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Why don't they minimize their tax? An experimental approach to cross border hybrid finance[a]

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Abstract

International tax law allows, under certain circumstances, to considerably reduce the group average tax rate. In some cases, even the tax-free repatriation of yields on intra-group finance is possible, in particular when using hybrid finance. These cases are normally connected to complex questions of foreign, domestic, and bilateral tax law as well as to uncertainty on whether the intended tax consequences will be upheld by the fiscs in future years. We experimentally investigate the two key variables, legal uncertainty and tax complexity while controlling for decision makers' risk attitude. Results show that overall tax complexity has a negative effect on the probability to choose a hybrid finance instrument, while legal uncertainty has not. The impact of the two factors is moderated by decision makers' risk attitudes.

Keywords: Hybrid finance, tax, experiment, uncertainty, complexity
JEL Classification Codes: C91, D03, D81, H25

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1 Introduction

Cross-border tax planning is a continuous source of annoyance to fiscs and states, an interesting aspect of minimizing costs for multinational firms, and a thrilling and money-making challenge for tax consultants. At the expense of consulting costs, multinationals as well as internationally active enterprises face the promise of sometimes considerable tax savings, culminating in income that remains completely untaxed. At the same time, such strategies are frequently connected to complex legal qualification, in particular in a foreign country, and to uncertainty regarding the reaction of the domestic and the foreign fisc in case of a tax audit.

One prominent example for a tax strategy that results in untaxed income is the use of hybrid finance which combines characteristics of typical equity and typical debt. Normally, but not necessarily, it offers profit participation, sometimes also loss participation or participation in an increase and/or decrease of the net asset value. It can be redeemable, it can entitle to claims in case of insolvency. The exact terms of a hybrid instrument depend amongst others of course on the laws of the respective country, in particular law of obligations and company law. Nevertheless, frequently either the freedom of contract or the mere lack of rules allows a broad range of terms. Examples for hybrid finance are profit participating debt, preference shares, convertibles, or similar.

For income tax purposes, hybrid instruments must be classified as either debt or equity. More precisely, yet on a high level of abstraction: in the source state (the residence state of the financee) the yield must be classified as either tax deductible interest expense or as taxable dividend. In the residence state of the financer, the yield received must be classified as either taxable interest income or as dividend received, which is tax-privileged or tax-exempt in most countries.[2] In purely domestic transactions, where source state and residence state are the same, a coherent treatment is normally guaranteed. In a cross-border situation, it may happen that a specific hybrid instrument is classified as debt in one country, and as equity in the other country. This may lead to

[2] This rough outline of possible tax treatments focuses on corporations and on the typical tax treatments of interest and dividend, valid for most countries. It cannot and does not consider the innumerable exceptions that can be found around the world.

double taxation (or even triple taxation where withholding tax is due and not credited): the yield of the instrument is considered dividend and subject to corporate tax in the source state, and it is considered taxable interest income in the residence state. In the reverse case, double non-taxation can arise: the yield is considered tax-deductible interest in the source state, and it is considered tax-exempt dividend income in the residence state (Eberhartinger and Six 2009).

The cross-border use of hybrid instruments involves thorough preparation, not only to safely avoid double or triple taxation, but also and with equal accuracy if untaxed income shall be received. Such preparation covers not only tax questions and the avoidance of unilateral or bilateral anti-avoidance rules, but also prior questions of company law and law of obligations. Such preparation is even more difficult if documentation is scarce, laws are not explicit enough, and administrative directives and/or case law are missing, as may well be the case in such specific forms of finance and in some countries with less elaborate or younger tax systems. If such preparations finally come to the conclusion that a certain instrument upon certain conditions actually results in double non-taxation, the company still faces the possibility of a later tax audit. If the standpoint of the enterprise regarding the tax classification of the instrument is not supported by the tax auditor, the fisc, or the courts of either country, the company not only faces an unwanted tax burden, but maybe additionally a fine for tax evasion.

To state the obvious: cross-border tax strategies such as the use of hybrid finance are connected to considerable chances of reducing the tax burden, and to risks of instead increasing the tax burden.

Our study is motivated by the observation that in spite of considerable possible tax savings, hybrid finance is not frequently used. Empirical evidence is hardly available: data-bases are not adequate as they either do not contain information on hybrid finance and/or as they include consolidated statements only, that by nature do not show intra-group finance. Discussion with consultants shows that in specific cases, for specific enterprises, hybrid finance is used and large tax savings are achieved. However, this is only anecdotic evidence, protected from detailed research by principles of professional confidentiality. An empirical survey of the individual accounts by Schreiner (2009) on the

use of hybrid finance by companies listed on the Austrian stock market supports this observation. It shows that only 21% of the companies use hybrid finance, mostly via public placement. This survey does certainly not answer all questions on the practical use of hybrid finance, but nevertheless it supports the general notion, and even without solid empirical evidence, it is reasonable to say that the use of cross-border hybrid finance is not wide-spread. This leads to the question: Why does not every multinational use that enormous potential for reducing the effective tax rate?

Given a situation, where a domestic parent company is required to finance a foreign subsidiary, it can choose pure equity, pure debt, or hybrid finance. It is likely that tax considerations are important, assuming that ultimately the parent bears the entrepreneurial risk of its subsidiary in any case. It can thus be assumed that the parent as an investor is risk neutral. However, in reality it is always officials – the CFO or the head of accounting or of legal services – that make the decision whether or not to use tax avoiding strategies, who have to rely on their personal degree of risk aversion (e.g., Graham et al., 2009).

In the above discussion of cross border tax planning, two factors have emerged that might be central to the decision of using a specific finance instrument. The first one is the complexity of international tax laws that may make it difficult and costly to evaluate the potential tax savings of certain cross border finance instruments. The second is the legal uncertainty with respect to the classification of hybrid finance as equity or debt by the countries involved. As aforementioned, classification conflicts might result in either double (or triple) taxation or in a considerable reduction of the tax burden. In light of the uncertainty involved, the risk attitude of the decision maker(s) that take the finance decision on behalf of their businesses is certainly an important third factor.

As mentioned above, empirical data on the use of hybrid finance instruments is hardly available on a micro-level and qualitative business interviews on tax planning and finance decisions are very likely biased. Moreover, even if tax complexity can be proxied by a semantic analysis of tax law, it is exceedingly demanding to capture nuances of uncertainty that arise from classification conflicts. Tax consultancy expenditures, as a direct financial consequence of complex tax law, are confidential business information

and thus hard to obtain. Hence, given the scarce opportunities to study influences on the use of hybrid finance, we provide a first, unique step in exploring possible choice determinants of cross border hybrid finance by relying on state-of-the-art laboratory experiments.

For our purpose, an experiment has several distinct virtues. First, it allows varying the vital variables, *tax complexity* and *legal uncertainty*, systematically and investigating how they affect the probability to choose a (stylized) hybrid finance instrument. Thereby, we can stringently establish a relation of cause and consequence. Second, we can identify possible interactions of the two factors by examining their joint effect in a full factorial design. Thirdly, we can elicit and subsequently control for decision makers' risk attitude.

One might argue that insights gained in the laboratory with student subjects might not be readily transferable to the field. In principle, we agree that generalizing lab results and deriving actual policy applications must be accompanied by reasonable caution. However, there is ample evidence from managerial and accounting decision experiments that results obtained from (business and economics) students do not different significantly from results found with managerial or accounting professionals (Ashton and Kramer, 1980, Remus, 1996, Depositario et al. 2009, Liyanarachchi, 2007).

The remainder of the papers is organized as follows: Section 2 reviews some related literature in the area of tax uncertainty and tax complexity, section 3 presents the experimental design to create a stylized decision scenario that offers decision makers to choose between two possible finance instruments. In section 4, the results of the experimental study are presented. Section 5 summarizes and concludes with a brief discussion.

2 Related literature

Previous research about tax complexity and uncertainty frequently regards these two concepts as closely connected. It is argued that complex tax law complicates taxpayers' task to determine their true tax liability, resulting in uncertainty about the essential parameters, like tax rate, tax base, audit probability or penalties. Such uncertainty may either result in reporting mistakes or affect strategic reporting decisions. Theoretical

models have studied the role of tax law complexity, and almost synonymously tax uncertainty, in the context of (individual) income tax compliance. The general emphasis is on whether and how uncertainty – reflected in variability of the tax base, tax rates, audit probabilities and fine rates – affects declared income and tax revenues.

Predictions of these models are mixed. While Scotchmer and Slemrod (1989) demonstrate the advantageous effects of uncertainty about tax liabilities for tax revenues, Alm (1988) stresses that tax base uncertainty is likely to increase tax revenues, while tax rate risk always leads to a decrease. Similarly, Beck and Jung (1989) find that higher uncertainty leads to a reinforcement of compliance incentives that are driven by audit probabilities, tax rate or fines. De Waegenaere et al. (2003) set up a model of multinational firms who face tax authorities from different countries. They find that tax law ambiguity could either increase or decrease firms' expected tax liability. Thus, according to these models, tax uncertainty is neither unambiguously beneficial nor detrimental for compliance and revenues.

The essence of these theories has been put to test by the use of lab experiments. Results show that reducing tax base uncertainty increases tax compliance (Beck et al., 1991), although this effect depends on the how the use of tax revenues is framed (Alm et al., 1992). A few other experimental studies have looked into the effects of tax complexity in a more straightforward way. For instance, Rupert et al. (2003) and Rupert and Wright (1998) varied the accessibility of effective tax rates, i.e. whether they could be inferred by a number of simple calculations or were directly visible, and concluded that higher complexity decreases decision performance. Similar findings are reported in an early behavioral study by Milliron (1985). Hence, it can be concluded that uncertainty has adverse effects on compliance as well as decision quality.

There are hardly any empirical studies that examine the consequences of tax complexity and uncertainty. A noteworthy exception is the work by Edmiston et al. (2003) who look at foreign direct investment in the presence of cross country differences in tax law complexity and legal uncertainty. Tax law complexity requires businesses to devote an increased amount of time and financial resources to understand and apply tax law to their activities and determine correct liabilities. While high complexity might directly

induce uncertainty, the authors argue that the latter may also arise from ambiguities in the interpretation and frequent changes of the tax law. Edmiston et al. (2003) are able to proxy tax law complexity and uncertainty by several indicators and uncover that inward foreign direct investment is discouraged by both.

In contrast to the tax compliance research reviewed above, in our study, we ask the question whether tax complexity and tax uncertainty affect the decision to choose a cross border hybrid finance instrument.[3] In particular, decision makers are confronted with a choice between two finance instruments that differ only in the tax treatment, but not in investment returns. One instrument reflects pure (equity or debt) financing with certain taxation while the other one reflects hybrid financing with the chance of obtaining a more favorable tax treatment and the risk of receiving a worse one. This specific uncertainty of the tax treatment is one main variable of interest. It is important to note that in studying the use of cross border hybrid finance, legal uncertainty and tax complexity have to be considered separately. The complexity of taw law impedes the calculation of effective tax rates and raises compliance costs in terms of expenses for tax consultancy services.[4] Legal uncertainty, in contrast, arises from possible conflicts between tax authorities of different countries in classifying a specific hybrid instrument as debt or equity finance.

Beyond addressing a genuinely new research question in its own right, our study extends the existing literature in two ways:

First, we disentangle tax complexity and tax uncertainty. This distinction has been largely neglected so far, despite becoming growingly important for tax planning of internationally operating businesses. Tax complexity describes the effort it takes to understand the legal situation in the domestic country and in particular in the foreign country, including double tax conventions. Tax uncertainty, in contrast, describes uncertainty on the marginal tax rate that will in the end apply, in particular after a possible tax audit and in the eyes of the fisc, also considering a possible fine, the

[3] We like to note that cross border hybrid finance instruments are chosen for a number of reasons, which are largely beyond the scope of this paper. We restrict our view to the benefits of cross border hybrid finance from a tax planning point of view.

[4] We particularly assume, however, that the tax code is precise enough to actually determine the correct tax rates and tax base.

possibility of later changes to the law and its stability. To put it more plainly: tax complexity describes the difficulty of finding an appropriate solution for double-non-taxation, tax uncertainty describes the uncertainty on whether the solution found is robust to later scrutinizing.

Second, our study does not focus on how given tax law design affects income tax declaration but rather how it affects financing decisions that have important implications for the tax burden of a multinational firm. These two issues have – to the best of our knowledge – not been previously touched by the vast literature on corporate taxes.

Naturally, it is more than difficult to pursue such a research endeavor by means of field data: tax decisions are a sensitive issue and businesses may not only be reluctant to answer survey questions about finance and tax decisions but have incentives to bias their reports. Even if empirical data on the use of hybrid finance were available across countries with diverging levels of tax law complexity, the uncertainty of the legal treatment can hardly be captured in quantitative terms. Thus, it seems most promising to take the first step in exploring the use of cross border hybrid finance by resorting to experimental economics methods. In this way, we try to shed light on the question, whether and to what extent tax complexity and legal uncertainty are underlying concerns in the decision on hybrid finance.

3 Experimental design and procedure

To address our main question, we set up the simplest possible, stylized decision experiment that still captures the essence of the decision without burdening participants with specific language or legal details. Although we capture a corporate decision, it is not unusual to assume that the finance decisions are ultimately taken by a corporate executive, e.g. the CFO, on behalf of the firm (e.g., Papadakis and Barwise, 2002). In the following, we first present an overview of the general design, particularly the variables of interest, and then review the procedure of the experiment where we describe the decision setting in greater detail.

The two main factors of interest, *tax complexity* and *legal uncertainty* were varied in two steps, high and low, resulting in a 2-by-2 design. The experiment was setup in a

between-subjects design, i.e. each participant encountered only one of the four treatment conditions (see Table 1 for an overview of treatments and number of participants). The dependent variable was binary, i.e. it was observed whether a decision maker chooses a finance instrument that is designed to reflect cross border hybrid finance with its main feature of tax rate uncertainty over an alternative, certain one. The four treatments then relate to the characteristics of the hybrid finance instrument that incorporate high and low uncertainty and high and low complexity. The characteristics of the alternative, certain finance instrument was kept constant across treatments. Risk-attitudes as an important moderator variable in risky decisions were elicited and related to subsequent choice behavior.

Table 1: Overview of 2-by-2 design

# Participants	*Complexity*	
Uncertainty	*Low*	*High*
Low	*33*	*33*
High	*31*	*31*

The experiment consisted of two phases. Phase 1 served the purpose of eliciting participants' risk attitudes. We thereby followed the procedure suggested by Holt and Laury (2002). In 10 repetitions, subjects had to choose between two binary lotteries X and Y. Table 2 shows the list of 10 lottery choices where all amounts are displayed in Euro. While the prizes of both lotteries $\underline{x}$, $\overline{x}$, $\underline{y}$, and $\overline{y}$ remain constant, the probabilities of the high prizes $p(\overline{x})$, $p(\overline{y})$ increase from choice 1 to 10 (with $p(\underline{x}) = 1 - p(\overline{x})$ and $p(\underline{y}) = 1 - p(\overline{y})$). A risk-neutral individual, who decides only upon the expected value, would choose lottery X four times and then switch to lottery Y at the fifth choice. An earlier switch from lottery X to Y indicates risk-seeking behavior, a later switch risk-averse behavior. At the end of the experiment, one of the ten choices was selected by a dice throw to be paid out.

Table 2: Lottery choices in the first phase

Nr.	Lottery X			Lottery Y		
	$p(\overline{x})$	$\overline{x}$	$\underline{x}$	$p(\overline{y})$	$\overline{y}$	$\underline{y}$
1	0.1	2	1.6	0.1	3.85	0.1
2	0.2	2	1.6	0.2	3.85	0.1
3	0.3	2	1.6	0.3	3.85	0.1
4	0.4	2	1.6	0.4	3.85	0.1
5	0.5	2	1.6	0.5	3.85	0.1
6	0.6	2	1.6	0.6	3.85	0.1
7	0.7	2	1.6	0.7	3.85	0.1
8	0.8	2	1.6	0.8	3.85	0.1
9	0.9	2	1.6	0.9	3.85	0.1
10	1.0	2	1.6	1.0	3.85	0.1

Note: Monetary payoffs in Euro.

In phase 2, the actual decision experiment took place. Subjects were asked to put themselves in the position of a firm executive who has to decide between two instruments to finance a subsidiary firm abroad.[5] The return from the subsidiary was known to be fixed at 100.000 Taler.[6] The two possible instruments to finance the subsidiary were labeled neutrally as alternative A and B and described by their consequences for the firm's total tax burden. The tax rate was fixed and known in case of alternative A (always 40%) that reflected a pure (equity or debt) finance instrument, where the tax rate is not subject to classification issues in the involved countries. In contrast, the tax rate for alternative B that reflected a hybrid finance instrument was known to be preliminarily low but prone to be overturned by tax authorities. The probability for such an overturn to a more unfavorable tax rate was known. If such an overturn took place, the higher tax rate had to be applied and, in addition, a fine amounting to 60% of the difference in taxes paid and taxes owed was due. By that, *uncertainty* for the tax consequences of alternative B was introduced. Table 3 provides an overview of the design.

[5] Instructions can be found in the Appendix.
[6] Taler were converted to Euro at the end of the experiment at the exchange rate of 4000:1, i.e. 4000 Taler correspond to 1 Euro. Subjects knew the exchange rate in advance.

While uncertainty is usually measured by the variance of possible outcomes (e.g. Alm et al., 1992; Beck and Jung, 1991), perceived high (low) uncertainty typically coincides with a high (low) probability of an unfavorable event (Slovic, 1967; Tversky and Kahneman, 1992). Thus, in our implementation of high and low uncertainty, we ensured that both measures of objective and subjective uncertainty coincide. The former is reflected in the standard deviation of possible tax rates and the latter by the probability to have the favorable tax rate overturned and the disadvantageous one applied.[7] Naturally, such design requirements put limitations on the tax rates and probabilities that can be used. Additionally, a useful experimental setup should avoid that one finance instrument clearly dominates the other (e.g., in expected terms) so that not enough heterogeneity of behavior across subjects and treatments could be expected. The parameters of the experiment were derived under these considerations and are presented in the following.

In the *low uncertainty* treatment, the favorable and initially assumed tax rate was 26%. The probability that this tax rate was accepted by the authorities was 75%. In case the tax authorities disagreed on the use of this low tax rate (known to happen with probability 25%), a higher tax rate of 45% was applied plus a fine amounting to 60% of the difference between taxes due and taxes paid,[8] resulting in effective taxes of 56.4%. Uncertainty, measured by the standard deviation of tax rates, is thus rather low at 13.6%. This objective measure of low uncertainty is supported by a relatively low probability that the favorable tax rate is overturned, enhancing the subjective impression of low uncertainty.

In the *high* uncertainty treatment, the initial tax rate was zero, accepted by authorities with a probability of only 25%. In case the initial tax rate was rejected (prob. 75%) the new tax rate to be applied was 28% plus a fine of 60% of the tax difference, resulting in an effective tax rate of 44.8%. High uncertainty was reflected in a standard deviation of tax rates of 19,4%, coinciding with high subjective uncertainty due to the fact that the

[7] It is important to note that when varying uncertainty the expected tax burden has to be kept at a constant level across treatments to avoid counteracting the effect of changing uncertainty by altering the expected tax burden at the same time.

[8] The imposed fine in case of an overturn of the favorable tax rate was employed to reproduce a more realistic situation.

odds for the favorable tax rate were lower than for the unfavorable one. All parameters used in the four treatments are presented in Table 3.[9]

The second variable of interest, *tax complexity*, enters via consultancy fees. While this operationalization might not seem obvious at first, it nevertheless captures the true essence of how tax complexity enters firms' decisions. Complex legal tax systems require large efforts to determine the correct tax rates for specific finance instruments. Since decision makers in firms typically delegate such matters to tax consultants, complex tax laws first and foremost create high expenditures for tax expertise if firms want to make use of potentially advantageous hybrid finance.[10] To map complexity in our experiment, we thus varied the cost connected to employing the hybrid finance instrument. While the cost of the pure finance instrument A (the one with sure taxation) was kept constant across treatments at 2500 Taler, the cost of the hybrid finance instrument (alternative B) was either 4000 Taler in the *low* complexity treatment or 6000 Taler in the *high* complexity treatment, which corresponds to an increase of 50%.

Since the return from the subsidiary that served as the tax base was known to be certain at 100.000 ECU, the consultancy fees that reflect tax complexity could be used by participants to calculate an effective tax rate including consultancy fees (see the last two lines of Table 3). However, the literature on mental accounting (Kahneman and Tversky, 1984) suggests that individuals tend to use separate accounts for different purposes so that it can be assumed that complexity, reflected in consultancy fees, and uncertainty, reflected in the dispersion of applicable tax rates, are truly regarded as separate inputs for decision making.

[9] One might argue that a manipulation check could have given more information on how participants perceived uncertainty. However, in our very simple decision setting asking such questions involves the risk of creating an undesired demand effect so that reactions to parameters of the experiment are driven by the method of asking. For this reason, we abstained from eliciting participants' perception of the parameters and relied on state-of-the-art operationalization of uncertainty.

[10] In other words, high tax complexity adds a higher component of fixed costs to the hybrid finance instrument, since tax consultancy expenditures are usually not performance-related.

Table 3: Parameters of the decision task in phase 2

Parameters				
Return (tax base)	100.000			
	Alternative A: Pure Finance Instrument			
Fixed tax rate	*40%*			
Consultancy fees	*2500 (2.5%)*			
Effective tax rate incl. cost of advice	*42.5%*			
	Alternative B: Hybrid Finance Instrument			
Treatments	*Complexity*			
	Low		*High*	
	Uncertainty			
	Low	*High*	*Low*	*High*
Preliminary tax rate	26%	0%	26%	0%
Prob. (acceptance of preliminary tax rate)	0.75	0.25	0.75	0.25
Tax rate in case of overturn	45%	28%	45%	28%
…including fine of 60% of tax difference	56.4%	44.8%	56.4%	44.8%
Prob.(overturn)	0.25	0.75	0.25	0.75
Expected tax rate	33.6%			
Standard deviation of tax rate (uncertainty)	13.16%	19.40%	13.16%	19.40%
Consultancy fees	4000 (4%)		6000 (6%)	
Expected effective tax rate (incl. consultancy fees)	37.6%		39.6%	
Standard deviation of effective tax rate (incl. consultancy fees)	13.76%	19.81%	14.47%	20.30%

The instructions in the experiment were presented in a neutral manner without using terms like “hybrid” or “pure” finance and without explicitly referring to between-country divergences of classifications that result in different tax treatments. Instead, tax rates and their probabilities were presented to setup the decision between a finance instrument resulting in a sure tax burden and one resulting in a potentially more favorable but unsure tax treatment.

The experiment took place at the computer labs of the Vienna University of Economics and Business in March 2009 using the software tool LimeSurvey. The 128 participants, 47 of them female and 81 male (ranging in age from 20 to 59 years), were recruited by sending e-mail invitations to business and economics students at the graduate level. Participants were seated and received written instructions on both phases of the experiment. Before the experiment started on screen, subjects had to fill in a control questionnaire to ensure their understanding of the lottery choices in phase 1 and the finance decision task in phase 2. The experiment did not start before every participant answered all of the control questions correctly.

After eliciting risk attitude in phase 1 and the decision for one of the two finance alternatives in phase 2, some demographic variables and background characteristics like gender, age and a self-assessment of risk attitude were collected. At the end of the experiment, one of the ten lottery choices of phase 1 was chosen for payout by a public dice throw. The outcomes of lottery X and Y were equally determined by a public die throw as well as the actual tax rate for alternative B, the hybrid finance instrument, in phase 2. Finally, subjects’ payoff was calculated, converted to Euro and paid out privately after the experiment. Average earnings in the experiment that took about 50 minutes to complete amounted to €17 with a standard deviation of €3.4.

4 Hypotheses

A risk-neutral decision maker will always choose the option that maximizes his expected payoff, i.e., minimizes the expected tax burden. The experimental setup is chosen to realistically reflect the beneficial situation for hybrid finance instruments where they offer a lower expected tax burden. Uncertainty, i.e. the legal risk that is inherent in the hybrid finance instrument, is not expected to affect risk-neutral decision makers. Likewise,

consultancy costs are chosen such that the expected return from the hybrid finance instrument always exceeds the return from the pure instrument.

Hypothesis 1: *Risk-neutral subjects will always choose the finance instrument that minimizes the expected tax burden, i.e. alternative B, irrespective of the uncertainty and complexity of the situation.*

In contrast, a risk-averse decision maker will consider the tradeoff between the expected tax burden and the risk involved in choosing the finance instrument with uncertain tax burden. In phase 1 of the experiment, we obtain only an ordinal measure of risk attitude. Thus, we cannot impute specific risk preferences to estimate specific individual utility functions as a basis for predicting choice patterns of risk-averse subjects. Instead, we focus on the comparative statics of our treatment manipulations: Both uncertainty and complexity will have an impact on risk-averse individuals: First, higher complexity in the form of increased costs for tax advice reduces the relative payoff advantage of the hybrid instrument compared to the alternative, certain one. A risk-averse decision maker will therefore, ceteris paribus, be less inclined to choose the hybrid instrument in the presence of higher complexity.

Hypothesis 2: *Risk-averse individuals will choose the hybrid finance instrument B less frequently in the high complexity treatments than in the low complexity treatments.*

Second, higher uncertainty of the hybrid instrument, i.e. greater divergence in possible tax rates, will also induce risk-averse individuals to choose the instrument less frequently, since the associated risk is increased while the expected tax saving remains constant.

Hypothesis 3: *Risk-averse individuals will choose the hybrid finance instrument B less frequently in the high uncertainty treatments than in the low uncertainty treatments.*

Risk attitude is thus expected to moderate the effect of uncertainty and complexity on the probability to choose the hybrid finance instrument.

5 Experimental results

This section first presents a descriptive overview of individual risk attitudes elicited in phase 1. Subsequently, the choice frequencies of the hybrid finance instruments in phase 2 are examined across treatments. To substantiate the findings from descriptive and non-parametric analyses, we present the results of probit regressions that assess the relative importance of the two variables of interest – legal *uncertainty* and tax *complexity* – for the choice of the finance instrument while controlling for individual characteristics.

5.1 Descriptive statistics

We first turn to risk attitudes elicited in phase 1 of the experiment. According to their choices in phase 1, a *risk index* can be calculated as the number of the lottery choice at which the individual switched from lottery X to lottery Y. A risk index of 5 reflects risk-neutrality. A risk index ranging from 6 to 10 indicates an increasingly risk-averse attitude, while an index ranging from 0 to 4 suggest a risk-loving attitude. Overall, 116 participants show a monotonous switching pattern between option X and option Y which allows to unambiguously assess the risk attitude of these subjects.[11] The mean risk index in the experiment is 5.9 (SD=1.6), indicating that the average individual is slightly risk-averse. Of the 116 individuals, 60 are risk-averse, 44 risk-neutral, and 12 participants risk-loving. These findings reflect the usual heterogeneity in individual risk attitudes that is frequently found in experimental studies. As expected by random treatment assignment, the risk attitudes do not differ, on average, across the four treatments (see Table 4, Kruskal Wallis Test: p=.89, df=3). In the next subsection, we will relate individual risk attitude to choice behavior based on individuals who can be unambiguously classified.

[11] The non-monotonous choice patterns of the remaining 12 participants are – although not readily explainable by standard economic theory or its behavioral extensions – no exceptional observation. Such idiosyncratic patterns occur in nearly all experimental studies that use the elicitation method by Holt and Laury (2002). In the subsequent analyses the risk indices and classifications of these subjects are treated as missing. These 12 missing values with respect to risk attitude are exactly equally distributed across the four treatments.

Table 4: Risk attitudes across the four treatments

Risk index	*Complexity*			
	Low		*High*	
Uncertainty	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
Low	5.8 (1.4)	5 (2)	5.9 (1.8)	6 (2)
High	6.0 (1.3)	5.5 (2)	6.0 (1.8)	6 (2)

Note: Since risk attitudes are not normally distributed, also medians and interquartile ranges (IQR=$Q_{0.75}$-$Q_{0.25}$) are reported.

Table 5 presents an overview of the choice frequencies of the hybrid finance instrument in the four treatments of phase 2. Overall, about two thirds of the 128 participants choose alternative B, the finance instrument that is subject to an uncertain tax treatment. However, we are not merely interested in the prevalence of choosing the hybrid finance instrument but the responsiveness of this choice to different situational parameters, such as uncertainty and complexity.

Table 5: Choice frequencies of uncertain alternative B in the four treatments

	Complexity					
	Low		*High*		Total	
Uncertainty	n	f	n	f	n	f
Low	27	81.8%	16	48.5%	43	65.2%
High	23	74.2%	18	58.1%	41	66.1%
Total	50	78.1%	34	53.1%	84	65.6%

Thus, we compare the choice frequency of alternative B across the four treatments. The first fact to attract attention in Table 5 is that, overall, the frequency of choosing the hybrid finance instrument with uncertain tax burden is constant across low and high uncertainty (65.2% vs. 66.1%, resp., p=0.91[12]). In contrast, instrument B is overall chosen less often when the situation entails higher complexity, expressed by higher cost of tax advice (78.1% in low vs. 53.1% in high, p<.01). Looking into the four separate cells, it is evident that choice frequencies of instrument B do not differ between high and low uncertainty, neither under low complexity (p=0.46) nor under high complexity (p=.44). However, complexity seems to be influential, since instrument B is chosen more often when complexity is low, at least when uncertainty is low (p<.01). When uncertainty is high, the difference in choice frequencies between low and high complexity is apparent (74.2% vs. 58.1%), yet not significant (p=.18).

Since uncertainty and complexity are hypothesized to unfold different effects depending on the risk attitude of the decision maker, we employ regression analyses to account for these potential interactions and other individual characteristics in the following subsection.

5.2 Regression analysis

To assess the relative importance of tax complexity and legal uncertainty while controlling for important characteristics of the decision maker, like risk attitude, gender or age, we estimate a probit model with the choice of the hybrid finance instrument as the dependent variable. The independent variables are dummies for uncertainty and complexity, as well as an interaction of both. In specification (1) of Table 6, a basic estimation model including all 128 observations with age and gender (1=male) as additional control variables is presented. Reported values are marginal effects and standard errors with an indication of significant marginal effects. In specification (2), the individual risk-index, calculated from choices in phase 1, is added. Since for individuals who exhibited non-monotonous behavior in phase 1 such a risk-index could not be calculated, the number of observations reduces to 116.

[12] All differences in the relative choice frequencies of alternative B are examined using two-sample tests of proportions.

Table 6: Probit regression

Dependent variable:	*Choice of alternative B*			
	(1)		***(2)***	
Marginal effects	*m.e.*	*se*	*m.e.*	*se*
Uncertainty (0=low, 1=high)	-0.088	0.128	-0.094	0.135
Complexity (0=low, 1=high)	-0.328**	0.112	-0.355**	0.115
Uncertainty Complexity*	0.163	0.148	0.227	0.137
Gender (1=male)	0.033	0.089	0.025	0.094
Age	-0.002	0.008	0.001	0.008
Risk index (1 to 10)	–	–	-0.051°	0.028
Pseudo-R^2	0.0628		0.094	
χ^2 (df)	10.34 (5)		13.83 (6)	
$p > \chi^2$	0.06		0.03	
# of observations	128		116	

** $p \leq 0.01$, °$p<.10$

The results of Table 6 confirm the impression gained from the non-parametrical analysis. Specification (1) suggests that high complexity reduces the probability that the hybrid finance instrument is chosen by 32 percentage points on average. Uncertainty does not seem to affect the decision; neither does the decision maker's gender or age. Specification (2) shows that the significant effect of complexity is robust to the inclusion of an indicator for risk attitude. However, the risk index has a slightly negative impact on the decision for a finance instrument. Recall that a higher value of the risk index indicates a more risk-averse attitude. However, it is more sensible to classify individuals into three categories of risk attitude, i.e. risk loving (risk index ranging from 1 to 4), risk neutral (5) and risk averse (6 to 10). Since the hypotheses concerning the treatment

effects differ with respect to the decision maker's risk attitude, we re-estimate the above probit models separately for risk-neutral and risk-averse individuals.[13]

Table 7: Probit regression for risk neutral and risk averse subjects

Dependent variable:	*Choice of alternative B*			
	Risk neutral		***Risk averse***	
Marginal effects	*m.e.*	*se*	*m.e.*	*se*
Uncertainty (0=low, 1=high)	-0.754**	0.209	-0.980°	0.070
Complexity (0=low, 1=high)	-0.899**	0.076	0.971°	0.092
Uncertainty Complexity*	0.162**	0.094	0.181	0.260
Gender (1=male)	-0.013	0.025	0.184	0.156
Age	0.000	0.002	-0.005	0.012
Risk index (6 to 10)	–	–	-0.124	0.134
*Risk index * Uncertainty*	–	–	0.255°	0.145
*Risk index * Complexity*	–	–	-0.274*	0.136
Pseudo-R^2	0.390		0.153	
χ^2 (df)	19.28 (5)		12.35 (8)	
$p > \chi^2$	0.001		0.14	
# of observations	44		60	

** $p \leq 0.01$, * $p < 0.05$, °$p<.10$

[13] Just like in the field, a risk loving attitude is only observed for a small number of participants, which renders a separate estimation of treatment effects for risk loving individuals infeasible. Moreover, although risk loving decision makers should be more inclined to choose the hybrid instrument in the presence of higher uncertainty, the prediction with respect to the effect of complexity is less straightforward.

The basic estimation model based on the subsample of the risk neutral individuals in Table 7 reveals a significant negative effect of both uncertainty and complexity. This is especially remarkable since risk-neutral individuals are predicted to react to complexity alone but not to uncertainty. However, it seems that both, higher uncertainty and higher complexity, decrease, ceteris paribus, the probability of choosing the hybrid finance instrument. The positive and significant interaction effect of the two treatment variables indicates that the negative effect of uncertainty and complexity is alleviated when both are of high value.[14] These findings stand in contrast to the expectations about risk-neutral decision makers: their decision to choose the risky finance instrument is not only affected by tax complexity, as predicted, but also by legal uncertainty.

Using the relatively large pool of risk-averse individuals offers a further possibility to exploit the data. Within the group of risk-averse individuals there is substantial heterogeneity concerning the degree of risk-aversion. Thus, we can investigate whether uncertainty and complexity have differential effects for individuals of different degrees of risk aversion. To that end, we add the risk index (ranging now from 6 to10) and interactions of the risk index with the main treatment variables uncertainty and complexity, to the basic estimation for the subsample of risk-averse decision makers. Results of Table 7 show that also for risk-averse individuals, higher uncertainty tends to decrease the probability of choosing the hybrid finance instrument. However, this effect is only significant on a 10% margin and tends to be reduced for individuals with higher degrees of risk-aversion as indicated by the slightly positive interaction effect of uncertainty and risk index. Interestingly enough, higher complexity tends to increase risk-averse individuals' inclination to choose the more risky finance instrument, evident by the marginally positive effect of complexity. Again, this tendency is weaker for more risk-averse individuals as the significantly negative interaction effect of risk index and complexity suggests. Overall, uncertainty affects decisions of risk-averse participants in the expected direction; for complexity it is the opposite: under higher uncertainty risk-averse decision makers are less likely to choose the hybrid instrument, whereas under

[14] We are well aware that in non-linear regression models, interaction effects can vary across different values of the dependent variable (Ai and Norton, 2003). In our estimations, we have checked the correct interaction effects that never change sign or size for different estimated probabilities to choose alternative B.

high complexity they are more likely to do so. Both effects decrease in strength when risk-aversion becomes more extreme. While this runs counter to our hypotheses, such behavior may be explainable by mental accounting processes mentioned earlier: if people mentally separate the evaluation of finance instruments with respect to tax rates and implementation costs (instead of assessing them on the two dimensions jointly to evaluate the final monetary outcome), higher complexity, i.e. higher implementation cost, could render a specific instrument subjectively more valuable. Without collecting data on motives of choice, such conjectures, however, have to remain speculative.

6 Summary and discussion

Tax liabilities of internationally operating companies can be considerably reduced by the use of cross border hybrid finance instruments. Conflicts in the classification of instruments across countries render even tax-free repatriation of yields on intra-group finance possible. However, assuming that an agreement with tax authorities on the treatment of a specific hybrid instrument cannot be reached in advance, the uncertainty of the tax treatment in the involved countries may discourage the use of cross border hybrid finance despite potentially large tax savings. In addition, complex international tax laws can make the search for a tailored finance instrument very costly. Such observations can be made for other complex choices of tax planning, for example the use of hybrid entities or cross-border lease agreements.

The present study takes the first step in exploring the decision to use hybrid finance by investigating two potential key factors, legal uncertainty and tax complexity. The difficulty to obtain data on tax planning and the use of finance instruments on a micro-level inspires the use of a stylized decision experiment.

From our experimental results, one can generally conclude that complexity plays (overall) a more important role than uncertainty. If classified according to risk attitude, the most pronounced effects are found for risk neutral individuals: they choose the hybrid instrument more often under low complexity and low uncertainty. For risk-averse individuals, the effects are more complex and less pronounced. Higher uncertainty tends to decrease the probability that the hybrid instrument is chosen, while higher complexity

tends to increase the probability. Both effects are not very strong and decrease with higher risk-aversion.

As a result, one might say that if legal uncertainty (which does play a role but has weaker impact) can be mastered – implying that parameters of the risky situation can be well estimated and taken into account, for instance, by seeking an advance agreement with the fiscal authorities on the tax treatment of the instrument – the decision will be made according to the risk profile but will be mainly affected by the expected tax burden.

The large overall effect of tax complexity implies that its reduction is important. However, tax complexity can be influenced by the enterprise only to a limited degree. It is rather given by the state and the legal environment. This adds to the importance of management decisions on the location of a subsidiary: from a tax point of view, not only statutory tax rates and effective tax rates, but also complexity of tax laws should be considered.

These results and their generalization are subject so some limitations. First, the most pronounced adverse effects of uncertainty and complexity are observed for risk-neutral participants. However, the assumption of companies' risk neutrality is not unreasonable in the real world, since firms are expected at least to be less risk-averse than individual decision makers. In addition, the chosen scenario (parent with 100% foreign subsidiary, seeking optimal finance for its subsidiary) supports risk-neutrality, since the parent most likely bears all risks of the FDI in any case, independent of the form of marginal finance. Second, effects are of course of qualitative nature and do not allow to conclude about the actual size of the problem of complex tax laws discouraging the use of (potentially beneficial) cross border hybrid finance instruments. Third, in case the tax authority does not accept the firms' classification of the instrument, there may be costs associated with being found a tax "cheater" that go beyond direct fines like damages to the company's reputation.

Finally, thoughts on extensions to the design for future research arise: An interesting prospect for future research would be to replace uncertainty by more realistic assumptions of ambiguity where the probabilities for specific classifications, and thus tax rates, cannot be easily determined. These more realistic assumptions might lead to a

completely different evaluation of hybrid finance instruments. Moreover, ethical considerations have so far been completely left out of the discussion of hybrid finance instruments. In addition to reputation concerns, firms might be reluctant to use cross border hybrid finance as a means of tax planning because double non-taxation contradicts firm ethical standards.

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Appendix: Instructions and control questions *(Treatment Low Complexity – Low Uncertainty) – Not intended for publication*

(Original instructions were in German. They are available from the authors upon request.)

General instructions for all participants

You are about to participate in an economic experiment. If you read the following instructions carefully, you can – depending on your decisions- earn a considerable amount of money. It is therefore important that you read through all the instructions carefully.

The instructions you obtained from us are for your private use only. **During the experiment, all communication is prohibited**. If you have questions, please ask the experimenters. If you do not comply with this rule you will be expelled from the experiements and all earnings.

The experiment consists of 2 independent phases.

Instructions for Phase 1:

In 10 different cases, you have to decide between two options X and Y. These 10 cases will be listed on screen. For each of the two options, there is a high or low amount to win, which are paid out with different probabilities (p).

Options X and Y will be presented on screen in the following way:

Case 1: *Please choose from the list:*
☐ Option X: with p=1/10 winning 2,00 €, with p=9/10 winning 1,60 €
☐ Option Y: with p=1/10 winning 3,85 €, with p=9/10 winning 0,10 €

This means for case 1:

Option X yields with probability of 1/10 a win of 2€ and with probability 9/10 a win of 1,60€.

Option Y yields with probability of 1/10 a win of 3.85€ and with probability 9/10 a win of 0.10€.

By clicking on the respective box on left side, please choose one option for each of the 10 cases.

Please note that at the end of the experiment (after phase 2), only **one of these 10 cases** will be selected for **payout**. All cases are equally likely to be selected, meaning that throwing a 10-sided die will determine which case is selected for payout. Afterwards, it will be determined whether the option you have chosen in this case yields the high or low amount. To do so, again the 10-sided die will be used. Which die numbers stands for which result will be explained by the experimenters right before the die throws.

You are informed about your payoff in phase 1 only after completing the experiment.

Instructions for Phase 2:

In phase 2, we use Taler instead of Euros. Your whole income will be calculated in Taler. The sum of Taler that you earn in phase 2 will be converted to Euro at the end of the experiment, using the following exchange rate: **4.000 Taler = 1 Euro.**

In phase 2 of the experiment you will be in the role of a decision or a corporate executive who has to take a decision between two alternatives. These two alternatives represent different finance instruments. The two finance instruments have different tax consequences for your corporation and will be described in more detail below. It is your task to achieve high net revenues (after tax) for your firm, because this is the amount that will be converted in Euro and paid out to you at the end of the experiment.

<u>This is your current situation:</u>

Your firm owns 100% of a subsidiary company abroad. This subsidiary shall be completely financed by your firm, and to do that, two possible alternatives are available, alternative A and alternative B. The **yield** of the subsidiary in return for financing it is in any cased fixed at **100.000 Taler.**

The choice of the finance alternative determines the consequences for the tax treatment of this 100.000 Taler yield. Below, you will find details on the two finance alternatives A and B and the respective tax consequences for your firm.

In general, the taxes payment is calculated as the yield of 100.000 Taler times the tax rate, therefore:

Tax payment= 100.000 * tax rate

Since the effort of determining the actual tax rate depends on the chosen alternative, the fees for tax consultancy are different for the two alternatives. To calculate the net amount after taxes and consultancy fees, you have to subtract the tax payment as well as consultancy fees from the total yield.

Net amount = 100.000 – taxes due – consultancy fees

The following two finance alternatives are available:

Alternative A:
Consultancy fees are 2.500 Taler.
The **tax rate** for the yield of 100.000 Taler is **0,4**.

Alternative B:
Consultancy fees are 4.000 Taler.
The **tax rate** for the yield of 100.000 Taler is **0,26.**

If you choose alternative B, a tax audit will take place. The tax audit will result in one of two possible outcomes:

1. Tax consultancy has produced an admissible tax rate and the tax rate of 0,26 is confirmed correct. This outcome will reached with a probability of 75%. In this case, there are no further consequences.
2. Tax consultancy has produced an inadmissible tax rate. This outcome will reached with a probability of 25%. Instead of the prior tax rate of 0,26 a higher tax

rate of 0,45 has to be applied. Additionally, your firm hast to pay a fine amounting to 60% of the tax difference. This means that for each Taler that your tax payment was short of actual dues, the firm has to pay 0,6 Taler as a fine. The fine is calculated as follows:

Fine = 0,6 * (higher tax rate – initial tax rate) * 100.000

The final net amount in this case is determined by yield, correct tax payment, consultancy fees and fines in the following way:

Net amount = 100.000 – tax payment – consultancy fees – fine

On screen, you choose either alternative A or alternative B. If you have chosen alternative B, it will be determined – after all participants have taken their decision – whether the initial tax rate is admissible or not according to the according probabilities. To do so, the experimenter will first choose a witness among the participants and then throw a four sided die. Which numbers represents which outcome will be explained properly before throwing the die.

At the end of the experiment, the net amount will be converted to Euro and paid out in cash together with the amount you won in phase 1.

Before phase 1 of the experiment starts, please answer some control questions to ensure you understood the instructions.

Do you have any questions?

Control questions and correct answers:

Questions concerning phase 1:

1. What is the probability that case 1 is selected for payout? (10%)

2. Assume that case 1 was selected for payout and you have chosen option Y. What is the probability that you receive the amount of €3,85? (10%)

Questions concerning phase 2:

3. What is the tax payment if you choose alternative A? (40.000 Taler)

4. What is the probability that for alternative B, the tax rate of **0,26** is found to be admissible in the tax audit? (75%)

5. If you choose alternative B and the tax rate of 0,26 is found to be inadmissible, what is the fine your company has to pay? (You can use the calculator at the PC)? (11400 Taler)

6. The consultancy fees are higher for alternative A than for alternative B. (wrong)

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