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Mitigate Tax Uncertainty and Foster Investment**

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Boon or Bane of Advance Tax Rulings as a Measure to Mitigate Tax Uncertainty and Foster Investment

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Boon or Bane of Advance Tax Rulings as a Measure to Mitigate Tax Uncertainty and Foster Investment

ABSTRACT:

Tax uncertainty often negatively affects investment. Advance tax rulings (ATRs) are commonly used as a measure to provide tax certainty. Rulings are currently controversially discussed in the context of tax planning activities of multinational firms (Luxembourg Leaks). We analyze ATRs as tax uncertainty shields from both the taxpayers' and the tax authorities' perspectives. In general, tax authorities charge ATR fees and investors request ATRs provided the fee does not exceed a certain threshold. We assume risk neutral investors and that tax authorities integrate investors' reasoning in their decision on whether and at what price to offer ATRs. We find for uniformly distributed cashflows that tax authorities offer ATRs at a prohibitively high fee. However, extending our model framework we find that ATRs are offered if the ATR enables tax authorities either to significantly reduce their tax audit costs, or to increase the probability of detecting ambiguous tax issues, or to increase their revenues by attracting more investment. ATRs may foster investment and are hence potentially beneficial for both tax authorities and taxpayers if the investment projects in question generate relatively small net returns but high tax uncertainty. This pattern is typical for aggressive tax planning strategies, e.g., in tax havens. Our findings are threefold. First, we find that even risk neutral investors will pay for tax certainty. Second, they enable us to explain the enormous demand for rulings for tax-aggressive strategies and illustrate the tax authorities' opportunity cost of offering ATRs free of charge to attract tax-aggressive foreign MNGs. Third, our results provide new explanations for why ATRs, even if the fee is rather low, are not as frequently requested by taxpayers with substantial investments, as expected in settings with high tax uncertainty. Our paper elaborates the theoretical foundation that is essential when planning to use ATR fees as a new measure for tax uncertainty in future empirical tests.

JEL Classification: H21, H25, M41, M42, M48

Keywords: *Advance Tax Rulings, Fee Design, Investment Effects, Tax Aggressiveness, Tax Planning, Tax Risk, Tax Rulings, Tax Uncertainty*

I. INTRODUCTION

Prior to making an investment decision, investors must forecast the prospective tax burden associated with the investment as it can be a significant cost factor. Sometimes, investment projects not only have uncertain future cashflows but are also characterized by high degrees of tax uncertainty. E.g., investments in R&D are often likely to generate intangibles whose tax evaluation is currently heavily under discussion. Such prospective investment projects sometimes only provide relatively weak tax facts. They often involve great tax uncertainty due to the difficulty in applying ambiguous tax laws and anticipating the consequences of a future tax audit (Mills, Robinson, and Sansing, 2010; Lisowsky, Robinson, and Schmidt, 2013).

Because tax uncertainty may negatively affect investments, it may be beneficial for the taxpayer to request an advance tax ruling (ATR) to reduce this uncertainty. An ATR is a fiscal instrument that offers legal certainty on a specific tax issue associated with a future business activity, e.g., an investment. Taxpayers can request an ATR from the fiscal authorities (internal revenue service, IRS) concerning an unclear tax issue, e.g., whether a certain position is tax-deductible. To obtain a binding ex ante ruling, the taxpayer has to pay a pre-determined fee.

ATRs are one tool to reduce tax uncertainty. Alternatively, taxpayers can hire tax professionals to help them prepare the tax assessment, or in some countries, ask the tax authority to provide a real-time-audit (Beck and Lisowsky, 2014) or even purchase insurance against tax risk (e.g., Logue, 2005). We delegate an analysis of these instruments to future research and instead focus on ATR as one prominent example. We investigate whether there are ATR designs that effectively shield against tax uncertainty and thereby foster risky investments and simultaneously contribute to an overall increase in tax revenues.¹

Recently rulings have received a lot of attention and have been controversially discussed since some countries use them excessively to attract multinational groups (MNGs), guaranteeing them ex ante that their tax avoidance structure will be accepted. Luxembourg Leaks (ICIJ 2014) has

taught us that the extent of tax avoidance of MNGs induced by this type of ruling is enormous. What are the basic characteristics of the underlying investments? First, without a ruling such international tax planning activities and the underlying investments are characterized by a high degree of tax uncertainty. This is due to the very limited substance invested in the target country and the resulting doubts whether profits from this investment can really be attributed to this target country. Second, the pre-tax profit of such investments is typically very low (even zero or negative) while overall after-tax profits are rather high. Hence, taxpayers are very interested in tax certainty and thus are often willing to pay a fee for a ruling.

Although the Organization for Economic Co-operation and Development (OECD) has launched an initiative to fight base erosion and profit shifting, there will always be tax competition and beneficial tax environments. Therefore it is worthwhile scrutinizing the economic reasoning behind offering and requesting such rulings and requesting ATRs in general as a tax uncertainty shield to foster tax-aggressive and non-tax aggressive investments and thereby understand the investment implications of ATRs.

In many countries tax authorities are required by law to issue ATRs. According to the OECD's Comparative Information Series (OECD, 2013: 282), which provides an overview of the tax administrations in OECD and selected non-OECD countries, ATRs are a popular and widely available instrument. Of the 34 OECD countries, 32 allow taxpayers to request an ATR. Colombia, India, and Russia are the only countries among the 18 non-OECD countries under review without this option. In 31 OECD countries and twelve non-OECD countries, the rulings are binding for the tax administrations. Non-binding rulings are offered in Japan, Brazil, Bulgaria, and Malta. Many tax authorities charge a fee in return for offering taxpayers ATR certainty. According to the OECD's Comparative Information Series, 13 (out of 34) OECD and four (out of 18) non-OECD countries charge a fee for providing ATRs (OECD 2013: 282).

From practical experience we learn that ATR fees vary considerably across countries. E.g., the fees range between 625 USD and 11.500 USD in the U.S., there is an upper bound of about

10,000 USD in South Africa, 84 to 130 USD plus taxes per hour are charged in Canada, and 423 USD plus 106 USD per hour are payable in Singapore.² In Germany the fees range between 35 € to a maximum of 109,736 €, or 50 € per hour if the amount in dispute cannot be determined.³ Austria charges fees ranging from 1,500 € to 20,000 € and Luxembourg charges between 3,000 € and 10,000 €⁴

As an ATR is not free of charge it is not clear at first glance under what circumstances an ATR is requested as a useful tax uncertainty shield that triggers investments. Investors will request an ATR if the fee for the ruling does not exceed a certain threshold (maximum fee). We identify necessary conditions, i.e., combinations of the degree of tax uncertainty and (low) investment profitability, that are typical for tax avoidance investments. Based on this maximum fee, we determine the crucial factors that drive tax authorities' decision whether to offer ATRs by backward induction. We find that tax authorities only benefit from ATRs if they are capable of reducing tax audit costs or increasing the probability of detection as a consequence of the extra documents submitted by the taxpayer together with the ATR application, or if additional investment projects can only be attracted by issuing ATRs. The latter is typical for tax haven countries.

Empirical studies provide evidence that a high level of tax uncertainty is associated with a high level of firm business activities (investments). Here, unrecognized tax benefits (UTBs) that have to be reported according to Financial Accounting Standard Board (FASB Interpretation No. 48, Accounting for Uncertainty in Income Taxes) FIN 48 are often considered an appropriate indicator for uncertain tax positions. Using UTBs as a proxy for tax uncertainty, the study of Lisowsky et al. (2013) finds, among other results, that there is a significantly positive association between unrecognized tax benefits on the one hand and, e.g., R&D intensity, and merger and acquisition activity on the other.⁵

Other studies investigate the impact of tax uncertainty on investment behavior and reported income. E.g., Beck and Jung (1989) analytically demonstrate that greater tax liability uncertainty

may either increase or decrease reported income. Furthermore, Edmiston (2004) provides empirical evidence for the negative impact tax uncertainty has on investments. Among the studies that focus on the impact of tax uncertainty on investment decisions in a real option setting, Agliardi (2001) and Niemann (2011) identify ambiguous effects of tax uncertainty on investment decisions. Whereas both find that tax policy uncertainty delays investment, Niemann (2011) also shows that if tax uncertainty is small compared to cashflow uncertainty, and if both stochastic processes are positively correlated, increased tax uncertainty may also accelerate investment.

All these streams of literature obviously indicate that tax uncertainty affects and thus distorts investment behavior in a rather unpredictable way. Unfortunately, tax uncertainty cannot be easily avoided. Even a detailed examination of the underlying legal norm sometimes cannot prevent a tax issue from being interpreted in different ways.

"Tax law ambiguity implies that even if you could claim to have committed to memory the entire Internal Revenue Code, you would be able to resolve only a small degree of ambiguity in how a tax return should be prepared. As technically detailed as the Tax Code may seem to be, it still contains rules that are far too general to indicate clearly how particular transactions are to be taxed." (Scholes, Wolfson, Erickson, Hanlon, Maydew, and Shevlin 2015: 17)

Therefore, given that investors typically strive to maximize their after-tax net cashflows, taxpayers may refrain from investments if the tax treatment is likely to make the investment project unprofitable. As a consequence, if taxpayers carry out fewer investment projects compared to a tax environment under certainty, the tax authorities may suffer from an overall tax revenue decrease. This might be true for local investors. However, a highly uncertain tax environment may also deteriorate the quality of countries as an investment location for multinational investors unless they offer tax rulings.

Against this background we analyze whether and under what circumstances tax authorities benefit from offering ATRs and determine the maximum fee that taxpayers are willing to pay for legal certainty. We find so far unknown effects. Our results also provide new explanations for why ATRs are not as intensively requested by taxpayers as expected against a background of high tax uncertainty.

The remainder of the paper is organized as follows. In the next section, we introduce the legal background and review the prior literature. In section III, we introduce our model and analyze the taxpayer's investment decision. In section IV, we integrate the tax authorities' perspective. Based on the results of the previous section, we determine the optimal fee that the tax authority should charge for ATRs for various settings. Finally, we summarize and draw conclusions in section V.

II. PRIOR LITERATURE

While there are several jurisprudential contributions regarding the legal conception and practical issues of ATRs, few contributions examine the economic reasoning behind such rulings. One such contribution is Givati (2009). By analyzing taxpayers' strategic considerations regarding whether to request an ATR, the author explains the infrequent use of such rulings in the US. The author shows that the strategic disadvantages of requesting ATRs (e.g., increased inspection, detection and expertise of tax examiners) outweigh the benefits (e.g., avoidance of penalties).

De Simone, Sansing, and Seidman (2013) study the attractiveness of "enhanced relationship tax compliance programs", in which taxpayers may disclose significant uncertain tax positions to the tax authority prior to filing a tax return. Simultaneously, the tax authority provides a timely resolution of these positions and does not challenge the position within the review of a filed tax return. Using a game theoretic framework, the authors identify settings in which these programs are mutually beneficial to taxpayers and tax authorities due to lower combined government audit and taxpayer compliance costs.

We contribute to this stream of literature by analyzing the advantageousness of ATRs from both the taxpayer's and tax authority's perspectives. Whereas "enhanced relationship tax compliance programs" address the resolution of uncertain tax positions, ATRs are an instrument that provides legal certainty to the taxpayer before the underlying business decisions are made.

Therefore, in contrast to De Simone et al. (2013), we analyze the costs and benefits of the uncertainty shield generated by ATRs in a taxpayer's investment decision-making process. Based on a taxpayer's maximum fee, we identify the crucial factors that drive the decision of tax authorities to offer ATRs. In doing so we are able to identify those scenarios in which offering ATRs is beneficial for tax authorities that anticipate a taxpayer's behavior.

In contrast to our study on ATRs, Beck and Lisowsky (2014) find that firms with moderate-sized FIN 48 reserves and moderate tax uncertainty exposure are more likely to participate in the "Compliance Assurance Process" audit program offered on a voluntary basis by the IRS. While they focus on compliance behavior, we are interested in the effect of an upfront tax uncertainty shield on investments. We also contribute to the literature that investigates the effects of additional information on tax compliance. Sansing (1993) investigates tax authorities' information acquisition that helps to improve audit decisions in a tax compliance game. Among other findings, he shows that such information acquisition often is likely to have no effect on the expected level of the tax authorities' revenues. Moreover, using a game-theoretic approach, Beck, Davis, and Jung (2000) investigate the effects of a penalty exemption for taxpayers who voluntarily disclose questionable positions to the government. They find that information disclosure may positively or negatively impact collection costs and tax revenues and that the penalty exemption often is not an effective tool to increase revenues. The results of both studies are in line with our finding that the tax authorities often are likely not to be better off when offering a tax uncertainty shield to taxpayers. Nevertheless, Sansing (1993) and Beck et al. (2000) do not provide insight into the taxpayers' possibility to eliminate tax uncertainty prior to the investment. Rather, they investigate the possibility of tax authorities' acquiring information to improve audit decisions and a voluntarily disclosure of uncertain positions, as well a compliance decision. Additionally, Mills et al. (2010) choose a game-theoretic approach to investigate the effects of FIN 48 on the strategic interaction between publicly traded corporate taxpayers and the government. They find that taxpayers, who are mandatorily required to disclose liabilities for uncertain tax benefits in their financial statements, are not necessarily

harmful by FIN 48. Furthermore, they show that such liabilities can be overstated or understated relative to the expected cash payments. As is common in the tax compliance and tax aggressiveness literature, Mills et al. (2010) consider a post-investment mandatory disclosure of uncertain tax benefits, whereas we investigate an instrument that enables taxpayers to eliminate tax uncertainty before an investment decision is made. Nevertheless, in support of their findings, we also identify the ambiguous effects of information provided by the taxpayer in the ATR process. Reducing tax uncertainty and simultaneously increasing information do not necessarily seem to be beneficial for the parties involved.

Therefore, our paper also extends the existing literature on the demand for (tax) information or advice. Similar to our investigation of ATRs, Shavell (1988) studies contemplated acts and finds (in a non-tax context) that individuals engage in a contemplated act if the benefits outweigh the expected sanctions. They seek legal advice if the expected value of advice, which is determined by the probability that the individual's decision of committing the act may change, multiplied by the benefit of committing the act, exceeds the cost. Beck and Jung (1989) show that the demand for tax advice in order to reduce tax uncertainty depends on the audit probability, the penalty rate and the tax rate. Furthermore, Beck, Davis, and Jung (1996) find that taxpayers who face the highest degree of uncertainty acquire information by tax advisers more frequently. Frischmann and Frees (1999) empirically demonstrate that taxpayers purchase tax advice to save time and protect against uncertainty. In line with these studies, we also find high willingness to pay for information (ATR) for high volatility of after-tax return.

All of these studies indicate that gathering information from experts about uncertain tax issues leads, similar to requesting ATRs, to reduced legal uncertainty. Against this background, our study is intended to highlight whether and under what conditions ATR demand and supply will meet and therefore whether ATRs help to improve the investment environment.

III. MODEL

Two parties are involved in the overall investment decision – an investor and the tax authority. The investment decision is risky. By assumption, the only risk involved is the tax risk. We abstract from pre-tax cashflow uncertainty in the following so we can isolate tax uncertainty effects.

The tax authority's role is to provide an ATR that offers the opportunity to resolve tax uncertainty and set a price \bar{F} for the ATR. Here, \bar{F} is the fee investors have to pay if they request the ATR.

During the ATR application process the tax authority audits the documents provided by the applicant before the underlying investment is carried out (ATR audit). If, at the end of the ATR audit, the tax authority interprets the tax consequences covered by the ATR in line with the investor's previous expectations, the investor does not need to adjust her initial tax expectations. If the tax authority's interpretation differs from that expected by the investor the expected after-tax net cashflow has to be corrected accordingly prior the decision-making process. This ATR audit anticipates the outcome of the regular ex post tax audit (ex post audit), which otherwise most likely would have taken place after the investment is carried out. Figure 1 illustrates this sequence of decision, events, and payoffs.

We restrict our model to tax adjustments that lead to an increase in the tax burden contrary to the investor's initial expectations. In the following, the monetary consequences of this adjustment are denoted by Δ . Based on this price \bar{F} the investor decides whether or not to request the ATR to resolve future tax uncertainty. Finally, the investor makes the investment decision, which she can make dependent upon the outcome of the ATR.

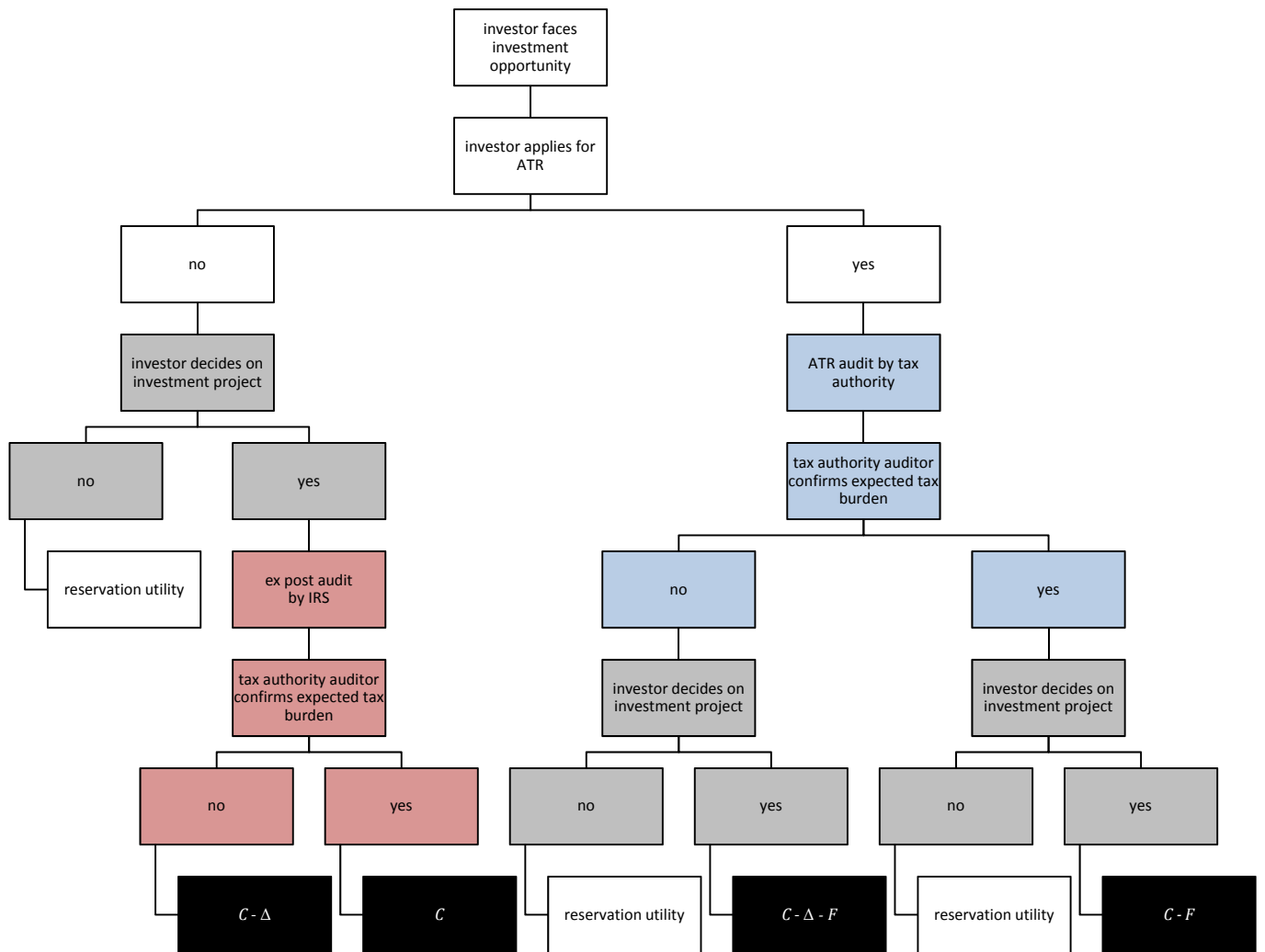


Figure 1. *Sequence of Events and Decisions*

We analyze the model illustrated in Table 1 by backward induction.

	investor's decision to request ATR	ATR audit	investor's decision to invest	ex post audit	payoff
investment opportunity	ATR for a fee	favorable ($1 - d$)	invest	favorable	$C - \bar{F}$
			not to invest	N/A	$-\bar{F}$
		unfavorable (d)	invest	unfavorable	$C - \Delta - \bar{F}$
			not to invest	N/A	$-\bar{F}$
	no ATR	N/A	invest	favorable ($1 - d$)	C
			not to invest	unfavorable (d)	$C - \Delta$
			N/A	0	

Table 1. Possible states of the investor's decision problem

Further, the tax authority anticipates the investor's decision when setting the fee.

IV. INVESTOR'S DECISION

As a first step, we abstract from the tax authority's decision and start with the investor's decisions stepwise in line with Table 1. We focus on a taxpayer who has to decide whether to carry out an investment project. The decision is complex. If the expected after-tax net cashflow from the investment is positive, the investment will be carried out. Nevertheless, there is uncertainty about the tax issues associated with the investment. We assume that the taxpayer, who is the investor, cannot anticipate the eventual tax consequences of the project perfectly. She has the opportunity to request an ATR. However, the ATR fee may outweigh the benefit of the intended investment. Thus, first, the investor decides whether or not to request the ATR and in a second step makes the investment decisions. To examine this situation more closely, we use a binomial model.

Specifically, the underlying investment is characterized by an exogenously given initial outlay I and an exogenously given cashflow CF . Both occur in period t . The return on investment is

subject to tax at rate τ . The investment will be carried out, if the after-tax net cashflow is positive. The investor faces a simple cashflow tax, which in our one-period setting is equivalent to a profit tax with an immediate write-off. Consequently, the tax base is equal to the pre-tax net cashflow. Against this background, the intended investment earns an after-tax net cashflow, denoted by $C = (1 - \tau)(CF - I)$. However, this is only part of the story. During the ATR procedure the tax authority scrutinizes the underlying tax issues (ATR audit). We assume that with probability $(1 - d)$, with $0 \leq d \leq 1$, the tax authority interprets the tax consequences in line with the investor's expectations after having audited the tax case on the basis the documents provided with the ATR application. The same probability is valid for the ex post tax audit.

Δ , the (negative) impact of a deviating fiscal treatment on the project's after-tax net cashflow C , is one possible outcome after an ATR routine. Alternatively, the fiscal authority confirms the investor's expected tax burden. We denote the potentially higher tax burden by $\tilde{\Delta}$, where $\tilde{\Delta}$ is a binary random variable with $\tilde{\Delta} \in \{0; \Delta\}$ and $\Delta > 0$.⁶ Consequently, we obtain $\widetilde{C}^{\Delta} = C - \tilde{\Delta}$. If the tax authority accepts the favorable interpretation of the tax consequences, $\tilde{\Delta}$ collapses to zero.

By contrast, with probability d the tax authority interprets the tax consequences of the tax case differently. E.g., a fraction of the investment outlay I may not be regarded as tax-deductible. In this case the tax burden increases by Δ .⁷ If the tax authority interprets the consequences of the project differently, the project's pre-audit after-tax net cashflow C , referred to as pre-audit net cashflow in the following, will be reduced by Δ to the post-audit after-tax net cashflow \widetilde{C}^{Δ} , referred to as post-audit net cashflow. Therefore,

$$\tilde{\Delta} = \begin{cases} \Delta & \text{with probability } d \\ 0 & \text{with probability } 1 - d. \end{cases}$$

We obtain

$$\widetilde{C}^{\Delta} = \begin{cases} (C - \Delta) & \text{with probability } d \\ C & \text{with probability } 1 - d. \end{cases}$$

Figure 2 illustrates the random variable \widetilde{C}^{Δ} :

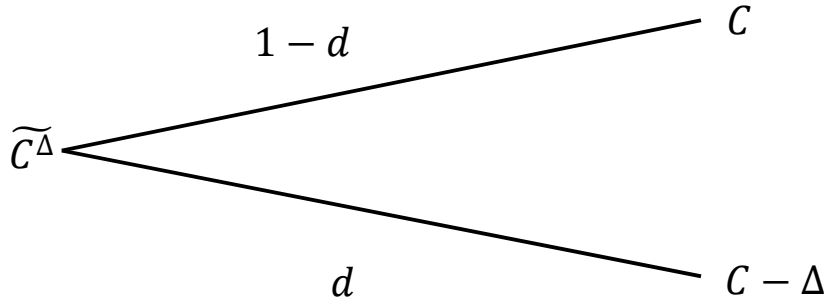


Figure 2. Random variable \widetilde{C}^Δ

The taxpayer is risk neutral (see, e.g., Beck et al. 2000: 247); that is, she strives for the maximum expected post-audit net cashflow of her investment $E[\widetilde{C}^\Delta]$ and will therefore carry out the project only if its expected post-audit net cashflow is positive. Thus, without considering an ATR, the objective function ϕ of the taxpayer is given by

$$\phi = \text{Max}\{E[\widetilde{C}^\Delta]; 0\} \quad (1)$$

With

$$E[\widetilde{C}^\Delta] = (1 - d)C + d(C - \Delta) = C - d\Delta.$$

Then, we obtain

$$\phi = \text{Max}\{C - d\Delta; 0\} = \begin{cases} C - d\Delta & \text{for } C > d\Delta \\ 0 & \text{otherwise.} \end{cases} \quad (2)$$

In line with the maximum calculus, the investor carries out the investment as long as $C > d\Delta$ (first case of eq. (2)). She will refrain from investment if the expected value of the post-audit net cashflow from the investment is not positive, that is, if $C \leq d\Delta$ (second case of eq. (2)). As tax damages are usually a function of gross values, such as operating expenses or accruals (e.g., depreciation allowances), we assume that the tax damage Δ is independent of C .⁸

To reduce uncertainty, the taxpayer may request an ATR before the decision on the investment is made. If the ruling turns out to induce a higher tax burden and hence be disadvantageous for the investor, she will be able to refrain from the planned investment. The investor will not carry out the investment if it generates a negative post-tax audit net cashflow and thus does not exceed the

after-tax hurdle rate of return of 0% required in this one-period model. Note that, although we assume a so-called neutral cashflow tax, a tax-induced distortion may arise from the underlying tax uncertainties and even make a pre-tax beneficial investment post-tax an unattractive investment.

If the investor has requested an ATR she knows the fiscal interpretation of the tax issue. Therefore, she can make the investment decision conditional upon the outcome of the tax ruling. In the decision-making process, the investor anticipates both a favorable and an unfavorable outcome of the ATR. Thus, she accounts for an unattractive tax treatment and the possibility that the investment will not be carried out. Thus far, we have abstracted from an ATR fee. However, if the taxpayer has to pay a fee \bar{F} for the ATR, she has to include this fee in her decision-making process.⁹

Assuming the investor requests an ATR,¹⁰ the objective function ϕ of the taxpayer (eq. (2)) turns to ϕ_{ATR} with

$$\begin{aligned}\phi_{ATR} &= (1 - d)C + d * \text{Max}\{(C - \Delta); 0\} - \bar{F} \\ &= \begin{cases} C - d\Delta - \bar{F} & \text{for } C > \Delta \\ (1 - d)C - \bar{F} & \text{otherwise.} \end{cases}\end{aligned}\quad (3)$$

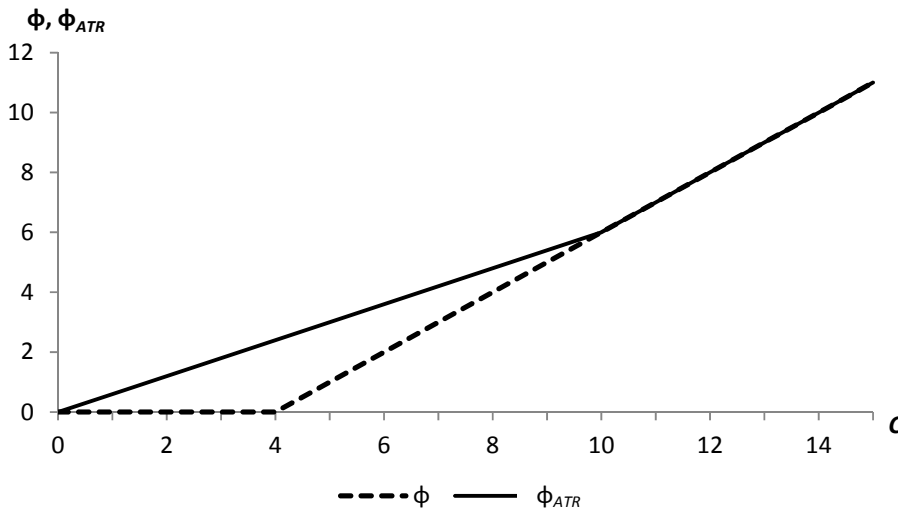


Figure 3. Objective functions with (ϕ_{ATR}) and without an ATR (ϕ) depending on the pre-audit net cashflow C

Figure 3 depicts the objective functions with and without an ATR depending on the pre-audit net cashflow C for $d := 0.4$, $\bar{F} := 0$ and $\Delta := 10$.

The graphs illustrate that the option to apply for an ATR becomes attractive when the post-audit net cashflow \widetilde{C}^Δ becomes negative ($C \leq \Delta$, here: $C \leq 10$) because of the tax authorities' divergent interpretation of the fiscal consequences.

Anticipating the optimal investment decisions from above the investor requests the ATR if and only if $\Phi_{ATR} \geq \Phi$. Equating the objective functions with and without an ATR allows us to determine the maximum fee F^{max} the taxpayer is willing to pay. We obtain from setting

$$\Phi_{ATR} = \Phi. \quad (4)$$

and inserting the eqs. (2) and (3) for Φ_{ATR} and Φ finally

$$\begin{aligned} F^{max}(C) &= C - dC + d * \text{Max}\{(C - \Delta); 0\} - \text{Max}\{(C - d\Delta); 0\} \\ &= \begin{cases} C(1 - d) & \text{for } d\Delta \geq C \\ d(\Delta - C) & \text{for } \Delta \geq C > d\Delta \\ 0 & \text{otherwise.} \end{cases} \end{aligned} \quad (5)$$

Figure 4 depicts the fee F^{max} as a function of the pre-audit net cashflow C for $\Delta := 10$ and $d := 0.4$.

Depending on the size of the cashflow and tax risk involved, the above plotted fee-tax risk relations can occur in reality. Against this background it would be worthwhile investigating in detail when an ATR is likely to be requested. Unfortunately, even after having scrutinized the ATR fee patterns in many countries, the lack of empirical data prevents us from estimating how often the relevant constellations may occur.

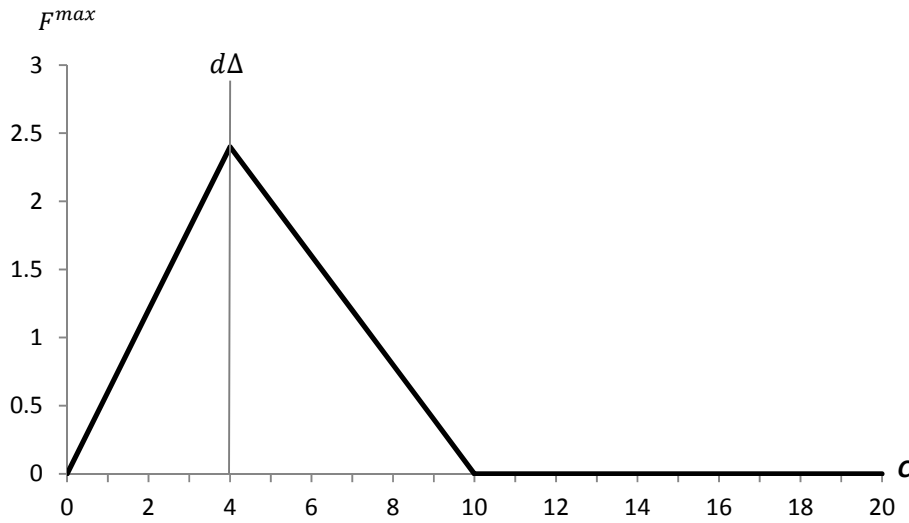


Figure 4. Maximum fee F^{max} for an ATR as a function of the pre-audit net cashflow C

To interpret our results and examine whether the investor is willing to pay for an ATR, we distinguish two scenarios. In the first scenario, the pre-audit net cashflow C exceeds the value of the impact of a different fiscal treatment Δ (third case in eq. (5)), while in the second scenario, C equals or is less than Δ (first and second case in eq. (5)).

If $C > \Delta$, the authority's divergent interpretation of the tax consequences leads to a reduction in the expected post-audit net cashflow $E[\widetilde{C}^A]$, but the investment is still worth being carried out upfront because in both states, it provides a positive post-audit net cashflow. Therefore, the ATR is not decision-relevant. An example of a non-decision-relevant ATR would be the decision to invest in a factory without knowing whether the taxpayer will be allowed to use linear or declining-balance depreciation. Given that the investment is favorable irrespective of the depreciation pattern to be applied, even if one of these depreciation options is more worthwhile for the taxpayer than the other, the taxpayer will not be willing to pay for legal certainty on the depreciation pattern. Here, an ATR would not offer decision-relevant certainty.

By contrast, the option to apply for an ATR becomes decision-relevant if \widetilde{C}^Δ becomes negative ($C \leq \Delta$) as a consequence of the tax authorities' divergent interpretation of the fiscal consequences. Then, the ATR serves as an effective shield against a possible tax damage. When we determine the maximum payable fee, we again distinguish between two cases. In the first case, the pre-audit net cashflow C ranges between Δ and $d\Delta$, that is, $d\Delta < C \leq \Delta$, while in the second case, C equals or is less than $d\Delta$, i.e., $0 \leq C \leq d\Delta$. Here, $d\Delta$ can be interpreted as a threshold that indicates whether the investor would realize the investment in the "laissez faire" case (i.e., without an ATR).

We first consider the case $0 \leq C \leq d\Delta$ (first case of eq. (5)), where the taxpayer will abandon the investment project without an ATR. She therefore will be willing to pay a fee up to the opportunity costs of not carrying out the investment, i.e., $C(1 - d)$. Considering the second case with $d\Delta < C \leq \Delta$ (second case of eq. (5)), the maximum fee corresponds to the disadvantage that the taxpayer suffers due to the negative post-audit net cashflow caused by the divergent interpretation of the tax consequences weighted against the probability of the negative interpretation. The maximum fee is $F^{max} = d(\Delta - C)$. Thus, the fee accounts for the expected loss that the taxpayer would experience from the investment if the tax authority were to interpret the tax issue disadvantageously.

The maximum of the function F^{max} , that is, the highest fee a taxpayer is willing to pay for a given investment, is depicted by the peak of the triangle in Figure 4. This maximum, $Max[F^{max}]$, is determined by $C = d\Delta$ and amounts to

$$Max[F^{max}] = (1 - d)d\Delta.$$

If we compare this maximum with the variance of the post-audit net cashflow, from the investment given by

$$Var(\widetilde{C}^\Delta) = (1 - d)(C - (C - d\Delta))^2 + d((C - \Delta) - (C - d\Delta))^2 = (1 - d)d\Delta^2$$

it is obvious that both expressions are very similar. Both the variance and the maximum of the maximum fee are functions of d . Both have their maximum exactly at $d = 0.5$. A high (tax-)

uncertainty, that is, the variance, induces a high willingness to pay for an ATR and therefore— for a given fee—also a high demand for rulings. In this context, the degree of ambiguity in a tax issue is reflected in the variance.¹¹ The variance is at its maximum for $d = 0.5$; that is, the investor has no clue how the tax issue is being interpreted by the tax authorities. If the uncertain interpretation is more likely to be interpreted favorably or unfavorably, that is, $d \neq 0.5$, the variance (ambiguity) decreases, as does the willingness to pay.

The willingness to pay a fee to gain tax certainty therefore depends on the probability d and on the net cashflow C . If we compare the maximum fee an investor is willing to pay (eq. (5)) with a given fee \bar{F} and solve for the probability d , we obtain combinations of d and C for which an investor is indifferent (indifference curve).

$$F^{max}(C) = C - dC + d * \text{Max}\{(C - \Delta); 0\} - \text{Max}\{(C - d\Delta); 0\} \geq \bar{F}$$

$$\Rightarrow \frac{\bar{F}}{-C + \Delta} < d < 1 - \frac{\bar{F}}{C}$$

Figure 5 depicts this inequation for a given fee $\bar{F} = 2$. The area in the ellipse describes d - C -combinations that lead to advantageous ATRs.

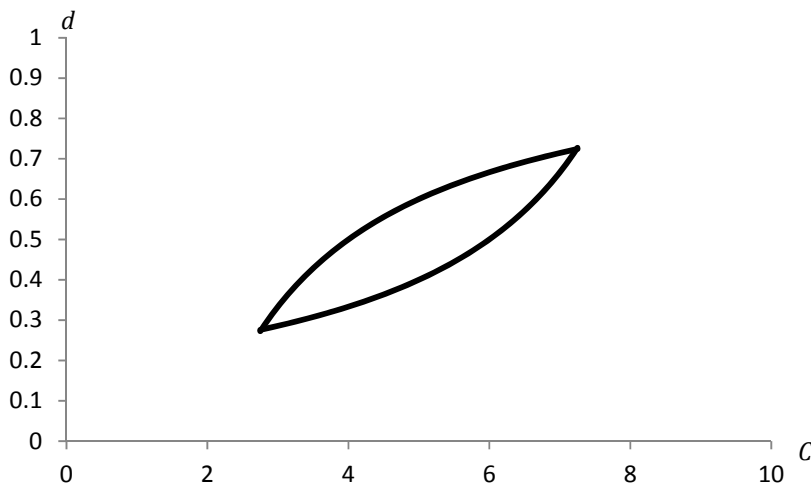


Figure 5. d - C -combinations for a given fee that induce indifference towards requesting an ATR (taxpayer's perspective)

It is evident that only taxpayers who face a high degree of tax uncertainty ($0.4 < d < 0.6$) and a medium net cashflow (compared to the potential tax damage) will apply for an ATR given a certain fee \bar{F} .

These conditions may be fulfilled especially in the case of international tax planning activities, such as those that rely on the Luxembourg rulings. First, such international tax planning decisions and the accompanying investments are characterized by a high degree of tax uncertainty since often only little substance is involved and it is therefore unclear whether profits can be attributed to the foreign country as planned. Second, since the net cashflow of such an investment depends only on the tax advantage, C will usually be considerably lower than Δ . Focusing on the taxpayers' perspective, we have seen that investors who apply for legal certainty regarding the tax consequences of an investment project are willing to pay a positive maximum fee for the ruling only in the case of small pre-audit net cashflows. The intuitive economic interpretation of this result is that, for relatively high pre-audit net cashflows (compared to Δ), the taxpayer will refrain from paying for legal tax certainty as she will carry out the investment anyway.

V. TAX AUTHORITIES' DECISION

We extend our model with respect to the tax authority's perspective. We aim to determine the optimal fee that tax authorities should demand for ATRs, taking into account the investor's reaction. We assume that the tax authority wants to maximize total revenue, which is the sum of expected taxes and the expected revenues from the fee net of costs (see, e.g., Graetz, Reinganum, and Wilde 1986; Reinganum and Wilde 1986; Beck and Jung 1989; Sansing 1993; Rhoades 1999). With respect to ATRs, Givati (2009) also confirms that revenue maximization plays an important role for the tax authorities. First, we determine the ex-ante optimal fee for the standard

model, which abstracts from complications, such as tax audit cost effects and selective ATR patterns that will be examined in the subsequent subsections.

V.1. Optimal Fee in the Standard Model

We determine the optimal fee \bar{F} . We assume that investments are distributed uniformly in the interval $[0, \Delta]$. This is in line with Mills et al. (2010). In the following we can determine the equilibrium fee by backward induction, taking into account the previously derived taxpayers' decision.

The taxpayers will request an ATR if their benefit from gaining legal certainty exceeds the actual fee for an ATR. From eq. (5) (see also Figure 6), we obtain two threshold values, \hat{C}_1 and \hat{C}_2 , that are determined by the fee \bar{F} . The taxpayer requests the ATR if C is in the interval described by \hat{C}_1 and \hat{C}_2 . The following tradeoff arises. The lower the fee \bar{F} , the more taxpayers demand ATRs. The revenue effect of a lower fee is ambiguous. On the one hand, revenues may increase as taxpayers carry out investment projects, which without the ruling, would not have been profitable in expected value terms. On the other hand, a lower fee may also reduce the fee revenues and, furthermore, decrease tax revenues due to projects that will not be carried out due to an unfavorable ruling.

In Figure 6, we compare the maximum fee F^{max} and the tax authority's fee \bar{F} depending on the pre-audit net cashflow C for $\Delta = 10$, $d = 0.4$ and $\bar{F} = 1$.

To formally describe the tradeoff more precisely, we distinguish between three different effects (see Figure 6).

First, area A described by the interval $\left[\frac{\bar{F}}{1-d}; \frac{d\Delta - \bar{F}}{d}\right)$ captures investment projects for which ATRs are requested given a fee of \bar{F} . Outside the area A , taxpayers are not willing to request ATRs because $\bar{F} > F^{max}$. Considering the probability density function in the interval, the tax authority receives expected fee-revenues $E[\tilde{R}_A^F]$ of

$$E[\tilde{R}_A^F] = \frac{1}{\Delta} * \bar{F} * \left(\frac{d\Delta - \bar{F}}{d} - \frac{\bar{F}}{1-d} \right). \quad (6)$$

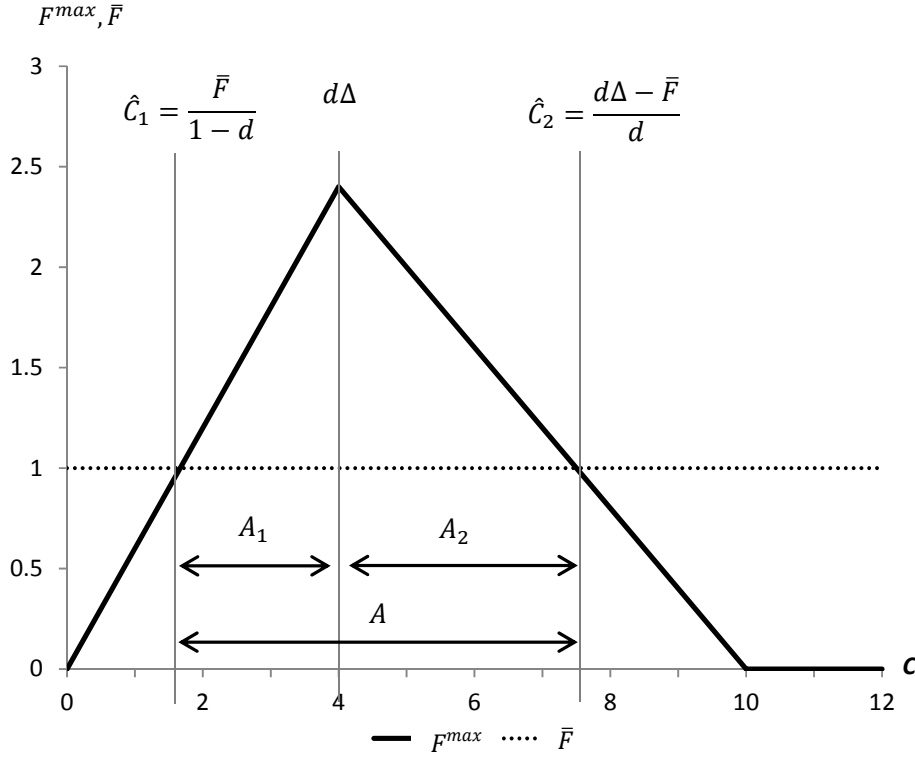


Figure 6. Comparison of the maximum fee F^{max} and the tax authority's fee \bar{F} for an ATR depending on the pre-audit net cashflow C

Second, area A_1 described by the interval $\left[\frac{\bar{F}}{1-d}; d\Delta \right)$ includes those investment projects that would not have been realized without a request of an ATR because, as long as the tax consequences are uncertain, the expected post-audit net cashflow is negative. The investment is only made in the case of a positive outcome of the ruling, that is, with probability of $(1-d)$. Therefore, compared to the case in which a request for an ATR is not possible, the tax authority generates higher expected tax revenues $E[\tilde{R}_{A_1}^T]$ with the probability of $(1-d)$ for all investment projects in area A_1 . As the net cashflow C is an after-tax value, we transform it to obtain the pre-

tax net cashflow by dividing by $(1 - \tau)$. Then, the tax rate τ is applied to this tax base. The expected additional tax revenues $E[\tilde{R}_{A_1}^T]$ due to the ATR in region A_1 are

$$E[\tilde{R}_{A_1}^T] = \frac{1}{\Delta} * \left(d\Delta - \frac{\bar{F}}{1-d} \right) * (1-d) * \frac{1}{2} \left(\frac{\bar{F}}{1-d} + d\Delta \right) * \frac{\tau}{1-\tau}. \quad (7)$$

Third, in area A_2 described by the interval $[d\Delta; \frac{d\Delta - \bar{F}}{d})$, taxpayers realize their investment projects even if no ATR is requested. However, when requesting an ATR, taxpayers only realize the investment project in the case of a positive outcome of the tax consequences. Thus, compared to the situation in which no ATR is requested, the tax authority loses tax revenues (including Δ) with the probability d . Hence, the expected lost tax revenues $E[\tilde{R}_{A_2}^T]$ are

$$E[\tilde{R}_{A_2}^T] = -\frac{1}{\Delta} * \left(\frac{d\Delta - \bar{F}}{d} - d\Delta \right) * d * \left(\frac{1}{2} \left(\frac{d\Delta - \bar{F}}{d} + d\Delta \right) * \frac{\tau}{1-\tau} + \Delta \right). \quad (8)$$

Summing up all three effects leads to the overall effect $E[\tilde{R}]$ with

$$E[\tilde{R}] = E[\tilde{R}_A^F] + E[\tilde{R}_{A_1}^T] + E[\tilde{R}_{A_2}^T] \quad (9)$$

$$= \frac{(\tau - 2)(\bar{F} + (d - 1)d\Delta)^2}{2\Delta(d - 1)d(\tau - 1)},$$

and differentiating $E[\tilde{R}]$ with respect to the fee \bar{F} , we get the first order condition for the optimal fee:

$$\frac{\partial E[\tilde{R}]}{\partial \bar{F}} = \frac{(\tau - 2)(\bar{F} + (d - 1)d\Delta)}{(d - 1)d\Delta(\tau - 1)} = 0. \quad (10)$$

Solving for \bar{F} , we receive the optimal fee \bar{F}^* :

$$\bar{F}^* = (1 - d)d\Delta. \quad (11)$$

The optimal fee corresponds to the maximum willingness to pay. Thus, it becomes obvious that tax authorities de facto choose a fee that is higher than taxpayers' willingness to pay for an ATR. Only a taxpayer who earns exactly a pre-audit net cashflow of $C = d\Delta$ would be indifferent to choosing an ATR and not doing so.

Theorem 1: Assume that the pre-audit net cashflows are distributed uniformly in the interval $[0, \Delta]$. Then, the optimal fee for an advance tax ruling is given by

$$\bar{F}^* = (1 - d)d\Delta.$$

When tax authorities offer advance tax rulings at this optimal fee, only taxpayers whose investment projects earn exactly a pre-audit net cashflow of $C = d\Delta$ are willing to request an advance tax ruling. Thus, the number of taxpayers that are likely to request an advance tax ruling is marginal. Note that these taxpayers will only be indifferent towards the ruling and would not be able to increase their return in the expected post-audit net cashflow terms via an advance tax ruling.

Two effects are crucial to why tax authorities are not able to take advantage of offering ATRs in the standard model, i.e., the so-called *real investment-revenue effect* and the so-called *advance tax ruling-revenue effect (ATR-revenue effect)*. To study these effects in detail, we first determine the lengths of the areas A , A_1 and A_2 .

$$\text{Length } A = \left(\frac{d\Delta - \bar{F}}{d} - \frac{\bar{F}}{1 - d} \right) = \frac{d\Delta(1 - d) - \bar{F}}{d(1 - d)}. \quad (12)$$

$$\text{Length } A_1 = \left(d\Delta - \frac{\bar{F}}{1 - d} \right) = \frac{d\Delta(1 - d) - \bar{F}}{1 - d}. \quad (13)$$

$$\text{Length } A_2 = \left(\frac{d\Delta - \bar{F}}{d} - d\Delta \right) = \frac{d\Delta(1 - d) - \bar{F}}{d}. \quad (14)$$

The complexity of these effects requires further elaboration. This analysis will provide further insights into the economic mechanism and support the underlying intuition.

V.1.1. Real Investment-Revenue Effect

The real investment-revenue effect refers to the tax associated with the pre-audit net cashflows $\frac{\tau}{1 - \tau} * C$. If the tax authority offers ATRs, it earns additional revenues in area A_1 from those investment projects that are realized with the probability $(1 - d)$. However, in area A_2 , the tax

authority loses revenues with the probability d from those investment projects that the taxpayer would have realized based on the expected post-audit net cashflows $E[\widetilde{C}^\Delta]$, but not in the case of a negative outcome of such a ruling. The probability p_{A_1} for the pre-audit net cashflows being additionally invested in area A_1 is

$$p_{A_1} = (1 - d) * \frac{1}{\Delta} * \frac{d\Delta(1 - d) - \bar{F}}{1 - d} = \frac{d\Delta(1 - d) - \bar{F}}{\Delta}, \quad (15)$$

and the probability p_{A_2} for the pre-audit net cashflows that are not realized anymore in area A_2 is

$$p_{A_2} = d * \frac{1}{\Delta} * \frac{d\Delta(1 - d) - \bar{F}}{d} = \frac{d\Delta(1 - d) - \bar{F}}{\Delta}. \quad (16)$$

When considering the probabilities in both areas, it becomes clear that the tax authority loses as many investment projects in area A_2 as it gains in area A_1 . Nevertheless, these effects do not balance each other because the after-tax net cashflows from the additional investment projects in area A_1 are smaller than the lost after-tax net cashflows in area A_2 , as are the expected tax revenues. The following theorem summarizes the result.

Theorem 1a: *Assume that the pre-audit net cashflows are distributed uniformly in the interval $[0, \Delta]$. Then, tax revenues associated with the pre-audit cashflow C decrease when tax authorities offer advance tax rulings because expected revenues from additionally realized investment projects are smaller than those from projects that are cancelled due to the ruling.*

Obviously, for small values of C , ATRs stimulate extra investment projects whenever the ruling is favorable for the investor. In contrast, investors will not conduct investments for high after-tax net cashflows if the ATR's outcome is unfavorable.¹²

V.1.2. Advance Tax Ruling-Revenue Effect

In addition to the tax revenues that the tax authority receives from the realized investment projects, they earn expected revenues from the fee $E[\widetilde{R}_A^F]$ for ATRs. By offering ATRs, they also

lose, in addition to the revenue loss addressed in eq. (16), tax revenues amounting to Δ in area A_2 because taxpayers cancel investments with disadvantageous tax consequences.

Whenever taxpayers request an ATR, the tax authority receives expected revenues from fees $E[\tilde{R}_A^F]$ in area A with

$$E[\tilde{R}_A^F] = \frac{1}{\Delta} * \bar{F} * \frac{d\Delta(1-d) - \bar{F}}{d(1-d)}. \quad (17)$$

Simultaneously, in the case of ATRs, the tax authority loses tax revenues of Δ for each investment that is no longer carried out in area A_2 with the probability d . The expected value of losing these tax revenues is

$$E[\tilde{R}_{A_2}^\Delta] = d\Delta * \frac{d\Delta(1-d) - \bar{F}}{d\Delta} = d\Delta(1-d) - \bar{F}. \quad (18)$$

Note that the highest possible fee is $\bar{F}^* = (1-d)d\Delta$, as derived in eq. (11). At higher fees, no taxpayer will request ATRs. Therefore, we can focus on fees \bar{F} with $\bar{F} \leq (1-d)d\Delta$. We obtain

$$\begin{aligned} E[\tilde{R}_A^F] &= \frac{1}{\Delta} * \bar{F} * \frac{d\Delta(1-d) - \bar{F}}{d(1-d)} \leq d(1-d) * \frac{d\Delta(1-d) - \bar{F}}{d(1-d)} \\ &= d\Delta(1-d) - \bar{F} = E[\tilde{R}_{A_2}^\Delta]. \end{aligned} \quad (19)$$

Therefore, it becomes obvious that the expected revenues from the fee $E[\tilde{R}_A^F]$ are generally smaller than expected reduction of tax revenues that are associated with Δ , that is, $E[\tilde{R}_{A_2}^\Delta]$. The following theorem summarizes this result.

Theorem 1b: *When offering advance tax rulings to all interested taxpayers, tax authorities are in expected value terms not able to generate more revenues from charging a fee than they lose due to the advance tax ruling-induced lost tax revenues Δ .*

The total effect from offering ATRs can be decomposed into two separate effects: the ones described in Theorem 1a and those in Theorem 1b. Because both effects are negative, it follows that by offering ATRs, the tax authorities cannot be better off than by not offering the ruling.

***Theorem 1c:** Assume that the pre-audit net cashflows are distributed uniformly in the interval $[0, \Delta]$. Then, there is no fee \bar{F} such that tax authorities strictly benefit from offering advance tax rulings.*

The above theorem recaptures Theorem 1. The optimal value in Theorem 1 is such that no taxpayer requests ATRs. This is equivalent to not offering ATRs at all.

Nevertheless, we can observe ATRs in reality. Against the background of this observation, Theorem 1c is unsatisfactory. Therefore, in the following, we integrate further details that may help to understand the puzzle. These settings might help to explain why ATRs are requested in practice, although based on our analysis, they do not offer any benefit to the involved parties.

V.2. Optimal Fee for Model Extensions

V.2.1 Ex Post Tax Audit Cost

Up to now, we have abstracted from ex-post tax audit costs that the tax authorities face when evaluating a tax case. In the following, we integrate audit costs and assume that these costs are reduced if investors use an ATR (similar to Beck et al. 2000: 248-249). This reduction of tax audit costs can be motivated as follows. To request ATRs, taxpayers need to precisely explain the tax issue and provide detailed descriptions of the situation and possible legal problems that are subject to the ruling. In contrast to the situation of an ordinary tax audit, in a ruling-free setting, the tax authorities receive more information about the tax issues. Therefore, they are able to assess and evaluate the tax case more quickly, which may lead to reduced tax audit costs.

We assume that the tax authority audits all tax issues and evaluates them correctly in cases without ATRs. Abstracting from tax evasion, the tax authority is able to reduce its tax audit costs whenever the investor receives an ATR. Therefore, in area A , the tax authority is able to save tax audit costs. We denote the size of the reduction in audit costs by P .

Because we want to conduct a relative comparison of the setting with and without ATRs, we can simply modify eq. (6). To determine the expected audit cost savings, we have to distinguish between the areas A_1 and A_2 . In area A_2 , audit cost reduction (P) resulting from requesting an ATR works as an additional fee because the investment has to be audited with or without the ruling. However, the additional investment projects that taxpayers carry out due to a positive outcome of the ATR in area A_1 evoke additional audit costs K . The costs K would not have occurred without the ruling and are of course also diminished by P due to the ATR. Table 2 illustrates the effects of the ruling on the audit costs.

	$C < d\Delta$ no investment without ruling	$C \geq d\Delta$
no ruling	0	$-K$
ruling	$-(K - P)$	$-(K - P)$
difference	$-(K - P)$	$+P$

Table 2. Effect of an ATR on audit costs, considering additional audit costs K and audit cost reduction P

Thus, the expected fee revenues can be modified to

$$E^{audit}[\tilde{R}_A^F] = \frac{1}{\Delta} * (\bar{F} - (K - P)) * \left(d\Delta - \frac{\bar{F}}{1 - d} \right) + \frac{1}{\Delta} * (\bar{F} + P) * \left(\frac{d\Delta - \bar{F}}{d} - d\Delta \right). \quad (20)$$

The presence of audit costs does not affect the expected additional tax revenues $E[\tilde{R}_{A_1}^T]$ and the lost tax revenues $E[\tilde{R}_{A_2}^T]$ (see eqs. (7) and (8)). Again, we are able to determine the optimal fee (\bar{F}_{audit}^*) from the respective first-order condition:

$$\bar{F}_{audit}^* = (1 - d)d\Delta + (dK - P)\left(1 - \frac{1}{2 - \tau}\right). \quad (21)$$

It is obvious that this fee is smaller than the one found in Theorem 1 given $P > dK$; that is, the saved audit costs P are greater than the additional audit costs multiplied with the probability d . In

this case, the tax authority offers a fee that at least some investors will accept. Thus, we describe a setting in which it is rational for both investors and the tax authority to participate in ATRs. The following theorem summarizes the result.

Theorem 2: *Assume that tax authorities' audit costs are reduced by $P > dK$ if investors ask for advance tax rulings. Then, the optimal fee is given by*

$$\bar{F}_{audit}^* = (1 - d)d\Delta + (dK - P)\left(1 - \frac{1}{2 - \tau}\right) \quad \text{with } \bar{F}_{audit}^* < \bar{F}^*.$$

To summarize, a reduction of tax audit costs increases the attractiveness of ATRs. Therefore, the tax authorities reduce the fee such that more investors request ATRs. We also want to emphasize that the reduction of the audit costs only affects the tax authorities' view and not the investors'. Therefore, it is not a zero-sum game.

V.2.2. Increased Attention to Ambiguous Tax Issues

In the case of an ATR, intensive documentation of all possibly ambiguous tax issues is required. Hence, close inspection (often performed by a specialist of the IRS) will take place, which by assumption certainly leads to the detection of unfavorable consequences (if any). By contrast, in the no-ruling case, the tax case is not necessarily audited ex post, since the tax authorities regularly only draw samples of tax issues to be audited in detail or the audit is performed by a non-specialist, who is most likely not aware of the inherent tax ambiguousness. Therefore, the fiscal authorities may want to incentivize taxpayers to request an ATR by setting a low fee and thus ensure that all tax issues are assessed accurately and any inconsistencies are detected upfront during the ATR audit. Consequently, in the case of an ATR, the tax authorities will always be aware of a tax problem (as in the previous subsections) which they possibly would not have detected otherwise.

This subsection hence addresses two issues that have been described as “strategic disadvantages of applying for an advance tax ruling” by Givati (2009), namely increased inspection and

detection risk for ATR applicants. Given a probability of an IRS inspection of the taxpayer's tax return of less than 1%, "by applying for an advance tax ruling the taxpayer increases the probability of inspection by the service from less than 1% to 100%" (increased inspection risk, Givati, 2009). Even if for large corporations the inspection risk is almost 100% "ex post auditors" may overlook the ambiguous issue unless an ATR "red flags" the ambiguous tax issue (increased detection risk, Givati, 2009).

To integrate this issue into our model, the probability that the tax issue in the no-ruling case is not audited or that the ambiguous tax issue is overlooked, is a . The following table summarizes the altered assumptions:

investor's decision to request ATR	ATR audit	investor's decision to invest	ex post audit	payoff	
ATR for a fee	favorable ($1 - d$)	invest	favorable	$C - \bar{F}$	
		not to invest	N/A	$-\bar{F}$	
	unfavorable (d)	invest	unfavorable	$C - \Delta - \bar{F}$	
		not to invest	N/A	$-\bar{F}$	
no ATR	N/A	invest	audit/detection ($1 - a$)	favorable ($1 - d$)	C
				unfavorable (d)	$C - \Delta$
			no audit/detection (a)		C
		not to invest	N/A		0

Table 3. Possible states of the investor's decision problem with increased inspection and detection risk

The expected post-audit net value without an ATR is

$$E[\widetilde{C}_a^{\Delta}] = a C + (1 - a)((1 - d)C + d(C - \Delta)). \quad (22)$$

With probability a , the tax authorities are not aware of the ambiguous tax issue, and the post-audit net cashflow is C . Otherwise, with probability $(1 - a)$, the expected post-audit net cashflow from eq. (1) will emerge. The expected post-audit net cashflow in the case of an ATR is identical to the one described in previous subsections, as tax ambiguousness will always be disclosed.

Again after equating the objective functions and solving for the maximum fee F_a^{max} we obtain

$$F_a^{max} = \begin{cases} C(1-d) & \text{for } d\Delta(1-a) \geq C \\ d(\Delta(1-a) - C) & \text{for } \Delta \geq C > d\Delta(1-a) \\ -ad\Delta & \text{otherwise.} \end{cases} \quad (23)$$

Obviously, the maximum fee has changed in comparison to our standard model. Figure 7 compares the maximum fee in the standard model with the model with inspection risk for $d := 0.6, a := 0.4$ and $\Delta := 10$.

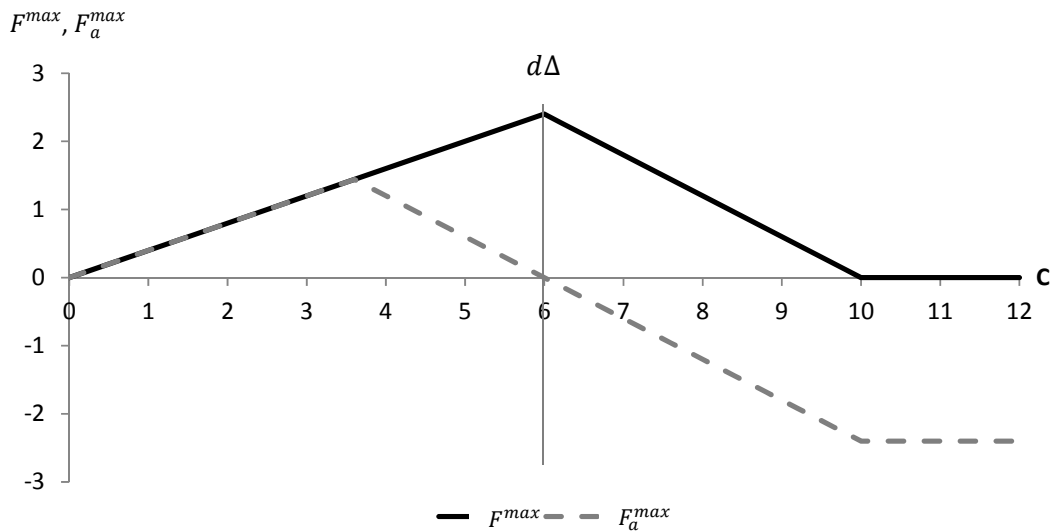


Figure 7. Comparison of the maximum fee in the standard model F^{max} and in the model with inspection risk F_a^{max}

One can see that for small net cashflows the maximum fee function remains unchanged after having integrated the inspection risk into the no-ruling scenario. The reason is that, without an ATR, these investments would not have been carried out. Therefore, these investments are not exposed to the benefits from more negligent tax inspections; that is, they are not able to benefit from the probability a . Only for higher net cashflows is the maximum fee affected by the inspection risk. The “laissez faire”-alternative is, compared to investments with an advance ruling, more attractive due to the possibility of not being audited in detail; therefore, the maximum fee for high net cashflows is lower and even takes negative values.

For the extended model with inspection risk for sufficiently large a , i.e., $a > 1 - d$, ATRs are only requested for $C \in [0; d\Delta)$, i.e., in the area in which in the “laissez-faire” scenario no investment would have been carried out. Then, there is no negative revenue effect in contrast to the setting described in eq. (8). No investment projects are lost when offering ATRs. Therefore, the tax authority’s expected revenues are given by

$$E^a[\tilde{R}_A^F] = \frac{1}{\Delta} * \bar{F} * \left(\frac{d\Delta - ad\Delta - \bar{F}}{d} - \frac{\bar{F}}{1-d} \right). \quad (24)$$

$$E^a[\tilde{R}_{A_1}^T] = \frac{1}{\Delta} * \left(\frac{d\Delta - ad\Delta - \bar{F}}{d} - \frac{\bar{F}}{1-d} \right) * \left((1-d) * \frac{1}{2} \left(\frac{\bar{F}}{1-d} + \frac{d\Delta - ad\Delta - \bar{F}}{d} \right) \frac{\tau}{1-\tau} \right). \quad (25)$$

We obtain the tax authorities’ optimum fee:

$$\bar{F}_a^* = (1-d)d\Delta(1-a) \frac{d-\tau}{2d-\tau}. \quad (26)$$

This fee is always lower than the maximum fee $F_a^{max} = (1-d)d\Delta(1-a)$ a taxpayer is willing to pay in this setting. To ensure positive fees, we have to postulate $\tau \leq d$. Otherwise, for higher tax rates ($\tau > d$), it is efficient for the tax authorities to set an optimal fee of zero. This is also due to the real investment effect, which outbalances the fee revenues for high tax rates.

Basically, the result that ATRs are offered also holds for the case in which the “new” maximum fee function has positive values for $C > d\Delta$ and thus for $a < (1-d)$. Because no additional insights will be gained, we will not elaborate this in detail.

Theorem 3: *Assume that there is a probability that indicates the possibility of not being audited in detail (or by experts), which exists only if no advance tax ruling is requested. In this case, the optimal fee for advance tax rulings is given by*

$$\bar{F}_a^* = (1-d)d\Delta(1-a) \frac{d-\tau}{2d-\tau}, \quad \text{where } \bar{F}_a^* < \bar{F}^* \text{ for } a > (1-d).$$

Hence, the fee \bar{F}_a^ is not cost-prohibitive such that the advance tax ruling will be requested by taxpayers and even can become zero.*

To summarize, the tax authorities' capability of increasing the detection probability as a consequence of an ATR increases the attractiveness of such rulings. Therefore, the tax authorities reduce, under certain circumstances, the fee such that more investors request ATRs.

V.2.3 Different Distribution of Net Cashflows

Until now we have assumed that net cashflows are distributed uniformly in the interval $[0, \Delta]$. Of course, our previous results crucially depend on this assumption and would change if the majority of projects lay, e.g., in the upper or lower area of the interval. For simplicity we adhere to the uniform distribution in the following, but change the boundaries of the interval to verify the robustness of our results in that respect. In the following we assume that all projects are equally distributed over the interval $[0, f]$.

Figure 8 exemplifies this setting graphically.

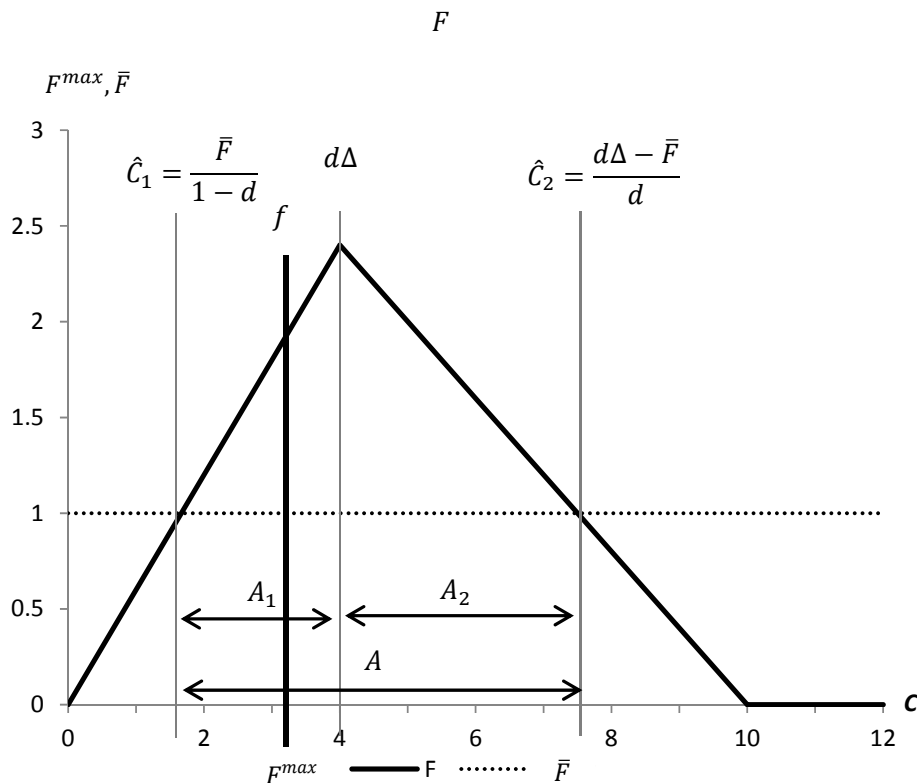


Figure 8. Comparison of the maximum fee F^{max} and the tax authority's fee \bar{F} for an ATR depending on the pre-audit net cashflow C considering the threshold f

We consider the case $\frac{\bar{F}}{1-d} < f \leq d\Delta$.¹³ Thus, only investors in the lower part of area A_1 will demand ATRs. Here, the tax authority receives expected revenues from the fee $E^f[\tilde{R}_A^F]$ of¹⁴

$$E^f[\tilde{R}_A^F] = \frac{1}{f} * \bar{F} * \left(f - \frac{\bar{F}}{1-d} \right). \quad (27)$$

The additional expected tax revenues due to extra investment caused by the increased certainty provided by the ATR (for low C) in area A_1 can be described by

$$E^f[\tilde{R}_{A_1}^T] = \frac{1}{f} * \left(f - \frac{\bar{F}}{1-d} \right) * \left((1-d) * \frac{1}{2} \left(\frac{\bar{F}}{1-d} + f \right) \frac{\tau}{1-\tau} \right). \quad (28)$$

The tax authority does not lose tax revenues by ATRs in area A_2 as there are no investment projects in this area. Thus, $E^f[\tilde{R}_{A_2}^T] = 0$.

The optimal fee \bar{F}_f^* in case of $\frac{\bar{F}}{1-d} < f \leq d\Delta$ is

$$\bar{F}_f^* = \frac{(1-d)f(1-\tau)}{2-\tau}. \quad (29)$$

Because the optimal fee in eq. (29) satisfies the previous assumption ($\frac{\bar{F}}{1-d} < f \leq d\Delta$), \bar{F}_f^* represents the optimal fee for all $f \leq d\Delta$.

Theorem 4: Assume that the investment projects are uniformly distributed over the interval $[0, f]$ with $f \leq d\Delta$. Then, the optimal fee equals

$$\bar{F}_f^* = \frac{(1-d)f(1-\tau)}{2-\tau}, \quad \text{where } \bar{F}_f^* < \bar{F}^*.$$

The optimal fee in Theorem 4 is strictly smaller than the one in Theorem 1. In contrast to the standard model, the tax authorities offer a fee that is accepted by investors. This is possible because there are no investors whose investment projects earn too high pre-audit net cashflows C for which the tax authorities would lose more tax revenues than they would gain by receiving the fee. The assumption that the investments' net cashflows (or at least the majority of the investments' net cashflows) lie below this threshold implies a considerably negative net cashflow

in the case of a disadvantageous tax treatment. This seems to be especially true in the case of tax avoidance investments. Therefore, contrary to revenue-maximizing, non-tax-haven countries, which would only offer ATRs in exchange for information or lower audit costs, tax havens may offer these rulings even if no such additional advantage were to result.

V. CONCLUSION

ATRs are commonly used by tax authorities to provide taxpayers with legal certainty regarding the tax burden that will emerge from intended investment projects. As tax uncertainty typically is negatively perceived ATRs promise to improve the tax environment for the investment. While investments in general are expected to contribute to economic growth and therefore are considered desirable there are specific tax-aggressive strategies that seem to benefit enormously from ATR.

Against this background we investigate under what conditions are ATR likely to effectively shield against tax risk and foster investments. We extend the existing literature on ATRs by integrating the investor's and the tax authority's perspectives simultaneously. Specifically, we analyze the attractiveness of offering ATRs to taxpayers. In general, tax authorities charge ATR fees and investors request ATRs if the fee does not exceed a certain threshold. Based on the maximum fee that risk neutral taxpayers are willing to pay for tax certainty, we determine the optimal fee that the tax authorities should set for an ATR. We demonstrate in the standard model with uniformly distributed future cashflows that, assuming maximization of tax revenues, the tax authorities will de facto choose a fee that is too high. Consequently, (most) taxpayers will refrain from applying for an ATR. Consequently, ATR supply is not met with ATR demand – despite a given high tax uncertainty.

By contrast, we identify settings that are likely to ensure not only positive revenues but also a benefit for the taxpayer. For example, ATRs become favorable when tax authorities are capable

of significantly reducing their tax audit costs or increasing the detection probability of ambiguous tax issues and set the ATR fee accordingly. Furthermore, tax authorities may reduce the ATR fee to attract more investments. ATRs could become particularly advantageous for both sides if the project's net cashflows are relatively small compared to the potential tax damage. These characteristics are often given for tax-aggressive investment strategies, which typically generate low pre-tax income and involve high tax risks. Moreover, our results offer tax authorities a first impression of the magnitude of the opportunity costs that countries that offer free rulings to tax-aggressive MNGs have to accept. Note that our model as a partial analytical approach does not have the power to draw conclusions on the aggregate level, including labor market and other effects.

To summarize, our findings are threefold. First, we find that even risk neutral investors will pay for tax certainty. Second, our results explain the enormous demand for rulings especially for tax-aggressive strategies and picture tax authorities' opportunity cost of offering ATRs free of charge to attract tax-aggressive foreign MNGs. Third, our results provide new explanations for why ATRs, even if the fee is rather low, are not as frequently requested by taxpayers with substantial investments as may be expected in settings with high tax uncertainty.

Our results are limited to settings with a tax-risky investment project and risk neutral investors. If we accounted for a risk averse investor, she might be willing to pay for certainty even in the case of high net cashflows under certain circumstances. Then, not only in the "Luxembourg" setting, but also for non-tax aggressive strategies ATRs could be an attractive way to resolve uncertainty and foster investment.

Our research may be a starting point for future research in this field. Our paper elaborates the theoretical foundation that is essential when planning to use ATR fees as a new measure for tax uncertainty in future empirical tests. Future research should also model the taxpayers' cost of preparing an ATR application; the cost of giving up valuable information, too, should be integrated into the model. Both cost categories gain importance in the course of the BEPS project

and in practice may even exceed the ATR fee in magnitude. Moreover, the model should be extended with respect to timing costs.

We believe our model also has testable empirical implications, such as the implication that ATRs are more frequently requested for investment projects that are characterized by small expected cashflows. Further research should also test the hypothesis that ATRs are offered and requested more frequently if the tax authorities are able to effectively exploit the extra information provided by taxpayers during the ATR process to either reduce costs or increase revenues directly.

NOTES

¹ Slemrod and Yitzhaki (2002) point out that revenue maximization is a common assumption in the literature (see, e.g., p. 1452) but suggest that revenue maximization is suboptimal from a normative standpoint under societal utility maximization. We abstract from these long-term effects and concentrate on ATR settings that are potentially able to increase public revenues.

² See Starkman (2010: 21), Inland Revenue Authority of Singapore (2013), South African Revenue Service (2013), Canadian Revenue Agency (2014: 4).

³ See § 89 Abgabenordnung (German General Tax Code) and § 34 Gerichtskostengesetz (German Court Fees Act).

⁴ See § 189 Bundesabgabenordnung (Austrian General Tax Code), KPMG (2014).

⁵ FIN 48 reserves are required when a firm is uncertain as to whether its tax positions may lead to an additional tax payment as a consequence of a future tax audit, settlement, or lawsuit because tax authorities do not agree to the tax benefits originally claimed. Unrecognized tax benefits (UTBs) must be reported in the financial statement notes and reflect a conditional liability due to tax benefits that are related to open tax positions according to FIN 48. See, e.g., Mills et al. (2010) and Lisowsky et al. (2013).

⁶ Similar to Mills et al. (2010: 1726), who also give an example for the discrete nature of tax disputes.

⁷ Tax disputes typically focus on operating expenses or accruals (e.g. depreciation allowances). The tax damage Δ can be determined by comparing the net cashflow of both options (full/partial deduction of I): $\Delta = (CF - I)(1 - \tau) - ((CF - I) - \tau(CF - (1 - \delta)I)) = I * \delta * \tau$.

⁸ While C results from offsetting taxable earnings against tax-deductible expenses and accruals, tax disputes typically focus on operating expenses or accruals (e.g., depreciation allowances). Such that, e.g., for $C = 0$ a huge tax damage may arise. Obviously, Δ is usually not a function of C .

⁹ Although, the fee for an ATR in most countries is or will be tax-deductible, it is not necessary to model this deductibility explicitly. The fee \bar{F} can be interpreted as a net fee for the taxpayer (gross fee net of tax savings resulting from tax deductibility) and net revenues for the tax authorities (net of lost revenues due to the deductibility of the fee).

¹⁰ Implicitly we assume that the probability of a negative outcome of the advance tax ruling is the same as the probability of a negative interpretation of the tax code in a setting without advance tax rulings.

¹¹ This tax ambiguity can be operationalized by FIN 48 reserves. Cf., e.g., Lisowsky et al. (2013).

¹² The ex-ante probability of losing cashflows due to fewer investments equals the one of additional cashflows due to more investment. This result crucially depends on the assumption that C is uniformly distributed.

¹³ For simplicity we only consider the case of an upper border f that is smaller than $d\Delta$.

¹⁴ See also eq. (6).

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