky (1979) and Tversky and Kahneman (1992), Prospect Theory has been established as one of the most important positive theories of decision making. It postulates, among others, that decision makers first set a reference point to assess whether the outcomes of the decision are perceived as gains or losses (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). When it comes to evaluating these outcomes, losses are viewed as more painful

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[1] For simplicity, we use the term professionals for finance professionals and non-professionals for employees outside the finance industry throughout the paper.

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than gains of equal magnitude are viewed as beneficial. Specifically, decision makers usually show risk-averse behavior in the gain domain and risk-seeking behavior in the loss domain. List (2003), however, issues the criticism that these results could be driven by inexperience. In an experimental study, he finds that the endowment effect – a bias closely related to Prospect Theory – can be attenuated with market experience in a market for sports memorabilia. In a follow-up study, List (2004) reports that Prospect Theory explains the behavior of inexperienced market participants in a sports card market, but experienced participants show behavior in line with neoclassical predictions.

Especially in finance, a small but growing body of literature analyzes whether experienced market participants exhibit behavior that is closer to neoclassical predictions and less prone to behavioral biases. Evidence is mixed, as some studies report financial professionals to exhibit large biases (Haigh and List, 2005; Cipriani and Guarino, 2009; Deaves et al., 2010; Abdellaoui et al., 2013; Kirchler et al., 2018; Schwaiger et al., 2020; Holzmeister et al., 2020), while another body of literature finds that professionals show a behavior that is relatively close to neoclassical benchmarks (Alevy et al., 2007; Kaustia et al., 2008; Weitzel et al., 2019).

Given the importance of risk-taking for financial professionals, surprisingly few studies investigate whether their experience makes them less prone to related biases than non-professionals. To shed light on this issue, we run two non-incentivized and well established experiments used for analyzing biases in risk-taking plus one additional experiment on the narrow framing bias to test for the strength of potential biases in decisions involving risk. To get a comprehensive picture, we vary the decision domain (gain vs loss domain) and the context of the decision (non-monetary vs explicit finance context) in our experiments. First, we set up a slightly modified version of the classical Asian Disease problem from Tversky and Kahneman (1981) and Kahneman and Tversky (1984) for testing domain-dependent risk-taking in a general, non-monetary situation involving risk. Second, to analyze the role of domain-specific risk-taking in an explicit finance context, we conducted a classical choice problem in investment decisions (Shefrin and Statman, 1985). In an additional experiment, we confronted subjects with two simultaneous risky decisions, presented either as two separate, or as a single, joint decision. Here, we ran a classical choice problem involving one risky lottery in the gain domain and one in the loss domain Kahneman and Tversky (1984), Tversky and Kahneman (1986). In total, 202 professionals covering a broad range of job functions in the US finance industry and 408 subjects from other US industries completed the online experiment.

First, we find that the outcome domain does affect risk-taking of both professionals and non-professionals in a non-monetary context. Second, we report different behavior of professionals and non-professionals in an explicit finance context. We show that professionals are significantly more likely to hold on to a losing than to a winning stock, a behavior we do not find among non-professionals. Finally, we observe that professionals are similarly prone to the narrow framing bias in risky decisions as non-professionals. Both groups select the dominated alternatives more frequently when they are presented separately (which potentially induces a cognitive narrow frame). Importantly, we also find similar effects for all subsamples among the professionals, with those working in sales and advisory showing the strongest domain effects (both in terms of magnitude and statistical significance).

Our paper contributes to several strands of literature. First, we add to the large body of literature on domain-dependent risk-taking and decision making in general (see, for instance, Camerer et al. (1997) for reference point-dependent behavior of NYC cab drivers and Pope and Schweitzer (2011) for loss-averse behavior of professional golf players in tournaments on the PGA tour). We contribute with our study by showing that risk-taking is strongly influenced by the domain of the decision (gain vs loss) even for highly experienced market participants like financial professionals. We even find that domain effects on risk-taking are stronger among professionals compared to non-professionals in investment-related contexts. This might be explained by finance professionals being more reluctant to realize losses than non-professionals, because, for the former, paper losses might count less heavy than real and monetized losses.

Second, we add to the literature on the behavior of finance professionals and on the discussion whether real-world market experience can reduce or eliminate behavioral biases. As outlined above, some studies attribute deviations from neoclassical theory to a lack of market experience (e.g., List, 2003, 2004), while other studies (e.g., Cherian and Jarrow, 1998; Ferraro et al., 2005) argue that economic theory might become self-fulfilling when economically more advanced individuals adopt the theory as a normative benchmark. In a paper closely related to ours, Sheffer et al. (2018) take this argument to elected politicians by administering non-incentivized experimental tasks, partly similar to ours, to incumbents in Belgium, Canada, and Israel. They show that politicians are as, or even more, prone to choice anomalies when compared to people from the general population. For instance, politicians exhibit a stronger tendency to escalate commitment when facing sunk costs and they show similar framing effects in risky decisions. Moreover, results of studies analyzing the role of financial professionals' experience on their behavior are at best mixed. Some studies show that professionals' behavior is not systematically closer to predictions from neoclassical theory than the behavior of students or of general population samples. For instance, Cipriani and Guarino (2009), Abdellaoui et al. (2013), Kirchler et al. (2018), Holzmeister et al. (2020), and the findings of Deaves et al. (2010), Menkhoff and Schmeling (2013), and Pikulina et al. (2017) show that professionals exhibit herd behavior similar to student subjects, behave in line with Prospect Theory, exhibit strong rank-dependent risk-taking, deviate in their perception of financial risk from the concept of mean–variance, and are overconfident with respect to their forecasting abilities, respectively. In contrast, some other studies suggest that professionals are less prone to anchoring than students (Kaustia et al., 2008) and produce price bubbles less frequently and with lower magnitude in laboratory asset markets (Weitzel et al., 2019). Turning to related literature on framing effects, it appears that such effects are not only present in non-finance domains (Druckman, 2001; Gächter et al., 2009), but also among financial planners (Roszkowski and Snelbecker, 1990) and finance professionals (Schwaiger et al., 2020). We contribute to this line of literature by providing first systematic evidence that professionals are consistently prone to domain-dependent risk-taking. Our data do not support the hypothesis that market experience promotes behavior that is more in line with neoclassical predictions. We even find stronger domain-dependent behavior and a more pronounced disposition effect among professionals in investment decisions compared to non-professionals.

2. The experiment

2.1. Experimental procedure

The study was conducted online in the United States in May 2018 via Qualtrics. In total, 610 subjects completed the experimental battery. The sequence of the three experimental tasks was randomized across subjects to control for order effects. Our PROF sample consists of 202 financial professionals from different areas in the financial sector. We deliberately did not restrict the job

functions to traders and portfolio managers. Our study aims to provide a more comprehensive picture, because risky decisions in various forms are relevant to a much broader spectrum of employees in the finance industry. In our sample, 38.6% have roles explicitly related to *markets* (trading, portfolio management, etc.), 34.2% work in *sales* (and advisory) and 27.2% have *support* functions (compliance, customer support).

Of the 408 subjects in the GEN sample of non-finance professionals from the general population, the most prominent sectors are services (43.1%), education (14.0%) and manufacturing and construction (13.0%). To contact our subjects, we used proprietary contacts of www.before.world (Behavioral Finance Online Research) and the US database and services of an international market research firm A detailed description of the job functions and industry sectors can be found in Appendix A.

The mean age of all subjects is 46.1 years, the gender composition is 50.7% males and 49.3% females. On average, it took subjects 11 min to complete the experiment. We paid one out of five participants (random draw) a flat fee of $25. We refrained from incentivizing each task separately, as the decision involving risk-taking in a general context (i.e., the Asian Disease Problem variant) inhibits monetary incentives (see also Sheffer et al. (2018) for applying a very similar approach when comparing the decision making of elected politicians and non-politicians from various countries). In doing so, we closely follow the original studies of Tversky and Kahneman (1981), Kahneman and Tversky (1984), Shefrin and Statman (1985), and Tversky and Kahneman (1986). Moreover, as outlined in Table A1 in Appendix A, most of the subjects from the various industry sectors, but also a substantial fraction of finance professionals, are compensated with a flat payment in their job. This further supports the choice of flat incentives in the experiment as a more realistic scenario for the experimental subjects.

2.2. Main experimental tasks

In the first experiment, we analyze the domain effect on risk-taking in a non-monetary context. In particular, we set up a between-subjects design, confronting half of the subjects with Experiment 1a (gain domain) and the other half with Experiment 1b (loss domain). We modified the Asian disease-problem of Tversky and Kahneman (1981) as follows to provide a more business-related vignette.

Experiment 1a and 1b (the introduction to the decision problem is the same for both groups). *Imagine that the industry your company operates in struggles with a recession. 900 of your employees (out of 5000) are endangered to lose their jobs if the weak development of the economic situation continues. You are now instructed to decide between two alternative programs to avert the worst case of all 900 employees losing their jobs. Which program do you prefer?*

Experiment 1a.
Adopt Program A: 300 employees will keep their jobs.
Adopt Program B: there is a one-third probability that 900 employees will keep their jobs and a two-thirds probability that no one will keep their job.

Experiment 1b.
Adopt Program A: 600 employees will lose their jobs.
Adopt Program B: there is a one-third probability that nobody will lose their job and a two-thirds probability that 900 employees will lose their jobs.

In the second experiment, we analyze potential domain-specific risk-taking in an explicit finance context by confronting subjects with the classical stock selling problem proposed by Shefrin and Statman (1985). To address both the gain and loss domain, we modified the task slightly to establish a between-subjects design where each subject faces one of the following two choice problems.

Experiment 2a. *Imagine you have purchased a stock one month ago for $100 and now it is selling at a price of $110. You now must decide whether to realize the gain or hold the stock for one more period. (Assume, for simplicity, that there are no taxes or transaction costs.) You further expect that in the upcoming period the stock will either increase in price by $10 or decrease in price by $10 with equal probability (50/50 chance).*

Experiment 2b. *Imagine you have purchased a stock one month ago for $100 and now it is selling at a price of $90. You now must decide whether to realize the loss or hold the stock for one more period. (Assume, for simplicity, that there are no taxes or transaction costs.) You further expect that in the upcoming period the stock will either increase in price by $10 or decrease in price by $10 with equal probability (50/50 chance).*

Subjects were then asked to indicate whether they would sell the stock (i.e., choose the riskless alternative, as this choice precludes further gains or losses) or hold it one more period (i.e., choose the risky alternative with an increase or decrease of $10 with equal probability). While neoclassical models would view the decision problems as almost identical[2] and predict risk aversion in both experiments, Prospect Theory predicts subjects to behave risk-averse in Experiment 2a and risk seeking in Experiment 2b.

Varying the contextual frames in which the choice problems are presented allows us to get a more comprehensive picture about potential differences in domain-specific risk-taking between financial professionals and the general population. In Experiment 1, we analyze domain-specific risk-taking in a primarily non-monetary context. We consciously build on a modified version of the Asian Disease Problem of Tversky and Kahneman (1981) as it directly addresses frame-induced domain effects and is set in a non-financial context. Within the general context of this decision problem, we analyze how a simple change in the description of the situation (with no differences in objective outcomes) affects the behavior of finance professionals and non-professionals. In Experiment 2, we investigate how outcome domains affect risk-taking in an explicit finance context that is related to investment decisions. To control for individual characteristics, we included questions about age and gender as well as self-assessed risk preferences in general and in finance-specific situations (based on the German Socio-Economic Panel SOEP by Dohmen et al. (2011). Accounting for the potential influence of cognitive reflection skills on decision making in risky gambles (Frederick, 2005), we also included the extended cognitive reflection test (CRT) by Toplak et al. (2014).

3. Results

3.1. Experiment 1: Domain-specific risk-taking in a non-monetary business context

Fig. 1 depicts the fraction of subjects who chose the risky alternative in Experiment 1, separated for subject pool and domain. We find a strong domain effect on risk-taking: the percentage of non-professionals (professionals) choosing the risky alternative increases from 29.4% (36.6%) in the gain domain to 52.9% (55.4%) in the loss domain. In Table 1, we provide logit models with RISKY_ALTERNATIVE as the dependent variable (1 if the risky alternative was selected, 0 otherwise). NEG_FRAME indicates the

[2] At the time of the decision, the only objective variation is the absolute difference of $20 in total wealth due to the higher or lower stock price.

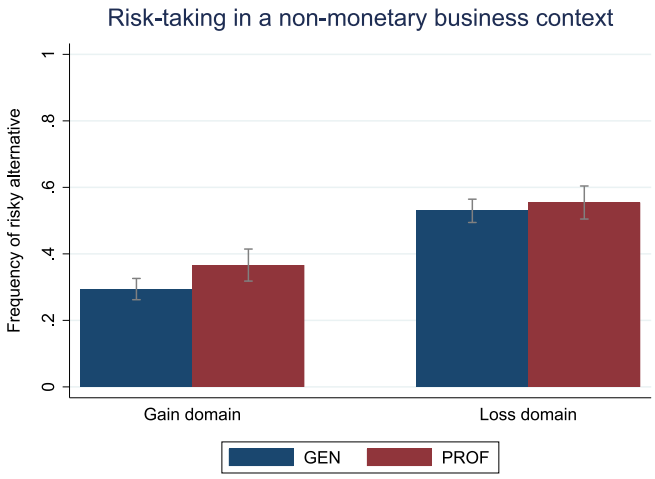

Fig. 1. Fraction of subjects choosing the risky alternative in the gain and in the loss domain in Experiment 1: This figure depicts the fraction of subjects selecting the risky alternative, separated for the gain domain (left) and the loss domain (right), and separated for the general population sample (GEN) and professionals (PROF). Error bars indicate standard errors of the mean. In both domains, the expected value of the sure alternative equals the expected value of the risky alternative.

domain of the decision, PROF stands for professionals, and the interaction term PROF x NEG_FRAME measures the difference between the domain effect on risk-taking of professionals and non-professionals. In column two, we additionally control for age, gender, self-assessed level of risk-taking in general RISK_GEN, and CRT score.[3]

We find a significant domain effect for both subject pools ($p < 0.001$ and $p < 0.05$, see NEG_DOMAIN for subjects from the general population group and NEG_DOMAIN + PROF x NEG_DOMAIN for subjects from the group of financial professionals on the bottom of Table 1). We would like to emphasize that our analysis reflects a 2x2 factorial design with variations along decision domain and subject pool. Thus, NEG_DOMAIN is the pure domain effect for the general population as in a subsample analysis for non-professionals only. PROF x NEG_DOMAIN shows the difference in the domain effect between the general population and professionals. To obtain the pure domain effect for professionals, we simply need to add the difference in the effect between the two groups, PROF x NEG_DOMAIN, to the effect for the non-professionals, NEG_DOMAIN). Hence, our findings indicate that both professionals and non-professionals select the risky alternative more often in the loss domain (i.e., where the outcomes are described as jobs lost) than in the gain domain (i.e., where the outcomes are described as jobs saved), even though the decision problem is identical. Moreover, we do not find evidence for a difference in this domain effect between professionals and the general population (see the interaction term PROF x NEG_DOMAIN). Note also that we drop the 10%-level of statistical significance for reducing the likelihood of false positives throughout the paper.

The fact that we recruited finance professionals from different areas allows us to test whether the patterns hold qualitatively for the three subsamples *market* (e.g., trading, portfolio management), *sales* (and advisory), and *support* (compliance, customer support). In the first line of Table B2 in the Appendix, we run the logit model for each of the three different subsamples

[3] As a robustness check, we also performed the regression with the self-assessed level of financial risk-taking, which does not alter the findings. Results can be provided upon request.

Table 1
Risk-taking in the gain and in the loss domain in a general context in Experiment 1. This table outlines decisions for the risky alternative depending on the domain (gain vs loss) and the subject pool. RISKY_ALTERNATIVE is a binary dummy taking on 1 if the risky alternative was selected and 0 otherwise. NEG_DOMAIN is a binary dummy standing for the domain of the decision, PROF stands for financial professionals, and PROF x NEG_DOMAIN is an interaction term measuring the difference between the domain specific risk-taking of professionals and non-professionals. In the second column, additional controls for age, gender, self-assessed level of risk-taking from the SOEP-question on risk-taking in general (RISK_GEN), and CRT score are added. The test for the presence of a domain effect in the sub-sample of professionals, NEG_DOMAIN + PROF x NEG_DOMAIN, is presented on the bottom of the Table. *, ** and *** represent p-values below 5%, 1% and 0.1%, respectively, of a double-sided test. z-statistics are provided in parentheses.

Dep. var.: RISKY_ALTERNATIVE	(1)	(2)
NEG_DOMAIN	0.993***	1.009***
	(4.77)	(4.82)
PROF	0.328	0.401
	(1.27)	(1.51)
PROF x NEG_DOMAIN	−0.227	−0.268
	(−0.64)	(−0.75)
AGE		0.002
		(0.34)
FEMALE		−0.212
		(−1.19)
RISK_GEN		0.062
		(1.14)
CRT		−0.075
		(−1.70)
Domain effect professionals		
NEG_DOMAIN + PROF x NEG_DOMAIN	0.767**	0.741*
	(2.67)	(2.55)
N	610	610
Pseudo R^2	0.039	0.046

of finance professionals separately. Due to the lower sample sizes and the corresponding decrease in statistical power, we are primarily interested in whether the results also hold qualitatively among the subgroups. We find similar effects for all subsamples, with those working in sales and advisory showing the strongest domain effect (both in terms of magnitude and statistical significance). We consider this to be insightful evidence, as professionals in this group are in particularly close contact with clients and thereby might pass on potential biases to their customers. Interestingly, we also observe a pronounced domain effect on risk-taking among professionals with explicitly market related job roles, while the effect is lowest among professionals in support functions.

3.2. Experiment 2: Domain-specific risk-taking in a finance context

In the second experiment, we investigate how outcome domains affect risk-taking in an explicit finance context related to investment decisions. Fig. 2 depicts the fractions of subjects who chose the risky alternative (i.e., hold the asset), separated for subject pool and domain. Interestingly, we find a much stronger domain effect among finance professionals than among the general population. While the percentage of non-professionals who chose the risky alternative only rises slightly from 66.0% in the gain domain to 70.2% in the loss domain, we find a substantial increase from 62.9% to 84.8% among professionals. Table 2 shows the results of a logit model with HOLD_ASSET as the dependent variable. In column two, we additionally control for age, gender, self-assessed level of financial risk-taking RISK_FIN, and CRT score.

As already indicated by Fig. 2, we find no domain-specific risk-taking for the general population (dummy NEG_DOMAIN), but we do find significant domain-specific risk-taking among financial

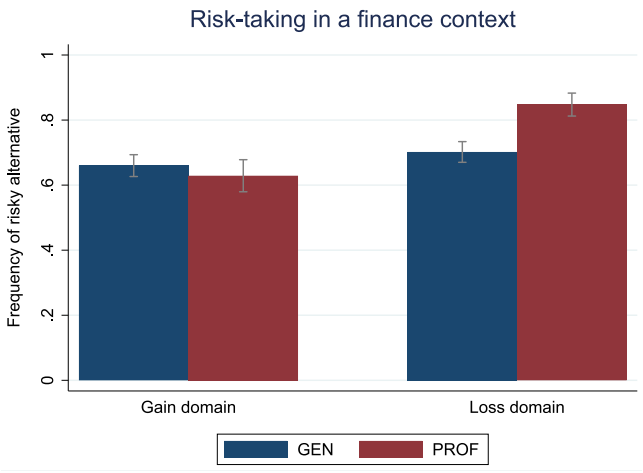

Fig. 2. Fraction of subjects choosing the risky alternative (i.e., staying invested in the risky asset) in the gain and in the loss domain in Experiment 2: This figure depicts the fraction of subjects selecting the risky alternative, separated for the gain domain (left) and the loss domain (right) and separated for the general population sample (GEN) and professionals (PROF). Error bars indicate standard errors of the mean. The "expected values" of the sure alternative and the risky alternatives are equal in the gain and the loss domain, respectively.

professionals (NEG_DOMAIN + PROF x NEG_DOMAIN). As can be seen from the interaction term PROF x NEG_DOMAIN, the difference in the domain effect between financial professionals and the general population is also significant.

These findings are remarkable as they emphasize the peculiarity of realizing potential losses for financial professionals. Turning to the control variables, we find a significant effect for age and evidence for a gender effect, indicating that older subjects and women are more likely to stay invested.

While the result that finance professionals are more prone to risk-taking in the loss domain than non-professionals seems surprising at first, we conjecture that there might indeed be an occupational bias behind it. The results can be interpreted such that financial professionals are more reluctant to realize paper losses and hence more willing to hold assets after incurring a loss with respect to the purchase price than non-professionals.

Again, we run this regression separately for the three different subsamples of finance professionals in the second line of Table B2 in Appendix. We find qualitatively similar effects for all subsamples with those working in sales and advisory showing again the strongest domain effect (i.e., significant domain effect with $p < 0.05$). This subsample analysis provides similar findings to the one of Experiment 1, as again the sales and advisory group (who are actively consulting clients) show the strongest bias.

3.3. Experiment 3: Domain effects and narrow framing

In an additional experiment, we seek to analyze the strength of potential domain effects on risk-taking. In particular, we are interested whether domain specific risk attitudes can relate to irrational decisions among finance professionals. To this end, we build on the narrow framing task proposed by Tversky and Kahneman (1981). Here, subjects are presented two simultaneous risky decisions, one of which is set in the gain domain while the other is set in the loss domain. The two decisions are parameterized such that acting risk-averse in the gain domain and, simultaneously, risk-seeking in the loss domain leads to the selection of a dominated pair of alternatives. While in the above experiments domain-specific risk-taking does not allow inference about the rationality of the individual choices, in this decision problem it comes at the immediate cost of selecting a dominated alternative.

Table 2
Risk-taking in the gain and in the loss domain in a finance-related context in Experiment 2. This table outlines decisions for the risky alternative (i.e., hold the asset) depending on the domain (gain vs loss) and the subject pool. HOLD_ASSET is a binary dummy taking on 1 if the risky alternative was selected and 0 otherwise. NEG_DOMAIN is a binary dummy standing for the domain of the decision, PROF indicates financial professionals, and PROF x NEG_DOMAIN is an interaction term measuring the difference between the domain specific risk-taking of professionals and non-professionals. In the second column, additional controls for age, gender, self-assessed level of risk-taking from the SOEP-question on financial risk-taking (RISK_FIN), and CRT score are added. The test for the presence of a domain effect in the sub-sample of professionals, NEG_DOMAIN + PROF x NEG_DOMAIN, is presented on the bottom of the Table. Numbers of observations are 200 (97) for GEN (PROF) in Experiment 2a, and 208 (105) for GEN (PROF) in Experiment 2b. *, ** and *** represent p-values below 5%, 1% and 0.1%, respectively, of a double-sided test. z-statistics are provided in parentheses.

Dep. var.: HOLD_ASSET (risky alternative)	(1)	(2)
NEG_DOMAIN	0.193	0.305
	(0.91)	(1.39)
PROF	−0.136	−0.244
	(−0.53)	(−0.91)
PROF x NEG_DOMAIN	0.996*	0.875*
	(2.46)	(2.13)
AGE		0.026**
		(3.27)
FEMALE		0.512**
		(2.65)
RISK_FIN		0.007
		(0.14)
CRT		0.086
		(1.77)
Domain effect professionals		
NEG_DOMAIN + PROF x NEG_DOMAIN	1.189***	1.179***
	(3.46)	(3.38)
N	610	610
Pseudo R^2	0.022	0.050

Tversky and Kahneman (1981) have shown that student subjects who are presented the two decisions separately largely fail to put the decisions in a common context (narrow framing bias) and hence choose the dominated pair of alternatives. In Experiment 3, we test whether finance professionals also fall prey to the narrow framing bias.

We thus confronted half of the subjects with the two decisions separately (Experiment 3a) and the other half with a single, joint formulation of the decision problem (Experiment 3b).

Experiment 3a. *The company you work for is operating in two markets. Imagine that you face the following pair of concurrent decisions for both markets.*

Market 1
Option A: Sure gain of $2,400,000.
Option B: 25% chance to gain $10,000,000 and 75% chance to gain nothing.

Market 2
Option A: Sure loss of $7,500,000.
Option B: 75% chance to lose $10,000,000 and 25% chance to lose nothing.

Subjects could then indicate their choices for the two markets. In this experiment, choosing Option A in Market 1 and Option B in Market 2 is strictly dominated by choosing Option B in Market 1 and Option A in Market 2.[4] Decision makers who are generally risk-averse in the gain domain and risk averse in the loss

[4] When facing both decisions simultaneously, the contingent payoffs of the choices in Markets 1 and 2 can be aggregated. Consequently, the decision

domain might fail to realize this observation more easily when they evaluate each situation separately. To control for unobserved reasons why subjects would choose the dominated alternative, we presented the other half of the subjects with the joint decision problem in Experiment 3b. This task offers the dominated combination (B in Market 2 and A in Market 1) and the dominating combination (B in Market 1 and A in Market 2) from the previous experiment as alternatives.

Experiment 3b. *The company you work for is operating in two markets. Imagine that you face the following pair of concurrent decisions for both markets.*

Option A: 25% chance to gain $2,400,000 and 75% chance to lose $7,600,000.
Option B: 25% chance to gain $2,500,000 and 75% chance to lose $7,500,000.

In Table 3 we provide a logit model with DOMINATED_ALTERNATIVE as the dependent variable (a binary variable taking on 1 if the dominated alternative was selected and 0 otherwise), showing the effect of narrow framing on the frequency with which the dominated alternative is chosen. SEPARATE is a binary dummy taking on 1 if the decision problem consisted of two separate choices (Experiment 3a) and 0 if the decision consisted of one choice of aggregated outcomes (Experiment 3b). As can be seen from the coefficient SEPARATE and the linear combination SEPARATE + PROF x SEPARATE, we find a strong and significant narrow framing effect for both subgroups that stays robust after including the usual control variables. Moreover, we do not find a significant difference in the effect between professionals and non-professionals (as indicated by PROF x SEPARATE). These findings suggest that professionals are similarly prone to narrow framing (i.e., selecting the dominated alternatives more frequently when presented separately) as non-professionals.[5]

Finally, we run this regression separately for the three different subsamples of finance professionals in the third line of Table B2in Appendix. We find almost identical effects of narrow framing among all subsamples, indicating that the effect is similarly strong across the three groups.

Table 3
Choice of the dominated alternative with and without narrow framing. This table outlines decisions for the dominated alternative when the outcomes are presented as two separate decisions compared to when they are already aggregated in the problem formulation. DOMINATED_ALTERNATIVE is a binary dummy taking on 1 if the dominated alternative was selected and 0 otherwise. SEPARATE is a binary dummy taking on 1 if the decision problem consisted of two separate choices (Experiment 3a) and 0 if the decision consisted of one choice of aggregated outcomes (Experiment 3b). PROF stands for financial professionals, and PROF x SEPARATE is an interaction term measuring the difference between the frame specific choices of professionals and non-professionals. In the second column, self-assessed level of risk-taking from the SOEP-question on financial risk-taking (RISK_FIN), and CRT score are added. The test for the presence of a domain effect in the sub-sample of professionals, SEPARATE + PROF x SEPARATE, is presented on the bottom of the Table. Numbers of observations are 203 (100) for GEN (PROF) in Experiment 3a, and 205 (102) for GEN (PROF) in Experiment 3b. *, ** and *** represent p-values below 5%, 1% and 0.1%, respectively, of a double-sided test. z-statistics are provided in parentheses.

Dep. var.: DOMINATED_ALTERNATIVE	(1)	(2)
SEPARATE	1.180***	1.197***
	(5.52)	(5.54)
PROF	−0.116	−0.047
	(−0.40)	(−0.16)
PROF x SEPARATE	0.345	0.364
	(0.91)	(0.96)
AGE		−0.011
		(−1.47)
FEMALE		0.053
		(0.29)
RISK_FIN		0.069
		(1.31)
CRT		−0.061
		(−1.32)
Narrow framing effect professionals		
SEPARATE + PROF x SEPARATE	1.525***	1.561***
	(4.90)	(4.98)
N	610	610
Pseudo R^2	0.071	0.080

4. Conclusion

Initiated with the seminal studies by Kahneman and Tversky (1979) and Tversky and Kahneman (1992), a large body of literature shows that decision makers are influenced by the domain (gain vs loss) in which the decision is embedded. However, some authors conjecture that real-world market experience would match predictions from neoclassical models more closely, leaving these findings as some kind of artifact of non-professional (student) subjects (e.g., List, 2003, 2004). In the present paper, we investigated whether real-world market experience can mitigate domain-specific risk-taking. In particular, we ran lab-in-the-field experiments with 202 financial professionals and 408 subjects from the general population and analyzed their behavior in classical experiments taken from Tversky and Kahneman (1981), Kahneman and Tversky (1984), Shefrin and Statman (1985), and Tversky and Kahneman (1986).

First, we reported a strong effect of domain-specific risk-taking for both professionals and non-professionals in a general, non-monetary decision problem. In particular, we found that risk-taking is higher in the loss domain compared to the gain domain. Importantly, we observed this pattern in a situation where we only altered the frames of an otherwise identical underlying decision problem, indicating the strength of the domain effect: In a variant of the Asian Disease Problem, we found that both professionals and non-professionals took more risk when the alternatives were framed as losses. Second, we observed a substantial difference between professionals and non-professionals when the decision problem was set in a finance context in a hypothetical investment situation. Here, professionals held on to a losing stock more eagerly (i.e., they selected the risky alternative more often) than non-professionals. This result is in contrast to the conjecture that experience in investment decisions mitigates the disposition effect and, to the contrary, suggests that professionals are more reluctant to realize (and therefore monetize) losses than non-professionals. Finally, we observed that professionals were similarly prone to the narrow framing bias in risky decisions as non-professionals, which further corroborates the strength of the domain effect on decision making in situations involving risk.

Interestingly, our findings of persistent domain-specific risk-taking among professionals and particularly the insights that professionals ride losing stocks even longer than non-professionals are in contrast to studies showing that market experience reduces or eliminates behavioral biases (List, 2003, 2004). In our

problem with two questions and two choice alternatives each can be interpreted as one single decision with four choice alternatives. Then, choosing Option A in Market 1 and Option B in Market 2 yields a 25% chance to win $2,400,000 and a 75% chance to lose $7,600,000. This choice alternative is strictly dominated by choosing Option B in Market 1 and Option A in Market 2, which yields a 25% chance to win $2,500,000 and a 75% chance to lose $7,500,000. Failure to assess this correctly is interpreted as a result of the narrow framing bias, as the decision maker overlooks to aggregate the potential outcomes of his decisions correctly.

[5] Interestingly, we observe a substantial fraction of irrational choices in Experiment 3a: in total, 54.1% of all subjects chose the dominated combination of option A in Market 1 and option B in Market 2. This fraction is slightly, but insignificantly, lower in the general population sample (52.2%) than in the group of financial professionals (57.8%).

subsample analysis, we find that market- and especially sales-oriented professionals – i.e., professionals with substantial market experience – are prone to domain-dependent risk-taking as well. Our results are thus in line with literature showing that financial professionals do not behave more in accordance with neoclassical predictions compared to non-professionals like students or people from the general population (Cipriani and Guarino, 2009; Deaves et al., 2010; Abdellaoui et al., 2013; Menkhoff and Schmeling, 2013; Kirchler et al., 2018; Sheffer et al., 2018; Schwaiger et al., 2020; Holzmeister et al., 2020). Our findings are also in line with studies exploiting field data which show that decision makers exhibit reference point dependent behavior (Camerer et al., 1997) and are prone to loss aversion (Pope and Schweitzer, 2011) in their daily (professional) decisions. Given the importance of this topic, we hope that researchers gain more and more insights into the behavior of finance professionals to get a more comprehensive picture of their behavior and to be able to identify if and where they do come closer to neoclassical benchmarks. As a related point, additional research on professionals' behavior should also focus on isolating the drivers of potential differences to the behavior of non-professionals.

Finally, our study has certain limitations. One criticism could center around the non-incentivized nature of our experiments. We are aware of this issue and we weighed the advantages and disadvantages of not incentivizing the experiments carefully while planning the study. The reason why we have opted for not incentivizing the tasks was twofold: first, we wanted to cover a wider range of risky decisions and therefore selected tasks spanning from a variant of the general Asian Disease Problem (Experiment 1) to an explicit investment decision in a finance context (Experiment 2). Second, we aimed to stick as closely as possible to the original studies to avoid potential confounds from a variation in the incentive schemes, and therefore also opted for not incentivizing the experiments.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.jbef.2020.100331.

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